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The Education University
of Hong Kong

ICLT2025

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on Learning and Teaching

Learning and Teaching for Future Readiness

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Conference Proceedings

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International Conference on Learning and Teaching 2025 (ICLT 2025)

Conference Proceedings

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1. Message from the Conference Organisers

The International Conference on Learning and Teaching 2025 (ICLT 2025) organised by The Education University of Hong Kong (EdUHK) took place both virtually and physically from 21 to 23 May 2025. The Conference is positioned to take place at a significant time for the education sector, when the unprecedented advancements in technologies are combining their impact to fuel fundamental changes. The Conference comprises keynote speeches by internationally renowned scholars, symposium cum workshop, and paper presentations. It provides an interactive platform for academics, researchers, practitioners and professionals in the education sector to share innovative learning and teaching approaches in higher education, and exchange of good practices in learning and teaching in school education.

ICLT 2025 featured five keynote speeches, one symposium and 27 paper presentation sessions. Embracing a hybrid format, ICLT provides an interactive platform for academics, researchers, practitioners, and professionals in higher education and K-12 sectors to exchange innovative approaches to learning and teaching.

The theme of this year's conference, "Learning and Teaching for Future Readiness", allows scholars to consolidate and reflect on the lessons learned and to find a way forward. The conference focuses on five key strands. These diverse themes attracted a significant number of participants.

- AI, Metaverse and STEAM Education
- Virtual and Blended Teaching and Learning
- New Humanities Education
- Values Education, Teacher Conduct and Well-being
- Educational Leadership and Curriculum Development for the Future
- Other Topics Related to Learning, Teaching and Assessment

This year we have the privilege of welcoming speakers and participants both in person and online. We have invited five renowned experts as keynote speakers. They are:

- Professor DENG Zongyi, Professor of Institute of Education – Curriculum, Pedagogy and Assessment, University College London, UK
- Professor HONG Ji, Professor of Department of Educational Psychology, Director of Quality Teacher Educational Advancement and Collaborative Hub (QTEACH), University of Arizona, US
- Professor William STRAW, Professor of Department of Art History and Communication Studies, McGill University, Canada
- Professor YU Shengquan, Professor of School of Education Technology, Director of Advanced Innovation Center for Future Education, Beijing Normal University, Beijing, China
- Professor LIM Cher Ping, Chair Professor of Learning Technologies and Innovation, Co-Director of Global Institute for Emerging Technologies, The Education University of Hong Kong, Hong Kong

ICLT 2025 calls for papers from scholars around the world. This year, the Conference received more than 200 submissions by 363 authors from mainland China, Hong Kong, Indonesia, United States, Viet Nam, Australia, Russia, France, Macao, Japan, Canada,

Malaysia, Nigeria, Singapore, South Korea and some other regions. Table 1 shows the statistics of regions of the authors.

Table 1. Statistics of regions of ICLT 2025 authors

Regions/ Countries	No. of Authors	Regions/ Countries	No. of Authors
Hong Kong	192	Singapore	3
Mainland China	91	Canada	2
Indonesia	19	New Zealand	2
United States	10	United Arab Emirates	2
Viet Nam	9	Finland	1
Australia	7	Japan	1
Russia	6	Malaysia	1
Taiwan	5	South Korea	1
France	3	Thailand	1
Macao	3	United Kingdom	1
Nigeria	3	Total	363

Each submission underwent a thorough review process, with a minimum of three programme committee members assigned to review each paper during the first round. The results of these reviews were then subjected to meta-review by the chair and co-chairs of the corresponding strand. Following this rigorous evaluation, a total of 162 papers were accepted for presentation at ICLT 2025 (please refer to Table 2).

Table 2. Statistics of paper acceptance of each strand in ICLT 2025

Strand	Submissions	Accepted	Acceptance Rate
AI, Metaverse and STEAM Education	60	44	73%
Virtual and Blended Teaching and Learning	24	19	79%
New Humanities Education	13	10	77%
Values Education, Teacher Conduct and Well-being	29	22	76%
Educational Leadership and Curriculum Development for the Future	22	16	73%
Other Topics Related to Learning, Teaching and Assessment	72	51	71%
Total	220	162	74%

We would like to extend our heartfelt appreciation to the dedicated and hardworking strand coordinators, namely Professor KONG Siu Cheung, Professor SONG Yanjie, Professor ERNI John Nguyet, Professor CHEN Junjun, Professor Bruce MACFARLANE, Dr HUANG Xianhan Yvonne, Dr Sedat GÜMÜŞ, and Professor YEUNG Siu Sze Susanna. They played a vital role in coordinating the review process for more than 200 abstracts and full papers submitted to ICLT 2025. Their meticulous efforts ensured a fair and comprehensive assessment of the submissions. Our

gratitude also extends to the programme committee members who diligently reviewed and provided valuable comments on the submitted papers. Their expertise and insights significantly contributed to the selection of high-quality papers for presentation at the Conference.

The success of ICLT 2025 would not have been possible without the collective contributions of the strand coordinators and programme committee members. We appreciate their commitment to maintaining the highest standards of academic excellence in the review process. Our heartfelt gratitude goes to the organising committee, composed by colleagues from Centre for Learning, Teaching and Technology, Faculty of Education and Human Development, Faculty of Humanities, Faculty of Liberal Arts and Social Sciences, and Graduate School, which makes ICLT 2025 a great success.

We will continue to organise the “International Conference on Learning and Teaching 2026 (ICLT 2026)” in May 2026 and more new strands will be included. We sincerely hope that our Conference will bring inspirations and a magnificent experience to all the online or physically attending participants. We look forward to meet you again next year.

Thank you very much.

Dr CHENG Kwok Shing Gary
Programme Committee Chairperson

Professor XU Guandong
Conference Co-Chairperson

Professor CHENG May Hung May
Conference Chairperson

International Conference on Learning and Teaching 2025

2. Organising Committee

Chairperson



Professor CHENG May Hung May
Vice President (Academic),
Chair Professor of Teacher Education,
The Education University of Hong Kong

Co-Chairperson



Professor XU Guandong
Director of Centre for Learning, Teaching and Technology,
Director of University Research Facility of Data Science and Artificial
Intelligence,
Chair Professor of Artificial Intelligence,
The Education University of Hong Kong

Members



Dr CHENG Kwok Shing Gary
Executive Co-Director of Centre for Learning, Teaching and
Technology,
Associate Professor of Department of Mathematics and Information
Technology,
The Education University of Hong Kong



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The Education University of Hong Kong



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3. Keynotes

Keynote 1 - Cognitive Outsourcing Based on Generative Artificial Intelligence: An Analysis of Interactive Behavioural Patterns and Cognitive Structural Features

AI, Metaverse and STEAM Education

Speaker



Professor YU Shengquan

Professor of School of Education Technology
Director of Advanced Innovation Center for Future Education
Beijing Normal University, Beijing, China

Abstract

Humans improve the efficiency and quality of task completion by outsourcing part of the cognitive task to external generative AI technologies, but the effectiveness of cognitive outsourcing varies from person to person. In order to reveal the key features and intrinsic requirements of effective cognitive outsourcing, this study designed a cognitive outsourcing activity for graduate students, in which participants wrote open-ended thematic essays with the assistance of a generative AI system, and were categorized into high-performing and low-performing groups based on their essay scores. Differential analysis of the knowledge pre-test revealed that the high-performing group had significantly higher levels of prior domain knowledge than the low-performing group. Through Lag Sequential Analysis and Epistemic Network Analysis of the interaction process data, it was found that the two groups differed in their interaction behavior patterns and cognitive structure characteristics: the behavioral transitions of the high-performance group were more diversified, resulting in the formation of “fast and autonomous task comprehension and planning---efficient and precise human-computer interaction---selective extraction and in-depth processing”. The cognitive structure of the high-performing group was more balanced and complete, as evidenced by the relatively diverse and strong associations between levels in the interaction, whereas the cognitive structure of the low-performing group was relatively unbalanced and loose, as evidenced by the bias toward lower cognitive level content in the interaction and the relatively single and weak associations between levels. Taken together, effective cognitive outsourcing is a complex process of active participation and in-depth processing by individuals in cognitive activities, which requires the balance of internal and external cognitive networks and the establishment of effective connections.

Biography

Shengquan Yu is a Jingshi Distinguished Professor in Beijing Normal University, Director of Advanced Innovation Center for Future Education, Director of the Joint Laboratory for Mobile Learning, Ministry of Education-China Mobile Communications Corporation. He was selected for the Ministry of Education's New Century Excellent Talent Support Program and National-Level Candidates of the "Hundred-Thousand-Ten Thousand Talents Project", and was awarded the honorary title of "Young and Middle-aged Experts with Outstanding Contributions" by the Ministry of Human Resources and Social Security, and was granted a special government allowance by the State Council.

He has published more than 300 academic papers in Chinese and English academic journals, 7 monographs, 1 ISO international standard, 23 authorized patents, presided over more than 100 projects such as the National Key Research and Development Program, the Ministry of Education's Philosophy and Social Science Major Projects, the State Language Commission's Major Projects, and the Natural Science Foundation, etc. He has organized the development of the Smart Learning Partner Platform, the "Listening to Textbooks" Intelligent Teaching Research Platform, the Evidence Based PBL Platform, the "Good Teacher" Open Tutoring Platform, the Sanyu Smart Reading Platform, the Problem Solving Ability Assessment Platform, and the Learning Cell Community Platform, 4A network teaching platform and other large-scale application systems.

Major academic adjuncts include: Deputy Director of the National Basic Education Informatization Teaching Steering Committee, member of the Expert Committee on Pilot Demonstration of Smart Education of the Ministry of Education, expert of the Pilot Steering Group of the Ministry of Education's Artificial Intelligence-aided Teachers Building Action, member of the Academic Committee of the Chinese Society of Education, member of the Academic Committee of the Chinese Society for Educational Development Strategies, member of the Academic Committee of the Chinese Academy of Educational Policy. Vice Chairman of Education Standards Committee of China Society for Educational Development Strategy, Vice Chairman of Modern Educational Technology Branch of China Electronics Society, Member of Academic Committee of Key Laboratory of Data Science and Intelligent Education of the Ministry of Education, Member of Academic Committee of Key Laboratory of Publishing Convergence Development of the State Press and Publication Administration, Member of Academic Committee of Key Laboratory of Digital Educational Publishing Technology and Standards of the State Press and Publication Administration.

His main research interests include artificial intelligence educational applications, mobile education and ubiquitous learning, regional education informatization, and information technology and curriculum integration, etc.

Keynote 2 - Rethinking Virtual and Blended Teaching and Learning: Towards Education Equity, Quality and Efficiency

Virtual and Blended Teaching and Learning

Speaker



Professor LIM Cher Ping

Chair Professor of Learning Technologies and Innovation
Co-Director of Global Institute for Emerging Technologies
The Education University of Hong Kong

Abstract

Virtual and blended teaching and learning have often focused on how emerging technologies provide schools and teachers with the opportunities to better engage students and improve their learning outcomes. Although efforts have been made for virtual and blended teaching and learning to address education quality gaps between schools and within schools, more attention has to be focused on how these efforts could be localised and customised to enhance equitable quality and efficiency. The localisation will require the capacity building of the education workforce, formulation of supporting policies and mechanisms, differentiation of infrastructure, hardware and resource mobilisation, and establishment of sustainable partnerships. This presentation examines how the localisation of virtual and blended teaching and learning enhances education equity, quality and efficiency.

Biography

LIM Cher Ping is a Chair Professor of Learning Technologies and Innovation, and the Co-Director of the Global Institute for Emerging Technologies at The Education University of Hong Kong. He is also a Visiting Professor at the UNESCO International Centre for Higher Education Innovations. He has served for more than a decade as the Editor-in-Chief of The Internet and Higher Education, and is now its Advisory Editor. Over the last 20 years, he has engaged major education stakeholders at the national and international levels as his research and development partners for enhancing equity, quality and efficiency in the education sector enabled by emerging technologies.

Keynote 3 - Relationality and Pedagogy in the Cultural Disciplines

New Humanities Education

Speaker



Professor William STRAW

Professor, Department of Art History and Communication Studies
McGill University, Canada

Abstract

My paper will reflect on 40 years of full-time teaching in the areas of Film and Communications Studies. I began teaching committed to developing, in each student, a “critical” attitude to media. I moved in later years to a concern with the ways in which students interact with each other in the collective production of knowledge. This shift was prompted by two realizations. The first is that critical approaches to media are to be found everywhere now – they are built into the structure of so many media or, at the very least, into the protocols and habits by which people use them. The second realization was that I was more and more committed to a “relational” turn in my own pedagogy – one that, like a “relational aesthetics” turn in art, sees its principal purpose as that of shaping the social relations within which texts and cultural works are received.

Biography

Will Straw is James McGill Emeritus Professor of Urban Media Studies at McGill University in Montreal. He is a past President of the Canadian Communications Association and a recipient of the David Thomson Award for Graduate Teaching and Supervision at McGill University. Dr Straw is the author of *Cyanide and Sin: Visualizing Crime in 1950s America* (2006) and of the forthcoming *Nights in Fairyland: Gossip, blackmail and the many lives of Broadway Brevities* (Autumn, 2025). He is the author of over 200 articles on film, media, music and cities, and co-editor of over 20 volumes, including *Circulation and the City*, *Formes Urbaines*, *Night Studies* and the forthcoming *Routledge Handbook of the Night Time Economy*. Dr Straw’s current research and public engagement centre on the night-time culture of cities and the ways in which this culture is governed, practiced and represented.

Keynote 4 - Rethinking 21st-Century Competencies and Curriculum

Translation:

Insights from Bildung-Centred and Subject-Matter Didaktik

Educational Leadership and Curriculum Development for the Future

Speaker



Professor DENG Zongyi

Professor, Institute of Education - Curriculum
Pedagogy and Assessment
University College London, UK

Abstract

There is a substantial body of literature from Asian researchers discussing the recontextualization of 21st-century competencies into educational goals, implementation plans, and classroom teaching across Asian contexts. However, the underlying assumptions and processes of translating these competencies into the curriculum have received little scrutiny. In this presentation I examine how 21st-century competencies are recontextualised into educational aims and translated into the national curriculum in Singapore. In doing so, I question the competency discourse underpinning the global competency movement and its translation into curricula. Drawing on Bildung-centred Didaktik and subject-matter Didaktik, I propose an alternative, viable approach to conceptualising and translating competencies into curriculum and classroom teaching.

Biography

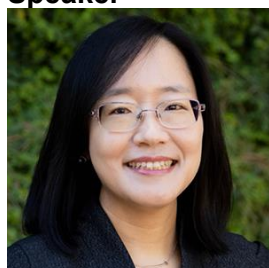
Zongyi Deng is a Professor of Curriculum and Pedagogy at the Institute of Education (IOE), University College London. He serves as an executive editor of the Journal of Curriculum Studies (JCS) and has previously held faculty positions at Nanyang Technological University and the University of Hong Kong. His research interests encompass curriculum content and subject matter, curriculum theory, didactics (Didaktik), curriculum policy and reform, as well as comparative and international education.

Professor Deng is a sought-after keynote and plenary speaker at international conferences and has served as an international adviser and consultant for projects and research centres in China, the UK, Canada, Sweden, and Denmark. He is currently a panel member for the Curriculum and Assessment Review in England.

Keynote 5 - Reconceptualizing Teacher Identity in Changing and Challenging Context

Values Education, Teacher Conduct and Well-being

Speaker



Professor HONG Ji

Professor, Department of Educational Psychology
Director, Quality Teacher Educational Advancement and Collaborative Hub (QTEACH)
University of Arizona, US

Abstract

Teacher identity has been considered important in understanding teachers' motivation, wellbeing, effectiveness, and retention. However, despite its significance, existing theories tend to be limited to articulating their identity negotiation in relation to changing and challenging contexts. The current educational landscape is unjust and demanding in that the societal structure and norms disproportionately disadvantage marginalized students and teachers. In addition, neoliberal policies, which prioritize productivity and competitiveness, permeate the educational landscape. These changing and challenging contexts often influence professional community standards and expectations of who teachers should be and what their roles should entail. Thus, it is important to reconceptualize teacher identity by intentionally exploring identity negotiation through teachers' interpretive lenses, while attending to social-cultural-historical context. In this presentation, I will discuss the theoretical reconceptualization of teacher identity in relation to the multiple identities teachers hold and the complexity of the multilayered contexts in which they work, supported by research findings.

Biography

Ji Hong is a Professor in the Department of Educational Psychology at the University of Arizona in the U.S. She received her B.A. from Seoul National University in South Korea, M.A. from Arizona State University, and Ph.D. from University of Georgia. Her research mainly addresses the training and development of pre-service and in-service teachers, through the lens of teacher identity, motivation, and emotion. Within this broad goal, she specifically investigates marginalized teachers' work and lives embedded in social-cultural-historical contexts. Her current project examines multiple marginalized teachers' intersecting social identity negotiation and their connection to teacher identity, agency, and wellbeing. She is a director of Quality Teacher Educational Advancement and Collaborative Hub (QTEACH), and serves as an editorial board member for *Teachers and Teaching: Theory and Practice*, *Journal of Experimental Education*, and *Contemporary Educational Psychology*.

4. Symposium

EdUHK x EdCity

Symposium cum Workshop on Empowering Future Readiness through Transformative AI Innovations in Learning and Teaching

Objective: The symposium and workshop aim to harness advanced AI technologies to enhance educational practices and outcomes. This event will serve as a collaborative platform for various educational stakeholders, including higher education institutions, primary and secondary schools, and industry partners, to drive the development and implementation of AI-driven solutions in education. By utilizing reasoning Large Language Models (LLMs), we seek to empower educators to leverage AI tools for fostering innovation and enriching the overall learning and teaching experience.

Language: Cantonese supplemented with English

Time	Activity
2:00 – 2:15 pm	Registration
2:15 – 2:30 pm	Opening
2:30 – 3:15 pm (45 min)	Opening and Seminar 1 by Professor YU Leung Ho Philip Professor at the Department of Mathematics and Information Technology; Associate Director of University Research Facility of Data Science and Artificial Intelligence, The Education University of Hong Kong
3:15 – 3:25 pm	Break
3:25 – 4:10 pm (45 min)	Workshop by Mr HONG Tsz Lam Samuel Lecturer at Centre for Learning, Teaching and Technology, The Education University of Hong Kong
4:10 – 4:20 pm	Break
4:20 – 5:05 pm (45 min)	Seminar 2 by Professor KONG Siu Cheung Research Chair Professor of E-Learning and Digital Competency at the Department of Mathematics and Information Technology; Director of Artificial Intelligence and Digital Competency Education Centre, The Education University of Hong Kong
5:05 – 5:15 pm	Closing Ceremony

香港教育大學 x 香港教育城

「裝備未來：利用人工智能創新賦能學與教」研討會及工作坊

簡介：本次研討會及工作坊旨在利用先進的人工智能技術來提升教育實踐和成果。此活動將作為一個協作平台，匯聚高等教育機構、中小學、以及相關產業等多元教育夥伴，共同推動人工智能驅動的教育解決方案之發展與實施。透過運用推理大型語言模型 (LLMs)，我們希望賦能教育工作者利用人工智能工具促進創新，並豐富整體的學習和教學體驗。

語言：廣東話附以英語

節目安排

2:15 – 2:30 pm	啟動
2:30 – 3:15 pm	講座一：生成式人工智能的創新教學應用 楊良河教授 香港教育大學數學與資訊科技學系教授 香港教育大學數據科學與人工智能中心實驗室副總監
3:15 – 3:25 pm	小息
3:25 – 4:10 pm	工作坊: 化 AI 為友——AI 互動教材設計工作坊 洪子霖先生 香港教育大學教學科技中心講師
4:10 – 4:20 pm	小息
4:20 – 5:05 pm	講座二：應對生成式人工智能融入中小學教育的挑戰 江紹祥教授 香港教育大學數學與資訊科技學系 電子學習與數碼能力研究講座教授 香港教育大學人工智能及數碼能力教育中心總監
5:05 – 5:15 pm	閉幕

講座一：生成式人工智能的創新教學應用

講者



楊良河教授

香港教育大學數學與資訊科技學系教授

香港教育大學數據科學與人工智能中心實驗室副總監

摘要

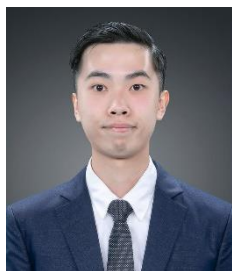
釋放生成式人工智能的潛力，提升老師們的教學水準，助力學生成功！本次講座將分享兩個具體的創新應用：(一)基於多模態人工智能的自主語言學習；(二)基於生成式人工智能的教學視頻自動合成。創新應用一：當學生觀察和描寫常見事物與情境時，我們利用多模態人工智能模型分析視覺圖像，自動生成詞彙、句子、對話等學習內容。同時，系統對學生的回答進行即時評價並提供反饋，從而通過人機交互的方式幫助學生自主提升英文寫作能力。創新應用二：我們根據老師的教學課件、個人頭像和語音，運用生成式人工智能技術生成講解腳本、教師頭像及各種評估練習，進而自動合成互動式學習視頻，幫助教師輕鬆開展混合式教學。

個人簡介

楊良河教授是香港教育大學數學與資訊科技學系教授，並擔任數據科學與人工智能中心實驗室副總監。他目前是國際統計計算協會執行委員會委員，曾任該協會亞洲區分會主席、香港統計學會副會長，以及 IEEE 計算智能學會計算金融與經濟學技術委員會委員。他的近期研究方向包括偏好學習、時間序列分析、多模態人工智能及其在教育 and 醫療中的應用。楊教授擁有超過 150 多篇學術著作和兩本研究專著，並獲得多項國際發明獎。

工作坊：化 AI 為友：AI 互動教材設計工作坊

講者



洪子霖先生

香港教育大學教學科技中心講師

摘要

教師常面臨備課時間不足、教材設計耗時，以及難以兼顧學生互動需求的挑戰。本工作坊將示範如何透過 Poe 提示詞機器人和 Canvas 應用程式，快速打造互動教學素材。您將學會：(1) 運用精準提問技巧，讓 Poe 自動生成選擇題，情境式問答，解決構思題目的困擾；(2) 將教學內容轉化為視覺化教材，如簡易教學網站；(3) 設計跨學科互動遊戲框架，提升學生參與度。無需複雜技術，從基礎到進階，適合所有的教師。

個人簡介

洪子霖先生現任香港教育大學教學科技中心講師，專研人工智能與數位素養領域，並精於大數據分析及運算技術。在教學方面表現卓越，加入香港教育大學前，曾連續兩年獲頒香港都會大學卓越教學獎殊榮。洪先生積極推動人工智能教育應用，致力於香港各教育機構推廣多元 AI 工具，協助教師提升教學成效。

講座二：應對生成式人工智能融入中小學教育的挑戰

講者



江紹祥教授

香港教育大學

數學與資訊科技學系電子學習與數碼能力研究講座教授

香港教育大學人工智能及數碼能力教育中心總監

摘要

傳統教育強調引導學生探究、提問、整合資訊並建立知識體系。然而，以大型語言模型為基礎的生成式人工智能工具，其運作模式與此存在顯著差異。這些工具不再僅僅提供資訊，而是能針對具體問題直接生成看似完整的答案，無論是文字還是圖像。這種「答案導向」的回應方式，雖然便捷高效，卻也潛藏著削弱學生自主思考與探究能力的風險。生成式人工智能工具的普及，教育工作正迎來前所未有的變革與挑戰。如何將這些技術有效融入中小學教育體系，既能利用其優勢促進學習，又不至於削弱學生核心能力的培養，已成為當代教育工作者必須深思的關鍵議題。教育工作者需要創設一個能鼓勵並保障學生有充分思考空間的環境，提供機會讓學生根據自身的學習情境與需求提出問題、尋找答案。我們需要培養學生不僅懂得使用生成式人工智能，更能理解生成式人工智能、批判生成式人工智能，並最終藉助生成式人工智能成為更具熱情、更具獨立思考能力的終身學習者。為了應對上述挑戰，以學生長遠發展為核心，圍繞「認識科技」、「應用科技」與「發展元認知」三個維度，構建系統性的人工智能教育框架。

個人簡介

江紹祥教授現為香港教育大學數學與資訊科技學系的研究講座教授，並擔任人工智能及數碼能力教育中心總監。江教授目前擔任國際期刊《Research and Practice in Technology Enhanced Learning (RPTEL)》和《Journal of Computers in Education (JCE)》的主編。江教授在二零一九年至二零二四年皆入選美國史丹福大學教育領域的全球首 2%科學家名單。江教授現正領導數個為期共八年（二零二零年至二零二七年）的人工智能普及認知教育項目，涵蓋香港及法國的高小及初中生、香港的高中學生、大學生、中小學教師及家長和在職行政人員。他是香港教育大學高級管理專業人員人工智能理學碩士 [MSc(AIEP)] 課程負責人。

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Strand

AI, Metaverse and STEAM Education

人工智能、元宇宙及 STEAM 教育

Leveraging Retrieval Augmented Generation to Assess and Enhance Course

Content and Design for Sustainable Development Goals in Higher Education

Jiaxin CAO¹, Jiaoyang DING², Yunsu Tina MA³, Gary CHENG⁴, Guandong XU^{5*}

^{1,2,3,4,5}Centre for Learning, Teaching and Technology, The Education University of Hong Kong, Hong Kong SAR, China
jxcao@eduhk.hk, djiaoyang@eduhk.hk, yma@eduhk.hk, chengks@eduhk.hk, gdxu@eduhk.hk

ABSTRACT

This research employs a Large Language Model (LLM)-powered tool that adopts the Retrieval Augmented Generation (RAG) strategy to access and enhance the course content as well as the design of related learning and teaching (LT) activities for promoting and achieving Sustainable Development Goals (SDGs). The integration of SDGs into course design and activities may raise students' awareness of sustainability, inspiring them to set up learning goals and career paths that contribute to the SDGs and global wellbeing across economic, social, and environmental domains. Given a large number of courses offered by a higher education institution, manually stocktaking and reviewing relevant SDG contents in existing LT materials proves to be time-consuming and labor-intensive, which hinders efficiency and the effectiveness of quality assurance and improvement. With the latest development of LLM and RAG, the current study introduces retrieval-based models to enhance the quality of LLM-generated texts by supplementing it with potentially relevant information from provided datasets. The development of the tool involves three main phases: (1) producing the SDG-enhanced course datasets, (2) deploying RAG, and (3) conducting the Proof of Concept (PoC) testing. A total of 431 SDG-enhanced LT activities from 145 courses were used as datasets in the PoC. These datasets were embedded and vectorised on a Model-as-a-Service (MaaS) platform to facilitate RAG by various LLMs. The PoC test demonstrated that the tool could produce more detailed and relevant outputs aligned with the provided datasets. The developed tool will be further deployed in real settings to collect more user feedback.

KEYWORDS

Learning and teaching, Sustainable Development Goals (SDG), Large Language Models (LLM), Retrieval Augmented Generation (RAG), higher education

Blended Learning with GenAI Technology in K-12 English Language Education: Emotions and Motivation

Alex Lap-kwan LAM

Department of Curriculum and Instruction, The Education University of Hong Kong, Hong Kong SAR, China
alklam@eduhk.hk

ABSTRACT

This presentation explores the integration of Image Generative AI and Blended Learning in teaching English writing among K-12 education. Traditionally, writing tasks posed challenges, often resulting in low enjoyment and increased boredom. By incorporating image GenAI technology, which converts students' text into matching images, and Blended Learning methods (pre-writing tasks with tutorial videos, Padlet for GenAI sharing, and interactive video sharing on Flip), the teaching package significantly enhanced students' enjoyment and reduced their boredom. The presentation is based on a small study conducted in Grade 3 (n=32) in a local school, which assessed the differences of emotions and motivation through Foreign Language Enjoyment (FLE) and Foreign language Learning Boredom (FLLB), which are critical emotional aspects influencing learning. Personalised feedback from peers, along with Assessment as Learning (AaL) strategies like self and peer evaluations, further supported metacognition and self-directed learning. This approach aligns with the idea that when students find assignments tailored to their needs and preferences, they are more likely to invest time and effort, thereby reducing boredom and increasing enjoyment. Through a survey, classroom observations and students' end products, notable improvements were observed in writing performance and emotional aspect. The presentation will delve into how these innovative teaching methods and emotional factors, such as FLE and FLLB, drove these positive outcomes. It will offer insights into the transformative potential of combining GenAI and Blended Learning to create a more enjoyable and less monotonous learning experience for K-12 English language learners.

KEYWORDS

Generative Artificial Intelligence, Image GenAI, Blended Learning, English as Foreign Language writing

Integrating Drama into Steam Education: Enhancing Engagement, Understanding, and Creativity through the ‘Chang’e Runs to the Moon’ Program

Yaxin HU

Hong Kong Metropolitan University, Hong Kong SAR, China

Wuhan City Polytechnic, Hubei, China

s1350034@live.hkmu.edu.hk

Abstract: *This study examines the innovative integration of drama teaching into STEAM education through the case study of the themed activity, Chang’e Flies to the Moon. By incorporating activities such as role-playing, situational simulations, scientific inquiry, engineering design, artistic creation, and mathematical application, the study demonstrates how drama can enhance students’ interest, engagement, understanding, and creativity. Through classroom observations and analysis of student work, the research evaluates the positive effects of drama teaching on students’ interdisciplinary skills, highlighting its capacity to foster creativity, critical thinking, and collaboration. Additionally, the findings reveal the potential of drama to inspire students’ sense of patriotism and social responsibility within the STEAM framework.*

The study underscores how drama teaching enriches the delivery of STEAM education, providing meaningful support for interdisciplinary learning and promoting students’ overall literacy. Based on these findings, the paper advocates for the broader adoption of drama teaching in STEAM programs. By doing so, educators and policymakers can advance innovative educational practices and foster the diversified development of 21st-century competencies among learners. This research contributes to the growing discourse on integrating arts into STEAM, offering valuable insights into how creative approaches can enhance holistic education.

Keywords: drama teaching, STEAM education, interdisciplinary skills, creativity

1. Introduction

Globalization and technological progress pose challenges to modern education, requiring innovative approaches to cultivate creativity and interdisciplinary thinking. While STEM education emphasizes knowledge and skills, it has limitations in fostering creativity and critical thinking (Kelley & Knowles, 2016). STEAM education, which integrates the Arts into STEM, aims to enhance students’ creativity, collaborative spirit, and comprehensive problem-solving abilities through interdisciplinary learning (Howes et al., 2013). It has become pivotal in equipping students with 21st-century skills such as critical thinking, innovation, and adaptability.

Drama teaching, as a participatory art form, enriches STEAM education by introducing humanistic and emotional elements. Through role-playing and situational simulations, drama fosters creativity, empathy, and cultural awareness (Zakopoulos et al., 2023; Shelton & McDermott, 2010). It allows students to engage deeply with science, technology, and engineering concepts, making abstract ideas tangible and stimulating interdisciplinary understanding. This paper examines the integration of drama into STEAM education, highlighting its potential to enhance students’ learning interest, creativity, and collaboration.

2. Literature Review

2.1. STEAM Education: Theoretical Foundation and Global Relevance

STEAM education extends the STEM framework by integrating arts, fostering creativity, critical thinking, and collaboration. Grounded in theories emphasizing experiential and interdisciplinary learning (Bedewy & Lavicza, 2023), STEAM encourages students to apply knowledge through hands-on activities, promoting adaptability and problem-solving skills for future careers (AlAli, 2024). Global education policies increasingly emphasize STEAM to nurture innovative talent in response to evolving scientific and technological demands (Harris & de Bruin, 2017).

2.2. The Role of Drama in STEAM Education

Drama teaching complements STEAM by bridging the gap between technical disciplines and emotional, social dimensions. Activities like role-playing and simulation enhance interdisciplinary understanding and teamwork (Rosario, 2023). Drama also simplifies complex scientific and mathematical concepts through contextual learning, transforming abstract ideas into practical experiences (Ødegaard, 2003). Moreover, it fosters empathy and social responsibility, helping students explore the ethical implications of technology and global issues (Lim et al., 2011).

2.3. Integrating Drama into STEAM Education: Empirical Evidence

Research shows that drama effectively promotes interdisciplinary skills in STEAM contexts. For instance, simulated scenarios enable students to grasp scientific methods and solve real-world problems collaboratively (Potkonjak et al., 2016). Case studies reveal enhanced creativity and deeper comprehension when drama is combined with scientific inquiry (Arieli, 2007). These findings underscore the value of integrating drama into STEAM curricula to foster holistic learning and innovation.

3. Research Methodology

This study adopts a qualitative research method based on a case study to assess the impact of drama teaching on students' interest, comprehension and creativity in STEAM learning through the means of data collection such as classroom observation, work analysis and teacher reflection.

a. Observation records: The researcher recorded students' interactions and performances during instructional activities, paying particular attention to students' behaviors in communication and cooperation, role-playing, scientific inquiry, engineering design, and artistic creation. These observational data provide detailed first-hand information for understanding the impact of drama instruction on students' interdisciplinary literacy.

b. Work Analysis: Work completed by students in art-making and engineering design challenges (e.g., Chang'e spacecraft models, paintings, or musical compositions) was analyzed to assess students' application of interdisciplinary knowledge and skills and creative performance. The analysis of the work helps to provide an in-depth understanding of the students' interdisciplinary application and creativity in the program.

c. Teacher Self-Evaluation: At the end of each instructional activity, teachers reflect on their instructional design, students' classroom performance, learning outcomes, and teamwork, with particular attention to improvements in communication, collaboration, and creative thinking. Teacher reflection helped to optimize the instructional design and provided insightful teacher perspectives for the case studies.

4. Analysis and Discussion

This study adopts qualitative data analysis methods, combining the summary and classification of classroom observation records, work analysis and teachers' reflections, to explore the multiple educational values of drama teaching in the 'Chang'e Runs to the Moon' STEAM program, as well as its promotion of students' interest in learning, comprehension and creativity.

4.1. Classification and Analysis of Students' Behavior and Performance

By collating classroom observation data, students' behaviors in the drama course can be categorized into four main aspects: learning participation, learning interest, depth of understanding and creative expression. These aspects were further subdivided into specific performances in science, technology, engineering, math, and arts education, reflecting the multi-level facilitation of drama instruction in each STEAM area. This categorization helps to comprehensively assess the development of student learning in different areas and reveals the overall enhancement of interdisciplinary competencies by drama instruction.

Table 1: Categorical analysis of student behavior and performance

Categorical Analysis of Student Behavior and Performance	Science	Technology	Engineering	Mathematics	Art
Student participation	Students actively engage in various disciplines, showing enthusiasm for exploring scientific principles, experimenting with technology tools, and participating in engineering design tasks. In mathematics, they take initiative in calculations and share results, while in the arts, they demonstrate passion for theatrical performance, stage design, and creative expression.				
Interest in learning	Drama-infused STEAM education fosters curiosity across disciplines. Students show inquisitiveness about scientific phenomena (e.g., gravity and space exploration), enthusiasm for exploring technology, curiosity about engineering design processes, and an eagerness to engage with mathematical concepts like proportions and spatial relationships. Artistic passion drives their willingness to contribute creatively to performances and visual designs.				
Depth of understanding	Accurate use of scientific terminology and explanations (e.g., Chang'e's	Proficient use of technical tools to enhance dramatic effects, such as	Comprehensive understanding of design processes and reflective optimization of	Precision in calculations related to proportions, angles, and	Nuanced emotional expression and enhanced visualization

	lunar journey).	lighting and sound.	models.	distances.	for storytelling and character development.
Creative expression	Unique integration of scientific concepts into storytelling and prop design.	Experimentation with tools like animation and programming to enrich narratives.	Novel approaches to material selection and structural design in models.	Creative solutions to proportional and structural challenges.	Distinctive artistic styles blending traditional and modern elements in scripts, props, and set designs.

4.2. Multiple Benefits of Drama Instruction in STEAM Education

4.2.1. Stimulates high levels of student engagement and active performance

Drama teaching provides opportunities for students to be fully engaged through contextualization and role-playing. In the theme activity of ‘Chang’e Runs to the Moon’, students’ active participation is not only limited to watching or listening to the lecture, but also deeply involved in the advancement of the story through role-playing. Relevant studies have shown that interactive teaching methods can help stimulate students’ motivation and engagement (Sun & Hsieh, 2018). Students come up with ideas and play roles in the process, and their emotions and cognition are doubly stimulated, enhancing their self-confidence and passion for learning.

4.2.2. Promoting in-depth understanding and application

Drama teaching concretizes abstract concepts and helps students better understand STEAM knowledge. In the teaching of ‘Chang’e to the Moon’, students not only act out the story, but also learn scientific knowledge related to the moon and gravity, and experience these concepts through experiments and simulation activities. According to the theory of constructivism, it is easier to form deep understanding when students construct knowledge in practice (Fosnot, 2013). Students not only learn the cultural context in the role play, but also extend classroom knowledge to practical operation through experimental activities, realizing the combination of theory and practice.

4.2.3. Fostering creativity and hands-on skills

Drama teaching allows students to become creators of knowledge rather than mere recipients. In the process of designing a model of the Chang’e spacecraft and writing a play, students apply creative thinking to solve practical problems, which greatly challenges their thinking frameworks and develops their ability to innovate with limited resources. This enhancement of hands-on practice and creative thinking has a positive impact on students’ future studies in science, technology and engineering (Shieh, & Chang, 2014).

4.2.4. Stimulating patriotic passion and sense of social responsibility

By exploring China’s aerospace achievements related to Chang’e to the Moon, students not only gained scientific benefits, but also strengthened their national pride and sense of social responsibility at the emotional level. Students enriched their knowledge by looking up information on rocket launches and the history of aerospace development, strengthened their identification with the country’s achievements and inspired a sense of patriotism.

4.3. Drama Integration of Education Theories: Advancing Our Understanding of Multiple Intelligences

Within the context of ‘Chang’e Runs to the Moon’ program, drama teaching embodies the principles of constructivism and Gardner’s theory of multiple intelligences. Still, constructivism states that knowledge gaining is a process of construction and interaction in action (Brau, 2016).

Drama lessons equip students with abundant interactive chances to enrich the learning experience of ‘Chang’e Runs to the Moon’ story, performing supporting activities like making props and playing different roles. It should also be noted that according to the theory of multiple intelligences, students’ capacities cover different positions, such as linguistic, spatial, bodily (kinesthetic) and interpersonal intelligences (Davis et al., 2011). In a drama play, students not only use verbal intelligence and spatial intelligence, but also exhibit physical-kinesthetic intelligence and interpersonal intelligence in characterizing themselves and cooperating with one another.

Playing the role, both in scenario simulation and drama teaching, leads to students’ emotional involvement in the learning content, which is consistent with the affective learning model, that ultimately promotes their motivation and involvement in the classroom and, thus, learning performance and progress.

4.4. Conclusion

To sum up, entertainment in the school drama lessons increases the students’ involvement in learning. With the usage of role-play and scenario simulation, the students are more likely to understand and appreciate scientific concepts better. This is because it provides an immersive learning experience that is fun-filled and encourages interactivity for deeper understanding of STEM concepts. Using this teaching strategy not only gives students the chance to comprehend STEAM teaching, but also

prompts them to be creative and artistic during the process of their creation. Additionally, by including the achievements of the modern Chinese space program into the curriculum, it provides students with a level of understanding about the country as well as the ability to foster a sense of national pride and social responsibility.

5. Summary

The ‘Chang’e Runs to the Moon’ English drama class highlights the unique integrative value of drama in education. Through scriptwriting and performance, students’ motivation and emotional engagement increased, demonstrating how drama fosters enthusiasm for learning. By connecting class content with China’s modern aerospace industry, students deepened their understanding of science and technology, showcasing the effectiveness of drama in promoting interdisciplinary knowledge.

The rocket launch scene further sparked a sense of national pride and social responsibility, blending historical and contemporary themes to inspire collective identity. Additionally, prop-making activities enhanced students’ creativity and practical skills, proving that drama education goes beyond intellectual development to cultivate hands-on abilities.

6. Future Prospects

As an innovative educational approach, drama teaching shows unique advantages in promoting the development of STEAM education. Through activities such as role-playing, situation simulation and playwriting, students learn deeply through interaction and experience, which not only enhances their understanding of STEAM core concepts, but also stimulates their learning interest and creativity. Future research should further explore the application of drama teaching in different educational stages and diverse student populations to enhance the overall quality of education. Meanwhile, education policy makers and frontline practitioners should consider formally incorporating drama teaching into the STEAM education system to promote educational innovation, broaden learning pathways, and support the diversified development of education.

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Reimagining Online Learning: Enhancing STEM education through Immersive Metaverse Environments

Manpreet SINGH

¹Lecture, Department of Mathematics and Information Technology,
The Education University of Hong Kong, Hong Kong SAR, China
manpreet@eduhk.hk

ABSTRACT

This research paper explores the effectiveness of utilizing a Metaverse virtual space as an alternative to traditional online lessons for delivering STEM lessons focusing on Coding and Science for undergraduate students. The students and teacher enter the browser-based Metaverse platform (spatial.io) as digital avatars in this Metaverse virtual space. The students explore the virtual space at their own pace by going through the lecture slides on the virtual walls. The students worked together in groups and completed STEM activities using third-party platforms like Blockly Games and PhET simulations, which were embedded into the virtual space using the portals. What sets the Metaverse lesson apart from conventional online teaching methods is its capability for real-time monitoring of student engagement. Instructors can observe the movement and interactions of students' digital avatars, enabling them to gauge participation levels and the overall classroom dynamic. This immediate feedback loop allows educators to provide prompt interventions and tailored support, fostering an inclusive learning environment. The findings indicate that the Metaverse lesson offers a dynamic and interactive alternative to online learning platforms, enhancing student participation and enabling personalized educational experiences. Additionally, incorporating game-based learning elements—such as the ability to customize digital avatars and engage in live voice chats intertwined with text messaging—elevates the learning experience, promoting heightened student engagement and creating a more immersive educational journey.

KEYWORDS

Metaverse, STEM Education, Immersive learning, Online Learning, Digital Avatars

Early Detection of At-Risk University Students Through Data Analytics

Chenxi DONG¹, Jonathan YIP², Alpha Man Ho LING³, Joyce Lok Yin KWAN⁴, Philip Leung Ho YU⁵, Albert LEE⁶, Susanna Siu Sze YEUNG⁷, Pamela Pui Wan LEUNG⁸, Eric Kwan Wai YU⁹, Eric Chi Keung CHENG¹⁰, Kwok Tung TSUI¹¹, May May Hung CHENG¹², John Chi-Kin LEE¹³ and Wai Keung LI¹⁴

^{1,2,3,4,5,6,7,8,9,11,12,13,14} The Education University of Hong Kong, Hong Kong SAR, China

¹⁰Yew Chung College of Early Childhood Education, Hong Kong SAR, China

cdong@eduhk.hk, yipjc@eduhk.hk, amhling@eduhk.hk, jlykwan@eduhk.hk, plhyu@eduhk.hk, albertlee@eduhk.hk, siusze@eduhk.hk, pleung@eduhk.hk, ekwyu@eduhk.hk, eckcheng@eduhk.hk, kttsui@eduhk.hk, vpac@eduhk.hk, poffice@eduhk.hk, waikeungli@eduhk.hk

ABSTRACT

The integration of data analytics in education has become increasingly vital, as it allows for the early identification of students who may be at risk of underperforming, thereby enabling timely interventions. Despite abundant educational data, effectively detecting at-risk university students remains a significant challenge. In this study, we developed a novel data analytics method combining Least Absolute Shrinkage and Selection Operator (LASSO) regression with the Youden index to predict student course GPA and identify individuals needing additional support. Our approach was applied in a psychology undergraduate course, utilizing data from two cohorts totaling 90 students at a local university in Hong Kong. Our approach demonstrated high predictive accuracy in recognizing struggling students by analyzing aggregated data from multiple sources. Following their identification, educators implemented targeted interventions tailored to the student's learning needs. To facilitate wider adoption of our approach, we have released an open-source Python package (<https://pypi.org/project/dualPredictor/>) that encapsulates our method. This tool empowers educators and institutions to apply advanced analytics to their own datasets, enhancing accessibility and scalability in educational technology. Our findings highlight the transformative impact of data-driven, student-centered strategies in higher education and underscore the potential for analytics to improve student outcomes on a broader scale.

KEYWORDS

Data analytics, At-risk students, Predictive modeling, Early intervention, LASSO Regression

Unpacking Immersive Learning: A Comparative Exploration of Metaverse, Virtual Reality, and Simulation in Education

Tobby KAN¹, Ken Hung Kit TSO²

^{1,2}Lingnan University, Hong Kong SAR, China
tobbykan@ln.edu.hk, kentso@ln.edu.hk

ABSTRACT

Immersive technologies such as the Metaverse, Virtual Reality (VR), and simulation have become pivotal in modern educational practices. While these three modes share similarities in enhancing student engagement and draw on common theoretical foundations, educators and policymakers often treat them interchangeably. This tendency can obscure their optimal uses and unique strengths. The Metaverse fosters collaborative learning by creating environments that support autonomy and social interaction. VR, on the other hand, offers deeply immersive, individual-focused experiences that enhance engagement and facilitate flow states. Simulations excel in structured, task-specific learning, promoting skill mastery through repeated practice and feedback. This research will provide a practical guideline, illustrated with real-world examples, to help educators and institutions effectively harness each technology. The guideline will outline strategies for selecting the appropriate mode, tailoring content to leverage their unique attributes, and adapting to different educational contexts for effective implementation. These strategies aim to guide stakeholders in making informed decisions that maximize the impact of these technologies on student engagement and educational outcomes. Ultimately, this comparative analysis empowers educators, policymakers, and practitioners with a detailed understanding of immersive technologies. By recognizing and leveraging their differences, educational applications can be better aligned with specific learning objectives and student needs, driving innovation and enhancing overall learning effectiveness.

KEYWORDS

Metaverse, Education Technology, Virtual Reality, TEL, Gamification

The Impact of Positive Technology Development Framework Integrated Curriculum on Children's Computational Thinking Development

Xiaowen WANG¹, Kan Kan CHAN^{2*}

^{1,2}Faculty of Education, University of Macau, Macao SAR, China
yc27121@um.edu.mo, kankchan@um.edu.mo

ABSTRACT

Computational thinking (CT) has received substantial attention in early childhood education because it could benefit young children's development. With the increasing provision of programming tools such as robots and graphical platforms in early CT education, there remains a challenge in integrating programming and CT ideas properly in kindergarten classrooms. The Positive Technology Development (PTD) framework aims to foster positive behaviors of children while interacting with digital environment. Thus, this study evaluated the effectiveness of PTD framework integrated curriculum on children's CT and positive behaviors by T-robot programming kit in a Chinese kindergarten. Five and six years old children (N=38) were involved in two weeks of CT learning via one of the two conditions: PTD integrated programming instruction, and unplugged programming instruction. *Techcheck-K* Chinese version and PTD observational checklist were used to measure CT scores of children and their positive behavior respectively. Results showed that programming robot activity increased young children's CT ability in both PTD integrated programming and unplugged programming instruction. In addition, children in PTD environment improved significantly more than their peers in the unplugged group and they showed higher engagement behaviors too. Therefore, early childhood teachers may consider PTD as a design framework for children to develop CT in a supportive, engaging, and positive classroom environment.

KEYWORDS

computational thinking, Positive Technology Development framework, programming instruction, unplugged instruction, young children

Transforming Mathematics Education: Exploring Large Language Models'

Performance, Applications and Impacts

Henry Pak Yeung TSANG¹, Philip Leung Ho YU^{2*}

^{1,2}The Education University of Hong Kong, Hong Kong SAR, China
hptsang@eduhk.hk, plhyu@eduhk.hk

ABSTRACT

Large Language Models (LLMs), such as ChatGPT, have significantly influenced mathematics education by offering new approaches to teaching and learning. Built on advanced neural networks, LLMs generate contextually relevant responses and demonstrate potential in automating tasks like lesson planning, grading, and tutoring. However, their ability to solve mathematical problems requiring logical reasoning often faces limitations, such as sensitivity to variable changes and inconsistencies in multilingual contexts. This study systematically reviews 112 articles published between January 2022 and September 2024 to evaluate LLMs' performance, applications, and impact in mathematics education. We address three key research questions: (1) How do LLMs perform in mathematical tasks across different difficulty levels? (RQ1); (2) How are LLMs applied to support mathematics educators? (RQ2); and (3) What is the effectiveness of LLM implementation? (RQ3). To identify thematic trends, we applied BERTopic modeling, which revealed four key areas of research focus: evaluation of LLM math ability, automated tasks, support for teaching and learning, and solving math word problems. Findings indicate that LLMs generally perform well on primary and secondary-level math tasks, particularly with the use of remediation techniques such as prompt engineering and integration with external tools. While LLMs enhance student engagement, foster critical thinking, and reduce teacher workloads, challenges remain, including hallucination and limited adaptability to non-English mathematical contexts. Despite these challenges, the evidence underscores their transformative potential when thoughtfully implemented. This review concludes by discussing advancements in LLM capabilities, providing insights to guide future research and the effective integration of LLMs into mathematics education.

KEYWORDS

Large Language Models (LLMs), Mathematics Education, ChatGPT, BERTopic

AI-mediated Digital Storytelling in Metaverse Through the Lens of Technology

Acceptance Model

Wan Yee Winsy LAI¹, Ju Seong LEE^{2*}

^{1,2}The Education University of Hong Kong, Hong Kong SAR, China
s1147993@s.eduhk.hk, jslee@eduhk.hk

ABSTRACT

Artificial intelligence (AI) and metaverse have presented possibilities for transforming the nature of classroom instruction. Yet, very little research explored teachers' perceptions of incorporating both applications into English language education. Addressing this gap, this study explored how to enhance future language teachers' perception of integrating emerging technology through hands-on practices. Thirty participants, a mix of Korean and Hong Kong students from the Seoul National University of Education and The Education University of Hong Kong formed five teams to create a digital book for under-resourced EFL primary school students. Over five weeks, they received training on utilizing Metaverse (<https://zep.us/en>) and AI tools and held weekly meetings on Metaverse. Pre- and post-surveys were collected, and their weekly engagement and perceptions on AI, Metaverse, and DST in English instruction were from 1 to 5. The findings suggested that students lengthened the weekly usage duration of all applications by an increase of 1.5-2 hours and enhanced their perceptions of the technology acceptance model's ease of use, usefulness, attitude, and behavioral intention. Among the applications, significant changes were seen in their perception of Metaverse's ease of use and usefulness. Despite no prior exposure, some students perceived it as user-friendly and effective for English instruction upon familiarization. However, they had minimal shifts in attitudes and behavioral intention towards the metaverse, suggesting that ease of use and perceived utility may not strongly influence their future intentions.

KEYWORDS

Metaverse, artificial intelligence, digital storytelling, technology acceptance model, perception

Parents' and children's agency in EFL through AI-based private tutoring

Chun ZENG

Jiangxi Science and Technology Normal University, Jiangxi, China
gwenzc703@gmail.com

ABSTRACT

The proliferation of AI-based English Private Tutoring (AIEPT) has significantly altered the landscape of early English education in China. Millions of Chinese parents have enrolled their children in AIEPT. Understanding how young children engage with technologies for learning English as a foreign language (EFL) and how their parents involve in the process can help identify the problems and challenges they are facing in the digital age. Adopting a relational approach to agency, this qualitative study, part of a broader PhD program, investigates the agency of Chinese parents and children in EFL through AIEPT. Focusing on six families, the study conducted interviews, observations, informal conversations, and collected parent-recorded videos and artefacts over a yearlong fieldwork. Thematic analysis was used to uncover the patterns of parents' and children's agency. While some parents guided and interfered in the interactions between their children and the AI tutors, others primarily played an assistant role. Children showed a continuum of agency (from explicit resistance to active involvement) in response to parents' varied agentic behaviors which were found to correlate with the parents' expectations, beliefs, and the cultural capital. This study contributes to the understanding of the intersection between technology in education for young children and parenting, informing technology developers and parents to optimize children's AI-based language learning experiences by considering familial context and other affordances.

KEYWORDS

AI, English private tutoring, agency, parents, children

The Generative AI-Enhanced Art and Design Curriculum: Exploring the Opportunities, Challenges, and Implications for Higher Education

Aaron CHAU¹, Min CAI^{2*}

^{1,2}The Education University of Hong Kong, Hong Kong SAR, China
s1151975@s.edu.hk, s1146696@s.edu.hk

ABSTRACT

The integration of generative artificial intelligence tools in art and design education presents both opportunities and challenges for higher education. Through a comprehensive literature review, this study examines the current state of generative AI implementation in art and design pedagogy, focusing on theoretical foundations, practical applications, and impact assessment. The study addresses three critical dimensions: the mechanisms of AI integration in art and design curricula, the effectiveness of AI-enhanced pedagogical strategies, and the impacts on student learning outcomes. The findings indicate that the successful integration of AI tools requires thoughtful pedagogical approaches, including project-based learning, collaborative assignments, and balanced curricula that combine traditional and digital techniques. Additionally, evidence suggests that students utilizing AI tools exhibit enhanced creative thinking, improved problem-solving abilities, and increased levels of academic engagement. Beyond pedagogical benefits, this study also examines the fundamental ethical considerations, while generative AI demonstrates significant potential for advancing creativity and innovation in art and design education, its effective implementation necessitates a balanced consideration of ethical protocols, pedagogical frameworks, and institutional infrastructure. This study offers valuable insights for higher education institutions seeking to implement AI-enhanced pedagogical approaches and foster creative innovation, thereby contributing to the evolution of responsive and adaptive art and design education systems.

KEYWORDS

Generative Artificial Intelligence (AI), Art and Design Education, Higher Education, Pedagogical Strategies, Creativity Innovation

Increasing Computational Thinking of Preschool Children through Robotic

Instruction with Local Culture

Yuqing WANG¹, Kan Kan CHAN^{2*}

^{1,2}University of Macau, Macao SAR, China
mc34254@um.edu.mo, kankchan@um.edu.mo

ABSTRACT

Research shows that preschool children can gain Computational Thinking (CT) skills through robotic activity and providing cultural experience to young children is beneficial to their development. However, no research has integrated local culture into robotic instruction and whether preschool children can develop CT skills in such environment or not. This study aims to explore the impact of robotic integrated instruction with Chaoshan local cultural elements on the development of CT in preschool children. A quasi-experimental design including an experimental group with plugged instruction and a control group with unplugged instruction was conducted for a period of 2 weeks. Participants were 35 children at the age of 5-6 years old in a kindergarten in Guangdong Province, Shantou City. The experimental group utilized a Chaoshan local culture-integrated robotic instruction called "I Take T-Robot Xiao Bai to Explore Chaoshan: Computational Adventure." Data collected at the pre- and post-test of CT skills were measured by the Techcheck-K Chinese version. Results showed that the CT scores of the experimental group with the background of Chaoshan local culture significantly improved than that of the control group. Therefore, this study provides evidence for teachers to utilize local culture in the context of computational thinking development in early childhood settings.

KEYWORDS

Computational Thinking, Preschool children, Robotic integrated instruction, Local Culture

Cultivating primary students' GenAI literacy via digital multimodal composing practices: Human-GenAI collaborative digital story creation

Xiaoxuan FANG^{1*}, Davy Tsz Kit NG², Samuel Kai Wah CHU³

¹Department of Family Medicine and Primary Care, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong SAR, China

²Department of Mathematics and Information Technology, The Education University of Hong Kong, Hong Kong SAR, China

³Department of Health Sciences, School of Nursing and Health Studies, Hong Kong Metropolitan University, Hong Kong SAR, China

xxfang@hku.hk, davyngtk@eduhk.hk, skwchu@hkmu.edu.hk

Abstract: Inspired by the rapid development of Generative AI (GenAI) applications, an increasing number of educators are integrating these advanced technologies into classrooms, particularly in digital learning environments. One such approach is Digital Multimodal Composing (DMC), which facilitates the creation of multimodal products that seamlessly blend text, images, and video. This innovative process significantly enhances student engagement, motivation, creativity, and writing skills, while also fostering GenAI literacy. The present study aimed to evaluate the impact of DMC practices on students' GenAI literacy and overall learning outcomes. Thirty primary students from Hong Kong participated in ten interactive workshops designed to familiarize them with five different GenAI applications, culminating in the creation of their own digital storybooks. The findings revealed substantial improvements in several areas, including students' GenAI literacy, motivation, creativity, critical thinking, collaboration, and writing skills. These enhancements highlight DMC's potential to enrich the educational experience. However, the study also identified challenges that students faced, such as limited digital capabilities, difficulties with effective prompt techniques, and a lack of originality in their work. Furthermore, the DMC process was often time-consuming, adding to these obstacles. In light of these findings, future research should focus on promoting DMC practices across diverse educational contexts to more effectively cultivate students' GenAI literacy and enhance their overall learning experiences.

Keywords: ChatGPT, digital multimodal composing, generative AI literacy, human-GenAI collaborative learning, digital story writing

1. Introduction

Influenced by the launch of ChatGPT, multiple Generative AI (GenAI) applications have been developed and applied in various industries, such as education and business (Chiu, 2023; Huang et al., 2022; Law, 2024). Educational researchers have explored the effectiveness of using GenAI for student learning, and the results showed it improved students' motivation, language learning, writing skills, and prompt techniques (Baidoo-Anu & Ansah, 2023; Kohnke et al., 2023; Fang & Deng, 2024a). Among these learning outcomes, writing skills are one of the most challenging literacies for student learning. Students often feel a lack of interest and motivation to complete writing tasks, as many of them do not have proficient language skills and creative thinking skills (Almelhi, 2021; Bai & Guo, 2021; Fang et al., 2024). To address these obstacles, researchers have incorporated GenAI into story writing practices, which effectively improves students' interest, motivation, and creativity (Fang et al., 2023; Xu, 2023). During this learning process, researchers have paid attention to developing students' GenAI literacy, which represents the knowledge and practice of GenAI. Meanwhile, digital multimodal composing (DMC) is a promising pedagogical approach that utilizes GenAI applications to help students create multimodal products via various digital sources such as text, images, audio, and video (Fang & Deng, 2024b; Liu et al., 2024; Smith, Malova, & Amgott, 2021). DMC practices can positively enhance students' interest, enjoyment, motivation, and writing performance (Liu et al., 2024; Kim et al., 2023). However, the effectiveness of using GenAI in DMC practices to cultivate students' GenAI literacy and learning outcomes has been rarely explored in the existing literature.

1.1. Research aims and research questions

To address the existing research gap, this study conducted a DMC approach using GenAI applications among primary students to cultivate their GenAI literacy and learning outcomes in the context of digital story creation. This study first explores the effect of using GenAI tools in DMC practices on students' GenAI literacy. It further investigates students' perspectives on the benefits and challenges they experienced during the learning process. This study provides empirical evidence and practical insights into the effectiveness of DMC practices for GenAI literacy and learning outcomes in primary education. Based on the research aim, this study addresses the following two research questions:

1. How do DMC practices influence students' GenAI literacy?

2. What benefits and challenges do students perceive in their DMC practices?

2. Theoretical framework

We used a theoretical framework called the social semiotic multimodal approach, developed by Kress (2003, 2010). This framework demonstrates the concept of design, which encourages users to adopt multimodal semiotic resources to produce and describe information in an interactive environment via various modern methods (Kress, 2003). This process includes two key concepts: transformation and transduction. Transformation refers to the reorganization of semiotic resources within written texts to create new forms of expression. Transduction refers to the process of transforming content from one format to another to deliver the intended information of the written text.

3. Methodology

3.1. Lesson Design

This study conducted DMC practices in the context of human-GenAI collaborative digital story creation. Participants were from Hong Kong primary schools. They attended ten workshops to learn the functions of GenAI applications that can be used to create digital storybooks, including ChatGPT, Sudowrite, DeepAI, Midjourney, and Canva AI. ChatGPT can inspire students' story ideas by generating sentences based on the intended prompts. Sudowrite can provide story elements such as character names, storylines, and scenarios. DeepAI offers AI chat, AI images, and AI video. Midjourney can generate multiple styles of images based on users' intentions. Canva AI can create storybooks in a storytelling format. The workshops were held once a week for three months, with each application taught in two workshops, each lasting one hour. During these workshops, students extensively learned and experienced various functions of several GenAI applications. After completing all workshops, students were required to adopt the GenAI applications they learned to design their storybooks and submit them to the hosting organization for evaluation. Students received feedback from judges based on a systematic assessment.

3.2. Data collection and analysis

A total of thirty primary students attended the workshops and submitted their digital multimodal products (see Fig. 1). We invited all the participating students to take part in a focus group interview, and six students volunteered to attend. The consent form was signed by the participating students and their parents, as required by the ethical guidelines. All interviews were recorded and transformed into transcripts.

A thematic analysis was used to analyze the interview data. We generated four subthemes of GenAI literacy (knowledge, application, creation, AI ethics) based on the framework proposed by Ng et al. (2021). We also generated additional subthemes (e.g., enhanced inspiration and creativity, poor prompting techniques) based on the interview transcripts. These themes were then organized into three broader categories: GenAI literacy, benefits, and challenges. The analysis process was iterative, with the two authors analyzing the transcripts and meeting regularly to discuss the coding results until they reached a consensus. The inter-rater reliability between the researchers was found to be good, as indicated by a Cohen's kappa coefficient of 0.9 (Watkins & Pacheco, 2000).



Figure 1. Example of Students' storybooks.

4. Results

4.1. Effects on GenAI literacy

Students' GenAI literacy was reflected in four dimensions: knowledge, application, creation, and AI ethics. The detailed perspectives and related conversations are presented below.

4.1.1. Knowledge

Students believed the DMC practice enhanced their knowledge of GenAI and their understanding of the concepts and functions of GenAI tools used to create digital stories. As stated by Student A, "I didn't even know about GenAI before this competition. I now have a good understanding of GenAI tools."

4.1.2. Application

Students stated that they improved their application of GenAI after experiencing the DMC practice. As Student B shared, "I strengthened my application experience of using GenAI tools as I exercised several GenAI applications such as ChatGPT and Midjourney to complete my digital storybook."

4.1.3. Creation

Students mentioned that they enhanced their creation with GenAI, as they used GenAI applications to create their digital multimodal products. As Student F expressed, "I used various GenAI tools to create my digital storybooks, from writing a story to creating a digital book and finally presenting in a storytelling format."

4.1.4. AI ethics

Students found the DMC practice increased their attention to AI ethics, which was seldom realized before this learning process. As Student A said, "I realized that it was not reasonable to directly use AI-generated content. I should modify it based on my story scenario. Otherwise, I may violate AI ethics."

4.2. Benefits and challenges of DMC practices

Five themes of benefits and four themes of challenges were generated from students' perspectives on their DMC practices of using GenAI tools to create digital storybooks. All themes and corresponding conversations are presented below.

4.2.1. Benefits

4.2.1.1. Trigger interest and motivation

Students believed the DMC practice enhanced their confidence in writing digital stories. As Student B reflected, "I felt more active in writing than before, as GenAI raised my attention and improved my confidence in completing writing tasks."

4.2.1.2. Enhance inspiration and creativity

Students mentioned the DMC practice inspired their writing ideas as well as strengthened their creativity. As Student E thought, "GenAI really inspired my writing thoughts towards the story content. It contributed to my creativity after reviewing the AI-generated content, which really made my story become more interesting."

4.2.1.3. Increase critical thinking

Students pointed out that the DMC practice enhanced their critical thinking. As Student A mentioned, "I would think critically before adopting AI-generated content for my story. After that, I would decide to refer to or modify the sentences to adapt to my story scenario."

4.2.1.4. Improve collaboration skills

Students believed the DMC practice increased their collaboration skills when they collaborated with their teachers and parents to complete writing tasks. As Student F remarked, "I worked with my teacher to create the story. She really helped me a lot. I frequently asked for her assistance when I faced challenges in interpreting sentences generated from ChatGPT."

4.2.1.5. Enhance writing skills

Students stated that the DMC practice enhanced their writing skills. This learning process taught them to make their story content diverse and complete. As Student C recalled, "I didn't know how to write a story before I attended this practice. Using GenAI really helped me improve my writing skills. Currently, I know how to write a story with suitable content and good structure."

4.2.2. Challenges

4.2.2.1. Limited digital capabilities

Students found they had low or limited digital capabilities to deal with the problems of GenAI usage. As Student D mentioned, "There were some access problems that I couldn't address, so I needed to ask my mother to help me fix them. After that, I could continue to write the story. Thus, I had to rely on my mother during the writing process."

4.2.2.2. Poor prompting techniques

Students pointed out that they lacked prompting techniques. It was hard for them to input correct and concise prompts. As Student B stated, "It was difficult for me to enter concise prompts to let Midjourney generate appropriate images for my story. I needed to modify them many times until it generates the suitable figures. This really troubled me, as I lacked prior knowledge and experience with this practice." Fig. 2 is an example of images generated by Midjourney.



Figure 2. Images generated from Midjourney.

4.2.2.3. Lack of originality

Students believed that AI-generated content lacks originality and creativity from a human perspective. The statement format of AI sentences seems too stable and lacks emotional color. As Student E answered, "Sometimes, when I reviewed the story context generated by ChatGPT, I felt that it was not the product that I created myself."

4.2.2.4. Time-consuming

Students emphasized that they had to spend a long time revising prompts until the AI produced appropriate content. Also, they took time to recognize the content that was suitable for their stories. As Student A mentioned, "It took me a lot of time to revise and edit the prompt until ChatGPT generated content that suited my thoughts. Also, I spent much time reviewing the content to avoid misusing it."

5. Discussion

The findings showed that DMC practices within the context of digital story creation can benefit students' GenAI literacy and learning outcomes. Digital story writing could be a pedagogy to develop students' AI literacy in terms of understanding, application, creation, and ethics of AI (Ng et al., 2022). Similarly, DMC has been recommended to be a pedagogical approach to improve students' interests, motivation, and writing performance and growth (Fang & Deng, 2024b; Kim et al., 2023; Xu, 2023). Our findings demonstrated that DMC practices significantly improved students' motivation, creativity, critical skills, writing skills, and collaboration skills. As Law (2024) and Kohnke et al. (2023) reported, collaborating with GenAI tools for language teaching and learning contributes to students' engagement, motivation, learning autonomy, and learning outcomes. Moreover, Xu et al. (2024) and Passey (2014) mentioned that digital technologies used in intergenerational learning would enhance teamwork, interpersonal and communication skills. This process also improves seniors' self-efficacy, enhances e-health literacy, and reduces their sense of fear towards technology usage. In addition, prompt engineering enables GenAI to generate high-quality content based on users' appropriate prompts (Lee et al., 2023). Students are encouraged to equip themselves with prompt techniques to adapt to the GenAI-supported learning context.

6. Conclusion

This study explored the effect of DMC practices on cultivating students' GenAI literacy and learning outcomes in the context of digital story creation. We found that the DMC practices effectively increased students' GenAI literacy in terms of knowledge, application, creation, and AI ethics. Simultaneously, students perceived that their motivation, creativity, critical thinking, collaboration skills, and writing skills were enhanced. However, they faced challenges with limited digital capabilities, poor prompt techniques, lack of originality, and time-consuming processes during their learning. This study contributes empirical evidence to the existing literature on the effects of DMC practices on cultivating students' GenAI literacy and learning outcomes. It also provides valuable insights into the DMC pedagogical approach for educators to promote students' language learning.

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From Navigation to Education: Leveraging the Sextant for Interdisciplinary

STEAM+X Pedagogy

Yunqi WANG^{1*}, Jie WEN², Liquan DING³

^{1,2}The Education University of Hong Kong, Hong Kong SAR, China

³The Hong Kong University of Science and Technology, Hong Kong SAR, China
s1143757@s.eduhk.hk, s1131776@s.eduhk.hk, warmth53@126.com

Abstract: In recent years, the widespread adoption of STEAM education has gained considerable momentum; however, challenges such as insufficient interdisciplinary connections have emerged as significant obstacles for educators. To address these issues, recent research has proposed the STEAM+X framework, where X integrates cultural and historical elements. Given the limited implementation frameworks in this area, this study focuses on the historical navigation device sextant as a teaching tool within the STEAM+X framework. This paper examines the sextant's pedagogical potential through structured lesson plans, starting with technical explanations enhanced by 3D models and GeoGebra simulations, followed by principle illustrations based on concepts from mathematics, physics, and geography. The study employs a qualitative research approach, utilizing formative assessments, including Quick Practices, teacher observations, student reflections, and group discussions to assess engagement and interdisciplinary comprehension. Results indicate that the structured use of the sextant significantly enhances students' understanding of core concepts while increasing their interest and engagement in real-world STEAM applications. This approach contributes to a more holistic, accessible, and effective implementation of STEAM education, providing a model for incorporating historical tools into contemporary learning environments.

Keywords: STEAM+X Framework, Sextant, Historical Tools in Education, Formative Assessment, Inquiry-Based Learning

1. Introduction

The rapid rise in STEAM education programs, which focuses on the interdisciplinary integration of Science, Technology, Engineering, Arts, and Mathematics, has generated widespread interest among educators. While interdisciplinary instructional methods foster creativity and critical thinking (Bevan et al., 2015), the practical implementation remains hindered by challenges such as resource limitation, inadequate connections across disciplines, and imbalanced integration of subjects (Margot et al., 2019). These obstacles undermine the comprehensive development of students' skill sets.

To address these limitations of conventional STEAM education, the STEAM+X model has been proposed, with X incorporating cultural and historical elements. Initial study highlights its role in bridge the gap between natural sciences and social sciences, integrating STEAM into more practical real-world contexts to help cultivate students' problem-solving skills (El Bedewy, 2023). Unfortunately, the method lacks suggestions for hardware teaching tools, which do not guarantee the feasibility of implementing this idea. To address this gap, this study proposes a STEAM instructional approach centered on the sextant, a traditional navigational tool.

In this study, the sextant teaching tool is used as a case to present an instructional design applicable to all STEAM+X frameworks. The approach involves formative assessment, such as Quick Practices, to facilitate student comprehension through steps including technical detail explanation, principles illustration, and hands-on inquiry activities. The results show that the structured instruction significantly improved students' understanding of interdisciplinary concepts, alongside heightened engagement and interest in practical STEAM applications.

2. Literature review

STEAM originates from the constructivist learning approach that promotes hands-on activities, where knowledge is actively "constructed" through students' own experiences and thinking (Von Glasersfeld, 1991). Research has shown that STEAM education, which incorporates interdisciplinary instructional methods, offers numerous benefits. These include helping students to effectively integrate knowledge and skills from multiple disciplines when addressing real-world problems, while also fostering creativity and critical thinking (Bevan et al., 2015; Yakman & Lee, 2012; Capraro & Slough, 2013). Among these benefits, the most significant aspect of STEAM education is that it embodies a positive educational philosophy. The philosophy which is primarily reflected in two key aspects. First, the hands-on nature of STEAM practices lowers the entry barrier by incorporating play elements, which encourage active student engagement and motivates learning. This aligns with constructivism principles (Bevan et al., 2015), which advocate for students to become knowledge creators rather than passive recipients, fostering a sense of responsibility within society. Second, in accordance with this, the Theory of Didactical Situations (TDS) views "mistakes" and "struggles" as natural learning components, structuring learning situations to support knowledge construction through trial and error (Brousseau, 1997).

However, the implementation of STEAM education faces several challenges that hinder its full potential. First, there is a significant shortage of equipment and materials in some regions, particularly in countries where fewer than 0.1% of elite schools have the resources to hire qualified teachers and acquire materials for STEAM programs (Bevan et al., 2015). Second, curriculum development poses substantial difficulties for teachers, who are often required to integrate content across different subject areas or teach subjects outside their expertise (Luo et al., 2022). Additional challenges include insufficient teaching time, difficulties in assessing effectiveness of STEAM methods, lack of resources, and inadequate teacher training (Kopcha et al., 2020). Finally, an imbalance in subject emphasis within STEAM education tends to prioritize science and technology over the arts (El Bedewy, 2023). This limited integration of the arts may ultimately constrain STEAM's potential to foster a truly holistic educational experience.

Faced with the challenges of depth and breadth in interdisciplinary integration within traditional STEAM education, El Bedewy (2023) introduced the STEAM+ X model, where X represents potential expansion fields or disciplines, such as architecture, culture, and history, that can be integrated with existing STEAM subjects. The role of X in STEAM+X is to identify the intersections between disciplines and design holistic practices. It expands the concept of interdisciplinary education, representing a transdisciplinary approach aimed at creating a unified knowledge framework beyond disciplinary perspectives (El Bedewy, 2023). In the study by El Bedewy (2023), teachers typically select artifacts such as GeoGebra files of architectural models, AR, or 3D printed architectural visualizations as teaching tools and mediums. However, the cost of these methods remains a limitation of STEAM education due to resource scarcity. Hands-on historical instruments under the STEAM+ X framework, with feasibility and practical applicability, remain underexplored. This study aims to fill this gap by proposing the sextant as a low-cost, context-rich tool that bridges mathematics, physics, and geography, in contrast to generic digital simulations.

3. Methodology

3.1. Participants

The target students for this lesson plan are in grades S2 in Hong Kong.

3.2. Measure

Formative assessments (Quick Practices) were supplemented with teacher observations, student reflections, and open-ended group discussions to capture engagement levels and interdisciplinary comprehension. The sextant serves as an exemplary historical tool in this context. It integrates knowledge from mathematics (angles of parallel lines), physics (laws of reflection), and geography (solar elevation angles), and requires no additional instructional skills from teachers. Due to the sextant's compatibility with electronic video demonstrations, its assembly materials are straightforward, eliminating the need for schools to allocate extra resources for purchases (Engineering Motion, 2023).

3.3. Procedure

The teaching approach follows Rosenshine (2009), emphasizing systematic sequencing, prior knowledge review, opportunities for independent practice and feedback.

3.3.1. Lesson 1 Teaching Design

The lesson begins with a question to stimulate students' curiosity: "How did sailors determine their position in the vast ocean in the absence of GPS?" (Figure 1). This question leads to a brief explanation of the sextant's function in navigation, establishing the framework of "why, what, and how" in students' minds.



Figure 1. Sextant usage introduction

By explaining the difficulties of using only a telescope to measure the angle between two objects (Figure 2) and the large reading errors caused by sea waves when using a clinometer, the teacher highlights the clever design of two mirrors and a movable arm in the sextant. These features allow us to observe both celestial bodies and the horizon line at the same point and accurately read the angle between them. From this point, students can appreciate the wonders of “Science” within the STEAM framework.

Next, the teacher proceeds to introduce the components of the sextant. By showcasing a 3D model (Figure 2), students can visualize the technical details of the sextant, including a circular arc angle scale, a pivot-mounted moveable arm, a semi-transparent and semi-reflective plane mirror referred to as the horizon mirror, an index mirror connected to the moveable, and a small telescope. Compact and elegantly designed, the sextant allows students to appreciate the artistry of its engineering, aligning with the requirements of the “Art” component in STEAM.

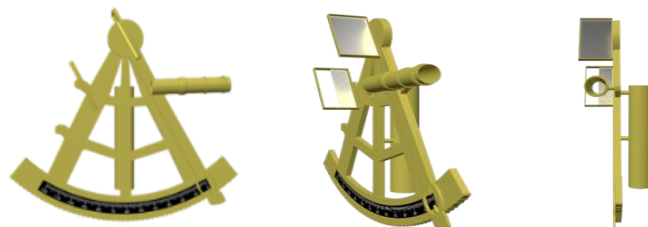


Figure 2. Sextant component 3D model

Furthermore, the teacher can combine GeoGebra to simulate the actual usage of the sextant (Figure 3). During the process, students should pay attention to the scenes visible through the reflection of the two mirrors from the circular perspective of the telescope, as well as the differences on the left and right sides of the circular perspective when adjusting the moveable arm. Through demonstrations, students will gain a deeper understanding of the “Technology” component within the STEAM framework.

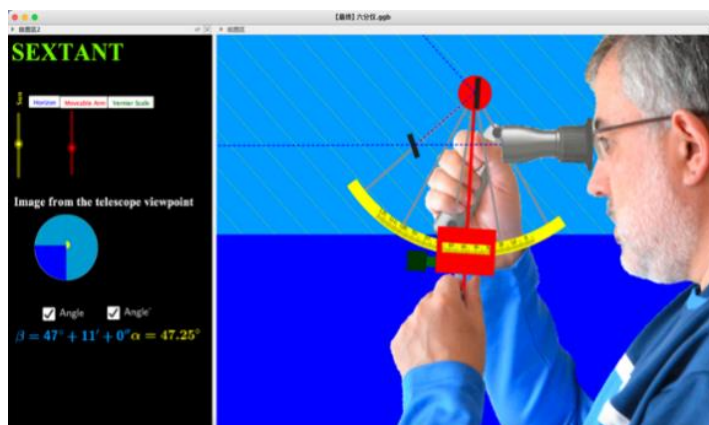


Figure 3. Sextant assistance GeoGebra program

A formative assessment - Quick Practice 1 is conducted after the technology presentations to diagnose students’ understanding of the sextant’s components and usage. Next, the teacher illustrates the principles to reinforce the “Law of Reflection” using a simplified model with two mirrors (Figure 4). By altering Mirror B’s angle by x , the mirrors are no longer parallel, changing the light’s incidence angle on Mirror B to $I + x$. According to the law of reflection, the reflection angle also becomes $I + x$. Thus, the total deflection on Mirror B is $2I + 2x$, with an additional deflection of $2x$ compared to the first mirror. The reflected ray is deflected by twice the angle between the mirrors. From this point, it also strengthens students’ foundational understanding of “Mathematics” within the STEAM framework.

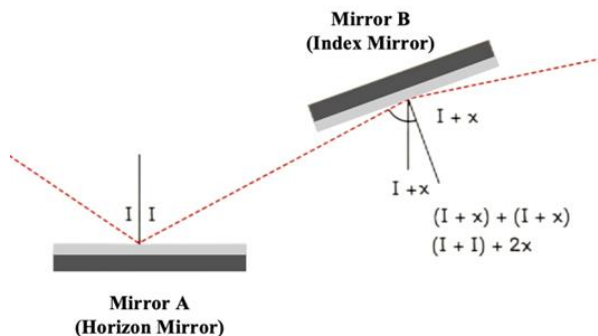


Figure 4. Two mirrors simplified model

After introducing students to the principles of the sextant using the simplified model mentioned above, we can then apply these principles to the actual sextant (Figure 5). It can be observed that the movable mirror B corresponds to the index mirror in the sextant, while mirror A is the horizon mirror fixed on the frame. By drawing blue and red lines, the path of continuous reflection of light can be determined.

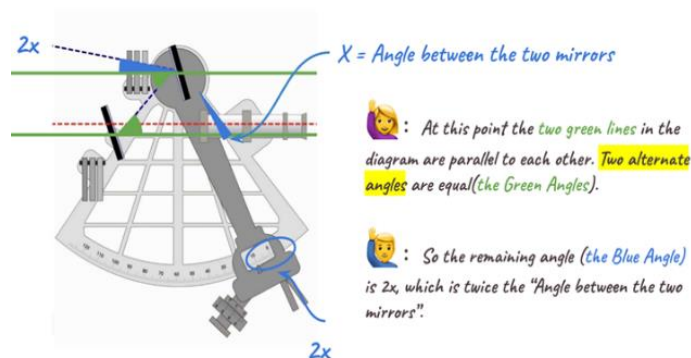


Figure 5. Detailed diagram of principles

Then the second formative assessment - Quick Practice 2 allows students to reinforce their understanding of reflection principles through tracing the light path, supporting concept retention (Figure 6).

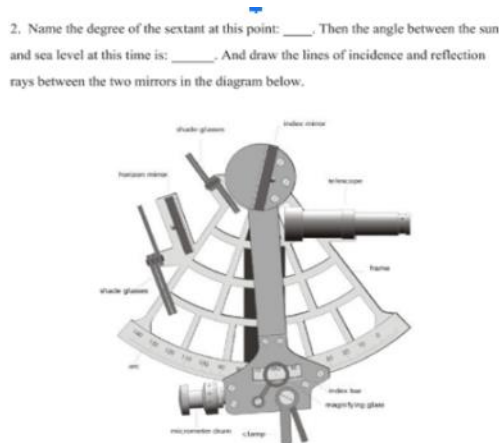


Figure 6. Quick practice assessment 2

3.3.2. Lesson 2 Teaching Design

Next class, the teacher demonstrates sextant assembly in inquiry activities, followed by group-based student assembly using material kits. Students then work in groups to assemble and refine their sextant models, solving challenges such as (1) calculating error angles due to observer height. (2) addressing a manufacturing error with same sized mirrors that prevent students from observing the horizon line (Figure 7). This approach will promote problem-solving and critical thinking.

Finally, students use their assembled sextant to complete an assessment worksheet in collaboration with their peers. The hands-on process undertaken by students aligns perfectly with the iterative trial-and-error and adjustment cycles inherent in STEAM “Engineering” practices, reinforcing their ability to measure angles and apply learned principles practically.

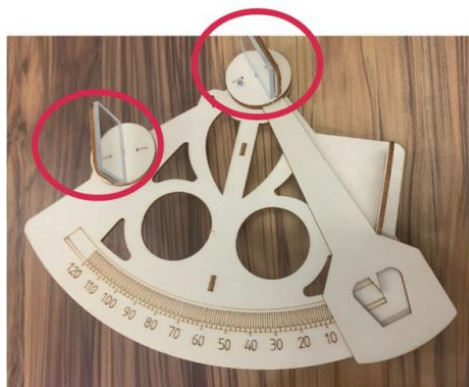


Figure 7. Inquiry activities tools

4. Results and Discussion

This study analyzes students' learning experiences within the STEAM+X framework through qualitative data. Teacher observations noted heightened collaboration during assembly tasks, with groups actively debating solutions to mirror alignment errors. The interview results show that the majority of students believe that interdisciplinary teaching using historical tools (the sextant) helps them gain a better understanding of the connections between different disciplines. One student remarked, “Assembling the sextant made me realize how math and physics were used to solve real problems in the past”, reflecting the framework’s success in contextualizing STEAM concepts.

The findings suggest that using the sextant to address key challenges in STEAM education by engaging students with transdisciplinary content while minimizing resource limitations through cost-effective, historical tools. This approach helps balance the traditional emphasis on science and technology with the arts, as the sextant combines aesthetic value with scientific principles (Margot & Kettler, 2019). Despite its contributions, the study has limitations. First, the small sample size and limited duration restrict the generalizability of results. Larger-scale studies across various educational settings are recommended to validate these findings. Additionally, as the study used only formative assessments, future research could incorporate long-term evaluations to assess the sustained impact of STEAM + X education on student learning outcomes. As this study merely provides a new insight into classroom design for STEAM+X, these issues can be further refined in future applications.

5. Conclusion

This study highlights the potential of incorporating historical instruments like the sextant to address existing challenges in STEAM education. The sextant effectively links mathematics, physics, and geography, while enriching students' engagement and understanding through historical and cultural contexts. However, this study proposes a novel pedagogical model rather than validating a hypothesis. By foregrounding qualitative evidence—student engagement, teacher observations, and historical contextualization—it demonstrates how low-resource tools can enrich STEAM+X implementation, inviting future researchers to explore hybrid (qualitative-quantitative) evaluations.

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Large Language Models in L2 Education: Bridging Challenges and Opportunities

Lin FANG¹, Yue ZHANG^{2*}

¹Faculty of Education and Human Development, The Education University of Hong Kong, Hong Kong SAR, China

²Department of Electronic and Information Engineering, Shantou University, Guangdong, China

aylinefong@163.com, yuezhang@stu.edu.cn

ABSTRACT

With the rapid proliferation of large language models (LLMs), their application in second language (L2) education has drawn significant attention from educators and researchers. While LLMs are praised for their ability to generate personalized, context-aware, and logical responses that facilitate L2 learning, they also present numerous challenges. However, a systematic summary of these drawbacks remains scarce. Through a systematic review of 31 peer-reviewed studies published in the past 3 years, we categorize the challenges brought by LLMs into six main areas: (1) academic integrity and plagiarism, (2) cognitive and pedagogical limitations, (3) lack of emotional and human interaction, (4) technical and accuracy issues, (5) equity and accessibility concerns, and (6) ethical considerations. Despite these challenges, few practical solutions have been proposed to address them. Drawing from early studies on artificial intelligence (AI) in L2 education, we identify potential strategies to mitigate these issues, including fostering critical digital literacy, integrating LLMs with human-centered teaching, and enhancing equitable access to technology. Our work provides a comprehensive overview of the limitations of LLMs in L2 learning and offers actionable guidance to optimize their use. This study not only sheds light on the emerging trends in LLM-assisted L2 education but also lays the groundwork for future research to address the pressing challenges.

KEYWORDS

Second language (L2) education, Large language models (LLMs), Educational technology, AI-assisted language teaching

Critical Feedback on Artificial Intelligence Tools and Writing Improvement:

Evidence from a Systematic Review

Yin Ling CHEUNG
Nanyang Technological University, Singapore
yinling.cheung@nie.edu.sg

ABSTRACT

For the past two decades, we have witnessed a large growth in research on artificial intelligence (AI) and language learning. However, the question posed here is: Have researchers addressed the shortcomings of previous research studies on AI and its impact on academic writing? We reviewed 28 peer-reviewed articles from Scopus, Web of Science, ProQuest, and Google Scholar. We examined the efficacy of AI tools in assisting students in their writing, the theoretical framework that formed the basis of their research, and the methodology and effects the AI tools have on the improvement of writing. AI tools in this review include Pigai, Intelligent Tutor, Rationale, EssayCritic, Whitesmoke, Grammarly, ChatGPT, iWriteJuku, Write and Improve, QuillBot, Wordtune, and PaperRater. In this presentation, we begin with a summary of early studies (2004 – 2017) and some of the major shortcomings. Then, we examine more recent studies (2018 – 2024). We conclude that, although many of the shortcomings of earlier research have been addressed, recent findings are still inconclusive when it comes to improving writing as a result of using AI. We argue that many research studies do not state the duration between the research intervention and post-test and do not indicate the genre of writing. We conclude by suggesting directions for future research on AI and writing improvement.

KEYWORDS

artificial intelligence, writing quality, systematic review

Personalized Learning with Generative AI in Teacher Education via the Concept

Prompt

Fridolin Sze Thou TING^{1*}, Lawrence Chi Lok CHAN²

^{1,2}The Education University of Hong Kong, Hong Kong SAR, China

fridolin@eduhk.hk, cchilok@eduhk.hk

Abstract: *In the dynamic field of teacher education, integrating generative AI technologies offers promising avenues for personalized and engaging learning experiences. This pilot study examines the implementation of the "concept prompt" in teacher education psychology courses, specifically in professional vocational education (PVE) and foundations of learning contexts. The "concept prompt" facilitates personalized learning by connecting students' hobbies and interests with abstract ideas and complex concepts, fostering deeper engagement and understanding. Using a modified Personalized Learning Support Instrument (PLSI) (Zhang et al., 2022) with generative AI, we measured six dimensions of personalized learning support: Engagement in Learning, Representation of Information, Action & Expression, Resourcefulness, Knowledge, and Progress Toward Goal. Our preliminary findings from two courses show promising results. In the first course, students reported significant improvements in their digital skills and awareness of AI learning strategies in PVE contexts. For the second course, significant improvements were observed in students' resourcefulness and progress toward goals, particularly in their ability to reflect on learning strategies and set personal learning goals. The results indicate that the "concept prompt" approach with generative AI particularly enhanced students' ability to (i) effectively utilize AI tools for their learning; (ii) plan and organize their learning; (iii) track progress toward mastery of key knowledge; and (iv) set and achieve personal learning goals. These findings suggest that personalized, context-driven learning strategies using generative AI can effectively support student learning, particularly in developing metacognitive skills and learning autonomy. Future research will expand this implementation across additional STEM disciplines to validate these preliminary positive outcomes.*

Keywords: Generative AI in Education, Teacher Education, Concept Prompt, Personalized Learning, Student Engagement

1. Introduction and Literature Review

1.1. Personalized Learning

Ever since ChatGPT first came out in late 2022, there was a great buzz everywhere promising that education will benefit by having generative AI having to increase personalized learning. Numerous research articles have touted the benefits of personalized learning to student learning, including increased learning satisfaction, learner efficiency and effectiveness (Gómez, 2014). In the form of one-to-one tutoring, personalized learning has shown to benefit students' academic performance (Bloom, 1984). Intelligent tutoring systems, or adaptive learning systems are other forms of personalized learning, shown also to benefit student learning outcomes by providing timely feedback and hints to problems (Kochmar et al., 2020). In fact, personalized learning can also be termed as customized learning and individualized learning (Shemshack, 2020). However, there is scarce literature, if any, on the benefits, relationship and correlations between generative AI and personalized learning.

1.2 Active learning and generative AI

Active learning is, essentially, anything other than traditional passive lecturing, which involves reflection, reflecting, engaging in meaningful learning experiences (Prince, 2004). It has been shown, extensively in literature that active learning benefits student learning outcomes, including increased conceptual understanding, motivation and academic performance (Freeman et al., 2024). However, at the current moment, existing generative AI platforms are designed for individual use only, hindering classroom integration and collaboration. Moreover, teachers often showcase personal generative AI use, leading to passive observation rather than active student engagement. Hence, to implement active learning using generative AI, we developed an online backchannel anonymous chatroom integrated with large language models, called YoChatGPT! to implement personalized learning activities in the classroom.

1.3 The Concept Prompt and Personalized Learning

One of the most remarkable features of large language models like ChatGPT is its ability to connect any two seemingly disparate and unconnected topics. One can get an idea of how good it is, by asking a large language model to write a poem about the derivative in Calculus in a Shakespearean tone, and it does so in seconds, in a very creative, yet rigorously correct way. In addition, personal contextualized examples help students to understand abstract ideas in science and math by

Cheng, M. H. M., Xu, G., Cheng, G., Kong, S. C., Song, Y., Erni, J. N., Chen, J., & Macfarlane, B., Yeung, S. S. (Eds.). (2025). *Proceedings of the International Conference on Learning and Teaching 2025 (ICLT 2025)*. Hong Kong SAR: The Education University of Hong Kong. providing relatable references and visualizations that make the concepts easier to comprehend (Klassen, 2006). Hence, the purpose of this study is to test whether personalizing any topic in a subject to a students' interest, hobby or passion, can increase a students' learning outcomes. To be more specific, we define the concept prompt, as follows:

Concept prompt:

I am a α student who loves β . Please help me understand π in the subject Ω , relating it to β .

where

- α = grade level of student
- β = students' hobby, passion or personal interest/experiences
- π = specific (sub) topic/concept/idea in science or math
- Ω = course or subject area of (sub) topic

An example of a concept prompt for a secondary 6 (or grade 12) girl who loves the K-pop girl band, BlackPink, trying to decipher the definition of limits in Calculus, can be as follows:

I am a grade 12 student who loves the K-pop girl band, BlackPink. Please help me understand the concept of a "limit" in the subject Calculus, relating it to BlackPink.

In fact, any large language model response will give a reasonably creative and rigorously correct response, for which, if further explored and quantified, in an inquiry-based type of pedagogy, can be very beneficial for the student to understand, conceptually, the concept of a limit. For example, the response here <https://poe.com/s/PN33oRGjVBUNw1KKyhLp> can be quantified by the student by asking them to define independent and dependent variables to capture the feeling of excitement as BlackPink members come onto the stage for their concert.

1.4 Measuring Students Readiness to use generative AI in their learning

Based on an adaption of university teachers' preparedness to use generative AI survey found in (Kohnke et al., 2023), we adapted and formulated the following survey "Measuring Students' Preparedness to Use Generative AI" in their course content learning:

1. Q1: Digital Literacy and [Course Content] Proficiency: I have the necessary digital skills to effectively utilize AI tools in my [Course Content] learning.
2. Q2: Learning with generative AI in my [Course Content]: I am aware of the key learning strategies that should be used when applying AI tools to my [Course Content] studies.
3. Q3: Challenges in Using AI for Learning [Course Content]: I feel confident that I can overcome challenges that may arise when using AI technologies for my [Course Content] learning.
4. Q4: Impact of Digital Competence on AI Utilization: My current digital skills and understanding of [Course Content] are sufficient to engage effectively with AI for learning purposes.
5. Q5: Curriculum Development for AI in [Course Content] Learning: The curriculum provides adequate preparation for using AI in learning my [Course Content] topics and skills.
6. Q6: Helpful Resources and Training: The resources, tutorials, and support available to me have been effective in developing the skills needed to use AI for my [Course Content] learning.

1.5 Measuring Personalized Learning via Universal Design of Learning Framework

As we are investigating the impact of generative AI on personalized learning, we need a psychometric instrument, measuring a form of personalized learning. As such, there Zhang, et al., (Zhang et al., 2022) developed the Personalized Learning Supporting Instrument (PLSI) to measure student perceptions of a learning environment designed according to the Universal Design for Learning (UDL) framework (Meyer et al., 2014). PLSI measures personalized learning in terms of six dimensions, described as follows:

1. Engagement in Learning: This dimension assesses whether the learning environment provides options for recruiting interest, sustaining effort and persistence, and self-regulation.
2. Representation of Information: This dimension evaluates if the learning environment offers options for perception, language and symbols, and comprehension.
3. Action & Expression: This dimension measures whether the learning environment provides options for physical action, expression and communication, and executive functions.

4. Resourcefulness: This is a desired outcome dimension that assesses if the learning environment supports access to learning.
5. Knowledge: This dimension describes the understanding and internalization of learning into knowledge.
6. Progress Toward Goal: This is another outcome dimension that measures whether the learning environment supports progress in learning.

For each of the above dimensions, we asked three questions adapted from the PLSI survey, for specific course content:

Dimension 1: Engagement in Learning

1. Q1: The AI tools allowed me to make choices about what I wanted to learn in [my course content] based on my interests.
2. Q2: Using the AI tools, I was able to learn [my course content] content that was relevant and valuable to me personally.
3. Q3: The AI-based learning activities helped me stay motivated and persistent even when topics were challenging.

Dimension 2: Representation of Information

1. Q4: The AI tools presented [my course content] information and content to me in different ways that I could understand.
2. Q5: Important [my course content] concepts were clearly explained and illustrated using various media in the AI system.
3. Q6: The AI tools highlighted and explained key [my course content] vocabulary terms to help me learn them better.

Dimension 3: Action & Expression

1. Q7: I was able to use the AI system to demonstrate my [my course content] knowledge and skills in different ways.
2. Q8: The AI tools provided me with choices in how to complete [my course content] assignments and projects.
3. Q9: I received helpful feedback from the AI system to revise and improve the quality of my [my course content] work.

Dimension 4: Resourcefulness

1. Q10: The AI tools helped me reflect on my learning strategies in [my course content] and adjust them when needed.
2. Q11: I was able to access additional AI-driven resources and support when I struggled with [my course content] concepts.
3. Q12: The AI system provided me with tools to effectively plan, organize and manage my [my course content] learning.

Dimension 5: Knowledge

1. Q13: Using the AI tools deepened my understanding of essential [my course content] facts and ideas.
2. Q14: The AI-based learning helped me see connections between [my course content] concepts and my prior knowledge.
3. Q15: The AI system supported me in transferring my [my course content] knowledge to solve new problems.

Dimension 6: Progress Toward Goal

1. Q16: The AI tools enabled me to track my progress in mastering key [my course content] knowledge and skills.
2. Q17: I was able to use the AI system to set personal [my course content] learning goals and create plans to achieve them.
3. Q18: The AI-driven learning experiences prepared me to handle more advanced [my course content] work in the future.

2. Methods

In this section, we describe the methods for which our experimental set up, including the participants involved and the procedures implemented.

2.1 Participants

To investigate the effectiveness of the personalized learning approach using generative AI, two teacher training courses: namely, a professional vocational education (PVE), which we shall call, Course 1, and foundations of learning contexts, which we will call, Course 2, were invited to participate in this project. Students in the PVE course tended to be more mature and had a full-time job in their vocation, e.g., hair stylist.

Course 2 is a training course for teachers of general academic subjects (such as Chinese Language, History, Mathematics and Visual Arts ... etc.) while Course 1 is a training course for teachers of vocational subjects (such as cooking, cosmetics, beauty, sports and outdoor adventure). There are 64 students in Course 2 and 18 students in Course 1. Students in Course 2 were more younger, and were in teacher training without much job experience.

2.2 Procedures

Students are invited to complete the pre-survey prior to the introduction of AI tools, such as YoChatGPT! (see <https://www.yochatgpt.io/>) in the early stages of their training programme. During their learning journey, students are encouraged to make use of the AI tools to understand some abstract concepts by linking the illustrative examples to their hobbies, *via the concept prompt* above. The instructor for both courses was shown how to implement the concept prompt in class using YoChatGPT! They are encouraged to use AI tools in learning and teaching their own subjects. At the end of the course, students are required to complete the post-survey. Eventually, there are 14 and 12 students in Course 2 and Course 1 completed both the pre and post surveys respectively. An example of a student concept prompt in the PVE course is shown in Figure 1 below.

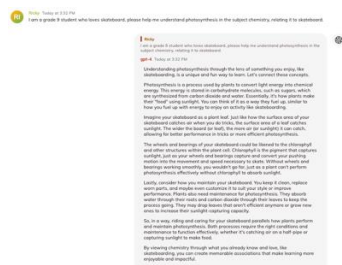


Figure 1: Example of a concept prompt where student asks LLM to help him understand photosynthesis in terms of his interest in skateboarding.

3. Results

For the PVE Course 1, a paired t-test for the six dimensions showed no significant difference in all dimensions, as shown below in Table 1:

Table 1: For PVE course, mean in personalized learning support increased in all dimensions.

No.	Dimension	Mean of Pre - score	Mean of Post - score	P-value
1	Engagement in Learning	3.61	3.86	0.339
2	Representation of Information	3.56	3.81	0.249
3	Action & Expression	3.64	4.03	0.121
4	Resourcefulness	3.56	3.94	0.137
5	Knowledge	3.67	3.86	0.514
6	Progress Toward Goals	3.72	3.97	0.403

The students in the PVE Course 1 reported that AI tools are helpful in their teaching and learning because AI tools help them to extend their knowledge. They are aware of the key learning strategies that they can use with AI tools when they are teaching the professional vocational content. They emphasize the usefulness of using AI tools to enrich their learning strategies. Due to the diversity of the teaching and learning content and skills, AI plays an important role in suggesting appropriate learning strategies and meeting the diverse learning needs in their vocational education.

In addition, for PVE Course 1, for paired t-test for individual questions, the following three questions have statistically significant results as shown in Table 2:

Table 2: For PVE course, paired t-test for individual questions.

Paired Samples Test								
	Paired Differences				t	df	Significance	
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference			One-Sided p	Two-Sided p

						Lower	Upper					
1	Pair	Q1		-.66667	.77850	.22473	- 1.16130	-.17203	- 2.966	11	.006	0.013
2	Pair	Q2		-.58333	.79296	.22891	- 1.08716	-.07951	- 2.548	11	.014	0.027
3	Pair	D4.3 PD4.3		-.66667	.98473	.28427	- 1.29234	-.04100	- 2.345	11	.019	0.039

That is, the following individual questions were statistically significant.

Q1) I have the necessary digital skills to effectively utilize AI tools in my Professional Vocational Education (PVE) learning.

Q2) I am aware of the key learning strategies that should be used when applying AI tools to Professional Vocational Education (PVE) studies.

Q12) (w.r.t. **Dimension 4**, Q3) The AI system provided me with tools to effectively plan, organize and manage my Professional Vocational Education (PVE) learning.

For Course 2 on foundations of learning contexts, a paired t-test for the six dimensions showed a significant increase in two dimensions of resourcefulness and progress towards goals:

Table 3: For on foundations of learning contexts, mean in personalized learning support increased in all dimensions, but especially in in dimensions of resourcefulness and progress towards goals.

No.	Dimension	Mean of Pre - score	Mean of Post - score	P-value
1	Engagement in Learning	3.74	3.88	0.579
2	Representation of Information	3.83	4.10	0.189
3	Action & Expression	3.52	3.90	0.108
4	Resourcefulness	3.45	4.05	0.035
5	Knowledge	3.67	3.83	0.446
6	Progress Toward Goals	3.40	4.00	0.041

Note that the majority of Course 2 students are general academic students, and Table 3 indicates that they emphasize the use of AI tools to help them set up a personal plan to achieve their learning goals. In addition, these general academic students emphasize the usefulness of AI to reflect on their learning strategies and provide direction on how to achieve their learning goals.

For Course 2 students, individual paired t-test results are as follows:

Table 4: Paired t-test for individual question results for foundations of learning context, Course 2.

Paired Samples Test										
		Paired Differences					t	df	Significance	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				One-Sided p	Two-Sided p
					Lower	Upper				
Pair 1	PD 4.1	0.71429	0.91387	0.24424	1.24194	0.18663	2.924	13	0.006	0.012
Pair 2	PD 6.1	0.76923	1.23517	0.34257	1.51564	0.02283	2.245	12	0.022	0.044
Pair 3	PD 6.2	0.92857	1.07161	0.28640	1.54730	0.30984	3.242	13	0.003	0.006

Therefore, for general academic students, the following questions and dimensions showed a statistically significant increase.

Dimension 4: Resourcefulness – Q1 D4.1

10. The AI tools helped me reflect on my learning strategies in my foundations of learning contexts and adjust them when needed.

Dimension 6: Progress Toward Goals – Q2 D6.1 and D6.2

16. The AI tools enabled me to track my progress in mastering key foundations of learning context knowledge and skills.

17. I was able to use the AI system to set personal foundations of learning context learning goals and create plans to achieve them.

4. Discussion and Future Directions

For the PVE Course 1 where the participants are more diversified and the content is less structured (due to the wide range of vocational contexts), students tend to place more emphasis on using generative AI to acquire appropriate learning strategies, as evidenced by the significant improvement in dimension 4 (resourcefulness) question 3. This suggests that for vocation educational students, their use of generative AI is for practical or means oriented. In addition, they valued learning and improving their digital literacy to use generative AI to help them learn the course content, as evidenced by significant differences in Q1 and Q2 on their preparedness to use generative AI in their PVE course learning.

For Course 2 on foundations of learning contests, academic content was more structured, and the students tended to place more emphasis on using generative AI to set up appropriate learning goals as evidenced by significant improvement in two of the three questions in dimension 6 (progress towards goals). This suggests that for more academically inclined students, they found generative AI to aide in self-regulatory goal orientation in their studies.

Interestingly, students in both courses significantly improved in at least 1 of ability to find diverse resources for their learning needs through generative AI, as evidenced by Dimension 4 (resourcefulness) Q3 and Q1 significant improvement in Course 1 and 2, respectively.

Future data analysis will determine whether there are any significant correlations between students' perception of their readiness to use generative AI in their learning, to the various dimensions of their support for personalized learning. In addition, we will investigate how the results differ or are similar to STEM related subject students.

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Exploring the Impact of Scratch Programming on Mathematical Thinking in Secondary School Students: A Game-Based Learning Approach

Xinrui TAO¹, Yuhao ZHENG^{2*}

^{1,2}Faculty of Liberal Arts and Social Sciences, The Education University of Hong Kong, Hong Kong SAR, China
xinrui.t2021@outlook.com, zhengyuhao74@gmail.com

Abstract: This study explores the relationship between the use of Scratch and the development of mathematical thinking skills in secondary school students, focusing on game-based learning as a pedagogical approach. Scratch, a visual programming language, has been widely used in education to promote computational thinking and problem-solving. This research investigates how different aspects of Scratch engagement, such as usage time, frequency, and skill improvement—correlate with students' mathematical reasoning and problem-solving abilities. A Pearson correlation analysis was conducted with data collected from 183 secondary school students, measuring their Scratch usage and performance in mathematical tasks. The results show a significant positive correlation between Scratch skill improvement and mathematical thinking ($r = 0.769$, $p < 0.01$), highlighting that as students' programming skills improve, so does their ability to think logically and solve mathematical problems. The study also finds that frequent engagement with Scratch leads to better mathematical reasoning, particularly in areas like algebra, geometry, and problem-solving. The findings underscore the potential of Scratch as an effective tool for enhancing mathematical learning through game-based, interactive activities.

Keywords: Scratch, mathematical thinking, game-based learning, secondary education, computational thinking

1. Introduction

As digital technology continues to play an increasingly important role in the classroom, Scratch, a free visual programming platform, offers possibilities for enhancing students' learning experiences. Similar to other digital tools, Scratch reshapes the way students engage with and understand mathematical concepts through interactive and dynamic design elements (Calder, 2011). By using Scratch, students can develop computational thinking and problem-solving skills while creating interactive projects, games, and animations without the need to master complex programming languages. This game-based learning approach not only enhances students' logical reasoning and spatial awareness but also provides a new way for students to experience and understand mathematics, thereby fostering the dynamic development of mathematical thinking (Borba & Villarreal, 2005). This study aims to explore the relationship between different aspects of Scratch participation (such as usage time, frequency, and skill improvement) and students' mathematical reasoning and problem-solving abilities, with a particular focus on the role of game-based learning in teaching mathematics.

2. Literature review

2.1. Game-Based Learning and Computational Thinking in Mathematics Education

Game-based learning (GBL) has gained increasing attention as an effective method for enhancing mathematics education by engaging students in interactive and creative tasks (Chen et al., 2021). Scratch, a widely-used graphical programming language, plays a key role in this shift. Through its drag-and-drop interface, Scratch enables students to create interactive games and projects that incorporate mathematical concepts such as geometry, algebra, and spatial reasoning. Research has shown that Scratch promotes mathematical thinking, particularly in areas like problem-solving and pattern recognition, by providing students with opportunities to apply logic and reasoning in a hands-on environment (Gökçe & Yenmez, 2022). This aligns with the goals of GBL, where students develop both mathematical and computational skills while engaging in creative, real-world applications of math.

Computational thinking, which involves solving problems using concepts from computer science such as abstraction, algorithmic thinking, and logical reasoning, is an essential skill that Scratch helps to develop. According to the study conducted by Maraza-Quispe et al. (2021), these elements closely align with mathematical thinking. Scratch supports this by providing students with tools to manipulate variables, use loops, and create conditionals—skills that mirror the problem-solving techniques used in mathematics, particularly in geometry and algebra (Calder, 2019). By using Scratch, students can see the direct application of mathematical concepts in the coding process, making abstract mathematical ideas more tangible and helping them better understand key mathematical principles.

2.2. The Relationship Between Scratch Usage and Mathematical Thinking

The correlation between Scratch skill improvement and mathematical thinking is particularly important, as it may provide insights into how the mastery of coding concepts facilitates the application of mathematical reasoning. Scratch's block-based interface encourages logical thinking by requiring students to construct sequences of commands to achieve desired outcomes, which closely mirrors the process of solving mathematical problems. Research by Lai and Yang (2011) has highlighted how Scratch's interactive environment fosters the development of logical reasoning and spatial skills, which are key for understanding geometry and other mathematical domains. Furthermore, frequent use of Scratch provides students with more opportunities to practice and refine their problem-solving skills, which could lead to stronger mathematical performance. Thus, understanding the extent to which Scratch usage impacts mathematical thinking is vital for optimizing its application in educational settings.

3. Scratch

Scratch (<http://Scratch.mit.edu/>) is a free, graphical programming language developed by the MIT Media Lab, which designed to introduce students to the world of coding in an intuitive and creative way (including three areas: a programming area, a scripting area and a stage area) (Figure 1). Drawing from Seymour Papert's principles of constructionism, Scratch allows students to build interactive projects, games, and animations by arranging visual programming blocks, eliminating the need for complex syntax (Papert, 1980; Sáez-López et al., 2016). This “tinkering” approach promotes hands-on learning, encouraging students to develop computational thinking, logical reasoning and problem-solving skills, which are critical components in the study of mathematics (Resnick, 2007). Scratch's design makes it an accessible tool for fostering these cognitive skills in an engaging and creative environment.

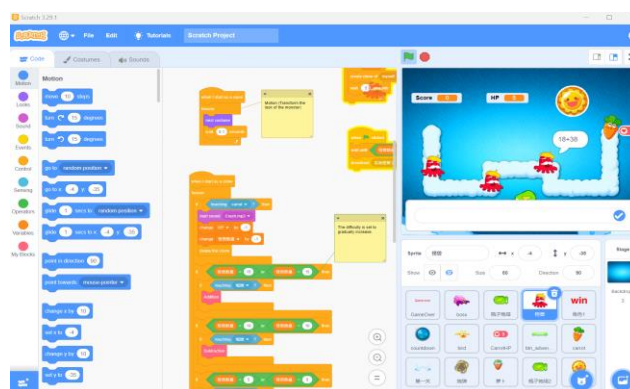


Figure 1. Three areas of Scratch user interface.

In the context of game-based learning, Scratch provides a unique platform for integrating mathematics education with interactive tasks. Secondary school students can use Scratch to design math games, animations, and simulations, applying concepts such as geometry, algebra, and data analysis. For example, students can create games that require players to solve algebraic equations, navigate geometric transformations, or explore statistical concepts (Fang et al., 2023). This iterative process of designing and testing projects enhances students' understanding of mathematical principles by applying them in real-world contexts, making abstract concepts more tangible and relevant. Additionally, the problem-solving nature of game development directly aligns with the cognitive skills required in mathematics, such as pattern recognition, spatial reasoning, and logical progression. By incorporating Scratch into mathematics education, educators can foster deeper engagement with math and enhance creativity (Chen et al., 2019).

4. Methodology

The participants in this study consisted of 183 secondary school students from form 1 to form 3 in Hong Kong. To maintain gender balance, 81 female participants (44%) and 102 male participants (56%) were included. Students were selected based on their ongoing involvement with Scratch and their ability to independently complete programming tasks. In order to represent the typical classroom setting where Scratch is integrated into the learning process, this sample was selected using a convenience sampling technique.

Data were collected through a structured questionnaire that was designed to assess the extent to which Scratch programming influenced students' mathematical thinking skills. The questionnaire consisted of 25 questions divided into four sections, including basic information, Scratch usage patterns, mathematics application through Scratch, and students' perceived improvements in mathematical reasoning and problem-solving. Participants were asked about the duration of their Scratch usage, frequency of usage, and the type of mathematical concepts they had learned through programming. Moreover, they were asked to evaluate how Scratch impacted their ability to solve mathematical problems, apply mathematical knowledge in programming tasks, and improve logical reasoning skills.

The questionnaire also contained items on a 5-point Likert scale to measure students' perceived skill improvements and their engagement with Scratch-based activities. In addition to examining if students felt more confident in mathematics,

specific items also examined whether they could use their mathematical knowledge to modify and optimize their Scratch projects.

5. Findings

The mean and standard deviation for usage time, usage frequency, skill improvement, and mathematical thinking by grade are shown in Table 1. Duration of Scratch usage were defined as follows: 1 for less than 1 hour, 2 for 1-2 hours, 3 for 3-4 hours, and 4 for more than 5 hours. According to the Pearson correlation in Table 2, a notable high correlation was found between the time spent using Scratch and mathematical thinking ($r = 0.721$, $p < 0.01$), suggesting that students who engaged with Scratch more frequently also demonstrated stronger mathematical reasoning abilities. Similarly, the frequency of Scratch usage was moderately correlated with mathematical thinking ($r = 0.462$, $p < 0.01$), indicating that students who used Scratch more regularly had a higher level of mathematical understanding. These results suggest that consistent and extended engagement with Scratch programming positively influences students' ability to think critically and apply mathematical concepts. The correlation between gender and mathematical thinking ($r = 0.713$) was positive but not statistically significant, suggesting that gender may not significantly affect mathematical thinking in the context of Scratch usage. While some studies (Ramírez-Uclés & Ramírez-Uclés, 2020) suggest gender can influence mathematical reasoning, these findings do not show a strong relationship. Further research with a larger sample size is needed to confirm and refine this result.

Table 1. Descriptive statistics of engagement and performance by grade and gender.

	Grade (Mean ± SD)		
	Form 1(n=52)	Form 2 (n=78)	Form 3(n=53)
Duration of Scratch usage	2.17±0.90	2.03±0.91	1.94±0.86
Frequency of Scratch usage	3.50±1.00	3.52±0.99	3.54±1.28
Scratch skill improvement	3.52±1.01	3.52±0.99	3.55±1.28
Mathematical thinking	4.27±0.88	4.10±1.02	4.07±1.10

	Grade (Mean ± SD)	
	Male (n=102)	Female (n=81)
Duration of Scratch usage	2.09±0.97	1.99±0.80
Frequency of Scratch usage	3.79±1.14	3.18±0.90
Scratch skill improvement	3.80±1.14	3.19±0.90
Mathematical thinking	4.25±0.99	3.99±1.02

Table 2. Pearson correlation analysis between Scratch usage and mathematical thinking.

	Grade	Gender	Duration of Scratch usage	Frequency of Scratch usage	Scratch skill improvement	Mathematical thinking
Grade	1					
Gender	0.440	1				
Duration of Scratch usage	0.527**	0.575**	1			
Frequency of Scratch usage	0.457**	0.574**	0.565**	1		

Scratch skill improvement	0.551**	0.232**	0.633**	0.852**	1	
Mathematical thinking	0.585	0.713	0.721**	0.462**	0.769**	1

** . The correlation is significant at the 0.01 level (two-tailed).

However, the most striking finding was the high correlation between Scratch skill improvement ($r = 0.852$, $p < 0.01$) and mathematical thinking ($r = 0.769$, $p < 0.01$), which was very strong. This indicates that as students' skills in Scratch programming improved, their mathematical thinking also significantly advanced. This relationship underscores the importance of skill enhancement in Scratch as an essential factor in fostering deeper mathematical understanding. The data suggests that as students gain proficiency in Scratch, particularly in applying logical reasoning and problem-solving techniques within the programming environment, they simultaneously develop their ability to engage with and solve mathematical problems.

6. Discussion and Conclusion

The findings (Table 2) of this study highlight the strong positive relationship between Scratch usage and improvements in mathematical thinking, which aligns with the results observed in prior research. Specifically, the Pearson correlation analysis reveals significant correlations between Scratch usage time, frequency, and skill improvement, and the enhancement of mathematical thinking, with the high correlation found between Scratch skill improvement ($r = 0.852$, $p < 0.01$) and mathematical thinking ($r = 0.769$, $p < 0.01$). This reinforces the notion that as students improve their programming skills in Scratch, they also show a marked improvement in their ability to reason and solve mathematical problems. The finding that more frequent and extended engagement with Scratch leads to stronger mathematical reasoning is consistent with studies that emphasize the importance of active, hands-on learning in fostering mathematical skills (Chen et al., 2021; Calder, 2019).

Furthermore, the correlation between Scratch skill improvement and mathematical thinking underscores the importance of focusing on the development of coding skills. The modular programming nature of working with Scratch, where students create, test, and refine their projects, mirrors the problem-solving process inherent in mathematics. This process allows students to engage with mathematical concepts in a meaningful way, particularly in areas like spatial reasoning and logical thinking. Studies by Gökçe and Yenmez (2022) and Benton et al. (2017) similarly highlight the positive impact of Scratch in developing students' understanding of geometric and algebraic concepts. In our study, the high relationship between time spent on Scratch and improved mathematical thinking ($r = 0.721$, $p < 0.01$) suggests that prolonged engagement with Scratch can deepen students' understanding of mathematical principles, particularly in areas that require logical sequencing and spatial manipulation, such as geometry and problem-solving.

The significance of these findings lies not only in the immediate benefits observed in students' mathematical reasoning but also in the potential for Scratch to bridge the gap between coding skills and mathematical thinking. As students engage in Scratch programming, they are not only solving computational problems but are also developing a framework for understanding and applying mathematical concepts. This dual engagement with both computational and mathematics reflects the synergistic relationship between computational thinking and mathematical reasoning, as described by Maraza-Quispe et al. (2021). The study's results align with Chen et al., (2021) assertion that Scratch promotes both creative problem-solving and logical reasoning, encouraging students to think critically and explore abstract mathematical concepts in a practical, interactive environment.

Looking forward, future research should explore how Scratch engages various student groups, particularly with regard to gender and prior mathematical proficiency. While this study shows the positive impact of Scratch on mathematical thinking, it remains essential to investigate how students from diverse backgrounds, such as those with varying levels of mathematical proficiency and gender differences—respond to Scratch-based learning. Previous studies have indicated that Scratch can serve as an inclusive tool that supports students with different learning needs and abilities (Israel et al., 2015), but further research is needed to determine whether its effects are consistent across different student demographics. Additionally, as Scratch continues to be integrated into educational curricula worldwide, it is crucial to assess how its implementation can be tailored to maximize its benefits for all learners, ensuring that both its computational and mathematical learning outcomes are accessible to students with varied backgrounds and learning styles.

In conclusion, the findings of this study emphasize the effectiveness of Scratch as a game-based learning tool for enhancing both coding and mathematical thinking skills in secondary education. By fostering a deeper understanding of mathematical concepts through interactive, game-based learning, Scratch offers a compelling alternative to traditional instructional methods. Educators are encouraged to integrate Scratch into their teaching practices, not only to improve students' technical skills but also to foster critical mathematical thinking.

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Immersive Learning with AR and AI in Hong Kong Education

Jungjin PARK^{1*}, Yuk Lin TSE², Man Kiu NG³, Wincy S C CHAN⁴, Shirley P.C. NGAI⁵, Stephane REODNNET⁶, Ryu FATTAH⁷, Larry K.B. LI^{8*}

^{1,6,8}The Hong Kong University of Science and Technology, Hong Kong SAR, China

²HKTA The Yuen Yuen Institute No.3 Secondary School, Hong Kong SAR, China

³Cheung Sha Wan Catholic Secondary School, Hong Kong SAR, China

⁴The University of Hong Kong, Hong Kong SAR, China

⁵The Hong Kong Polytechnic University, Hong Kong SAR, China

⁷VisionARi, Hong Kong SAR, China

jparkak@connect.ust.hk, larryli@ust.hk

ABSTRACT

We present the development and evaluation of an immersive learning platform integrating augmented reality (AR) and artificial intelligence (AI) technologies, piloted by secondary school and university students in Hong Kong. Since its introduction at ICLT2023, the VisionARi platform has been enhanced with AI-driven features, such as fine-tuned AI agents focused on specific learning topics. The agents guide students through learning modules via conversational and immersive 3-D interactions. These interactions are monitored and analyzed to support the creation of bespoke learning experiences to diverse user needs. We also present a learning management dashboard that compiles and summarizes these metrics, offering educators actionable insights into student performance. Pilot studies were conducted across multiple educational institutions, gathering qualitative and quantitative feedback. At the university level, the platform was implemented in an aerospace engineering laboratory course at The Hong Kong University of Science and Technology and tested with students studying cardiopulmonary physiotherapy at The Hong Kong Polytechnic University, and students studying the science of crime scene investigation at The University of Hong Kong. At the secondary level, the platform was piloted by students studying the HKDSE biology curriculum at HKTA The Yuen Yuen Institute No.3 Secondary School, and Cheung Sha Wan Catholic Secondary School. A mix of user acceptance tests, focus group interviews, and quiz assessments measured user experience, perceived learning efficacy, engagement, and learning enhancements made through the intervention. This study contributes to the growing field of AR and AI in education by addressing technical, pedagogical, and logistical challenges in integrating these technologies. By promoting spatial interactivity and enabling detailed assessment of open-ended responses, the platform offers practical tools to address specific learning challenges in STEM education and supports the broader goal of advancing immersive learning in diverse educational settings.

KEYWORDS

augmented reality, artificial intelligence, immersive learning, STEM education

Enhancing Optometry Clinical Skills Through AI-Powered Tutoring System: A Pilot Implementation Study

Kin WAN^{1*}, Tsz Wing LEUNG²

^{1,2}School of Optometry, The Hong Kong Polytechnic University, Hong Kong SAR, China

²Centre for Myopia Research, School of Optometry, The Hong Kong Polytechnic University, Hong Kong SAR, China

²Research Centre for SHARP Vision (RCSV), The Hong Kong Polytechnic University, Hong Kong SAR, China
kkinwan@polyu.edu.hk

ABSTRACT

Clinical skills training in optometry, crucial for developing competent practitioners, often necessitates intensive hands-on practice and personalized feedback. However, the availability of instructors to provide this level of individual attention is often limited, hindering effective practical training. This project addresses this challenge by developing and evaluating an AI-powered tutoring system. The system employs motion-tracking-based AI algorithms to analyze student performance in preliminary clinical optometric tests, specifically focusing on working distance, instrument positioning, and procedural timing. Feedback is provided in real-time. Questionnaires administered to 37 students and 5 teachers demonstrated the effectiveness of the system in enhancing optometric teaching and learning. It facilitated both instant feedback on procedural accuracy and objective clinical skills evaluation. Teachers rated the system as “extremely useful” for instruction, while students reported increased engagement compared to traditional teaching methods. By quantifying clinical performance, the system provides students with concrete metrics for improvement. Students reported increased confidence and appreciated for the consistent, unbiased feedback. This system not only enhances the learning experience but also offers potential for standardized evaluation across practical sessions. These findings suggest that AI-powered tutoring systems can effectively address the challenges of current optometry practical skills training, maintain high clinical standards, and foster student autonomy in skill development.

KEYWORDS

AI in optometry education, clinical skills training, educational technology

ESP Teachers' Artificial Intelligence (AI) Acceptance and Adoption: A Qualitative Case Study on Aviation English Teachers in China

Yunwen YANG¹, Yue ZHANG^{2*}, Liya ZHOU³

^{1,2}The Education University of Hong Kong, Hong Kong SAR, China

^{1,3}Civil Aviation University of China, Tianjin, China

s1158185@s.edu.hk, yuezhang@eduhk.hk, lyzhou@cauc.edu.cn

ABSTRACT

Many studies have investigated AI-mediated English language education based on students' performance. Therefore, further exploration is necessary to realize how AI tools contribute to English for Specific Purposes (ESP), not merely English for Academic Purposes, especially from teachers' perspective. This paper aims to demystify ESP teachers' acceptance of AI and their AI application in the case of aviation English, focusing on three research questions: (1) What are ESP teachers' initial attitudes towards AI, including perceived benefits, limitations, and concerns? (2) What factors influence ESP teachers' perceptions and intentions of AI? (3) How do their intentions affect their actual behavior? Grounded in the Theory of Planned Behavior (TPB), five ESP teachers from a flight academy in mainland China were invited to attend 1:1 semi-structured interviews. Also, their screenshots of AI use in designing a one-hour lesson plan for the Radiotelephony English course were collected. Findings revealed that ESP teachers had varied familiarity with AI, probably resulting in diverging attitudes. They realized AI could assist them with preparing aviation-specific teaching materials, enable PPT and audio recording generation, provide tailored vocational dialogue exercises, and simulate controller-pilot learning experiences. On the other hand, concerns were raised regarding the potential inaccuracies in interpreting highly specialized aviation English terminologies, as well as immature automatic grading and personalized feedback specific to aviation English contexts. ESP Teachers' intentions to use AI were influenced by their AI acceptance and literacy, ethical concerns over AI undermining teachers' roles, potential over-reliance on technology, and institutional support.

KEYWORDS

artificial intelligence (AI), ESP teachers, AI acceptance, TPB, aviation English

Using Customised Artificial Intelligence Chatbots for the Development of Interaction Skills under Authentic Settings

William Man Yin CHEUNG
City University of Hong Kong, Hong Kong SAR, China
mycheu@cityu.edu.hk

ABSTRACT

The development of interaction skills is a common intended learning outcome of a wide variety of disciplines, such as law, veterinary science, and social science. One useful way to develop such skills is via exposing students to real-life scenarios, which can also offer students with authentic learning opportunities that enhance the connection between learning in classroom and application in workplace. Developing these real-life scenarios, however, can be time-consuming, and it can be challenging to accommodate the highly variable responses from the students when they explore these scenarios. Utilising a mixed-methods approach (quantitative survey results and qualitative interview responses), this paper evaluates how a university in Hong Kong tackles the abovementioned challenges with artificial intelligence (AI) chatbots that are based on Large Language Models and customised with course-specific knowledge. These include a chatbot customised to take up the role of a veterinary assistant who helps the students in veterinary science to make diagnoses and suggest treatment plans for sick horses. Another example would be a chatbot equipped with legal knowledge of a court case to argue what kind of sentence should be imposed. It is hoped that the results of this study can shed light on how customised AI chatbots can be appropriately used for the enhanced achievement of learning outcomes by students.

KEYWORDS

customised chatbot, Large Language Models, authentic learning, interaction skills, mixed-methods approach

Empowering Remote-Area Students' Literacy in Academic Writing through Digital Tools and Critical Use of GenAI

Soryaly CHAU^{1*}, Khon CHAU², Nguyen Phi Oanh CHAU³, Thi Kim Thao PHAN⁴, Chi Huy NGUYEN⁵

¹The Education University of Hong Kong, Hong Kong SAR, China

^{1,2}An Giang University, VNU-HCM, Vietnam

³SOM English Center, Vietnam

⁴Van Hien University, Vietnam

⁵YINS Center, Vietnam

s1136219@s.eduhk.hk, ckhon@agu.edu.vn, chaunguyenphioanh@gmail.com, thaokim.pt@gmail.com,
chihuy4work@gmail.com

ABSTRACT

Enhancing English language capacity for young learners throughout the country, particularly remote-area students, emerges in the Vietnamese government's national foreign language development projects. The Ministry of Education and Training (MOET) has issued decrees and documental policies immediately to adopt the different contexts of schools in Vietnam to foster students with English language capacity productively, especially in academic writing. However, remote-area students face unique challenges compared to urban-area students. The paper first aims to explore students' challenges. Then, it examines the process of students using digital tools and generative AI (GenAI) to improve their academic writing skills using the teacher's instructions and lessons. Data was collected through 25 face-to-face interview participants, who were interviewed for 30 to 45 minutes together with their essay writing assignments' performance in six months. The interviews, after transcribing and translation (from Vietnamese to English), were analyzed using NVivo 12 for a systematic analysis. The findings of the study show the main themes: (1) the necessity of introducing and training the use of digital tools and GenAI; (2) the importance of evaluation and assessment; (3) the necessary supports from schools and teachers; (4) the national language and policy planning. Discussions and recommendations are valuable references for MOET and governmental authorities to reconsider the national language development projects throughout the years to prepare for effective students' literacy in academic writing.

KEYWORDS

empowering, remote-area students' literacy, academic writing, digital tools, critical use of GenAI

Enhancing Academic Writing for Second-Language Learners: Guiding Ethical and Effective Use of AI Tools in Literature Reviews

Shiqian ZHOU¹, Qian ZHANG²

¹The Education University of Hong Kong, Hong Kong SAR, China

²Central South University, Hunan, China
jszhou@eduhk.hk

Abstract: *Many students, mainly English second-language learners, find English academic writing challenging. This research aims to enhance second-language learners' academic language proficiency by guiding students to use AI tools such as Avidnote, Elicit, and Scite. While AI tools improve students' English language use and sentence structures, they raise concerns about academic integrity. The primary issue is the risk of academic dishonesty, as some students may over-rely on AI, neglecting critical thinking and engagement with their learning. This research addresses these concerns by teaching students to use AI effectively and ethically, helping them balance legitimate assistance with the risk of misconduct. The research involved 33 senior undergraduates and postgraduates majoring in Education and Language Studies, participating in 12 workshops on writing literature reviews. Feedback from focus group interviews indicated that while AI helps students efficiently summarize academic sources, many copy and paste AI-generated content without modification, leading to superficial analysis and potential academic misconduct. Two key themes emerged: AI's effectiveness in research writing and the need for guidance on avoiding academic misconduct. The study recommends instruction on responsible AI use, emphasizing critical evaluation and ethical concerns, and proposes guidelines for proper AI integration in academic writing.*

Keywords: AI integration in research, ethical consideration of using AI, second-language learning assistance, literature review writing tips, AI usage guidelines

1. Introduction

While many students use AI to directly generate essays due to its ability to produce content within a minute, which improves their working efficiency, many English as a second language (ESL) learners rely on AI for academic writing not to generate content, but to polish their writing. This phenomenon can be explained by the anxiety and timidity that second-language users often experience when writing in English for academic purposes. Yu (2020) notes that students may feel anxious or even frightened without sufficient practice when required to write in English. This fear arises from the challenges of writing in a foreign language, which demands both emotional and cognitive engagement. Cheng (2000) and Lee (2005) highlight that limited language proficiency, cultural unawareness, and the inability to understand cross-cultural expectations of academic writing present significant obstacles for ESL learners. These challenges result in students' neglect of the social and cultural nuances of academic writing, prompting them to use AI for polishing their academic writing. AI-powered tools can mitigate these issues and alleviate non-native speakers' writing anxiety. For example, Jia et al. (2022) found that learners can benefit from AI-generated corrective feedback when feeling confused about whether they write in a proper way, while some AI platforms, such as Automated Writing Evaluation (AWE) systems, provide context-sensitive support during different stages of the writing process (Alharbi, 2023). Duncanson (2024) further suggests that platforms like QuillBot can support students by simplifying complex linguistic structures and providing real-time feedback, helping learners refine their drafts and meet academic expectations. These tools offer a safe and constructive environment for practice, enabling learners to develop their writing abilities while gradually building confidence.

Building on the foundations of existing research on AI's potential to tackle the writing challenges faced by English second-language learners, my study investigates whether AI research tools—Scite, Elicit, and Avidnote—can support students who use English as a second language in writing literature reviews. Literature reviews require advanced skills in comprehension, synthesis, and critical engagement with academic sources, which often overwhelm learners identified as English second language users. To address these challenges, my research involved 33 senior undergraduates and postgraduates who use English as their second language in Education and Language Studies from the Education University of Hong Kong. These students participated in 12 workshops about effectively integrating AI tools into their academic writing process. The workshops introduced Scite for identifying citation patterns and relevant studies, Elicit for automating the summarization of academic materials, and Avidnote for organizing and annotating research notes. By using these tools, students gained academic support in organizing the structure of literature reviews, locating sources for analysis, and polishing the writing language.

While the study argues that AI tools can help enhance students' ability to summarize sources and structure their writing, it also revealed ethical concerns regarding academic dishonesty and a lack of human originality in writing. Many participants admitted that they directly copied and pasted AI-generated content without modification even though the writing produces superficial analysis and lack critical engagement. Their practices raised the risk of academic misconduct, highlighting the

need for structured guidance on how to use AI properly in academic writing. Feedback from focus groups underscored two main themes: the effectiveness of AI in streamlining research writing and the necessity for frameworks to prevent over-reliance on these tools. To address these concerns, the study proposed a dual approach to promote ethical and effective use of AI tools. First, the research suggests that students must critically evaluate and adapt AI-generated content. Students should engage meaningfully with the suggestions provided by AI, using the tools as a complement rather than a substitute for their intellectual effort. Also, students might need teachers' assistance with critical analysis in their literature review. Second, teachers should develop ethical guidelines to balance the advantages of AI with the need for academic integrity. These guidelines must indicate for what purposes, such as using AI for brainstorming ideas, organizing research, and verifying grammar, while discouraging direct reproduction of AI outputs in final drafts.

2. Methodology

This study conducted focus group interviews to explore the effectiveness of AI tools in assisting English second-language students with research writing. The research investigated how AI tools such as Scite, Elicit, and Avidnote could aid students in writing literature reviews, especially organizing the structure and producing critical evaluation of the sources, while also addressing ethical concerns associated with their use. A total of 33 senior undergraduates and postgraduates, majoring in Education and Language Studies, participated in this research. They were all Chinese native speakers and English second-language learners. They were enrolled in 12 workshops designed to familiarize them with these AI tools and enhance their ability to locate academic sources effectively, organize academic writing, and improve their writing proficiency.

After the workshops, participants must participate in an 1-hour focus group interview. These interviews collected qualitative data on the students' experiences using AI tools during the workshops, which enables assessment of the AI-powered tools' effectiveness in supporting their research writing process. The focus group interviews covered several key themes: the alignment of workshop outcomes with students' expectations, the perceived usefulness of AI tools in research writing, challenges faced in the writing process, and the ethical considerations surrounding AI use.

The questions in the focus group interviews addressed specific research aims. To assess whether the workshop met students' learning expectations, participants were asked if the outcomes of the workshop aligned with their initial expectation and what they hoped to gain from it. This question aimed to evaluate the overall success of the workshop's design. Evaluating the effectiveness of the AI tools, the interview asked students about their perceptions of the tools' usefulness in research writing, including whether they helped overcome specific challenges such as summarizing sources or organizing content. Moreover, the interview explored whether there were any needs in the research and writing process that participants felt AI tools could not address. Therefore, the study also identified limitations of AI tools, suggesting a user guideline that maximizes the benefits of AI in the field of research writing.

Ethical concerns were also a focus of the interview. Participants compared their experiences with AI tools to working with human tutors and to reflect on any ethical challenges related to over-reliance on AI-generated content, such as the risk of academic misconduct. This line of questioning aimed to highlight the ethical implications of integrating AI into academic writing. Finally, students were invited to suggest improvements to the workshop design and provide feedback on additional support they might need for further development of their research writing skills.

Overall, the focus group interviews focused on the students' experiences, the effectiveness of AI tools, and the ethical considerations associated with their use in academic writing. The results of these interviews informed recommendations for refining the integration of AI tools in academic writing instruction for English second-language students.

3. The Benefits and Challenges of AI Tools in Literature Review Writing

3.1. Background on AI in Academic Writing

Artificial Intelligence (AI) tools, such as Scite, Elicit, and Avidnote, help students improve their writing efficiency by offering them emotional support and providing instant feedback on how to improve their academic writing. Besides these practical functions, AI could even offer emotional support to English second-language learners when experiencing difficulties in writing. For instance, Nazari et al. (2021) found that AI intervention improved writing outcomes for students by enhancing self-efficacy and encouraging persistence. This finding is consistent with studies that show AI can help students become more confident in their writing abilities, which in turn results in improved performance (Nazari, Shabbir, & Setiawan, 2021). Also, AI tools provide students with instant, personalized feedback, which can help English as a second language (ESL) students revise their writing promptly and earn a higher grade. According to the research by Utami et al. (2023), AI-powered tools, particularly in writing classes, allow students to access immediate corrections, helping them recognize and address errors in real-time. By using these AI tools, students can reduce writing anxiety, a barrier for many ESL students, and builds their confidence as they see improvements in their work (Duncanson, 2024). Similarly, the work of Talayhan (2023) emphasizes AI's role in organizing and structuring writing effectively, ensuring that students produce coherent and logically arranged essays.

3.2. Benefits of AI integration in Research Writing

The introduction of AI tools in literature review writing in the workshop enables students to effectively find and understand sources useful to be incorporated in their literature review. Instead of searching for articles in databases like Jstor and Google Scholar, participants in the focus group interview revealed that Scite, Avidnote, and Elicit could directly extract excerpts from different scholarly journals simply by inputting a prompt. 23 participants mentioned that Scite was helpful for quickly finding articles on research topics, which saved much time and effort. For example, Scite, a tool for identifying relevant literature, reduced the time spent on initial research because it can list different scholarly sources instantly. This AI function supports that AI tools facilitate the effective organization of ideas by presenting sources required for synthesis and analysis (Talayhan, 2023). Furthermore, 9 participants appreciated how AI tools helped them filter key information from articles so that they do not need to read the whole paper, enhancing their ability to understand the main points quickly. Avidnote and Elicit could extract key points from articles in a simpler language, making the abstract content easy to understand. Therefore, AI tools could assist in organizing writing and helping students structure their research more coherently (Utami et al., 2023). Also, AI tools facilitate efficient comprehension of complex academic texts by directly synthesizing the key takeaways in the academic discourse without having students read through every article (Utami et al., 2023).

3.3. Challenges and Limitations of AI Tools in Literature Review Writing

Despite the advantages, 12 participants found limitations in the use of AI tools. The focus group interview showed that obtaining effective answers from AI tools requires premium versions, but Scite and Avidnote only provides limited free prompts, making the use of AI costly. Similarly, while tools like Avidnote helped with understanding literature, participants suggested that they needed other functions to help them directly link key information to the articles from which it came because sometimes the extract provided by AI might appear in the wrong page. One participant suggested that AI tools like Avidnote could be more effective if they linked extracted information back to the original source, allowing users to trace content more effectively. From the feedback, students wrote the literature review completely with AI instead of their own intellectual efforts, which reflects the concern raised by Zhang (2024): Over-reliance on AI tools may prevent students from developing their independent critical thinking and writing skills.

Also, students have problem assess whether the AI-generated content is well-written. while AI tools helped students gather and organize information, one interviewee highlighted difficulties in assessing whether literature review meets the academic criteria because she did not study the proper writing style of a literature review prior to the workshop. She felt that the AI's writing lacked full logic and clear explanation of ideas. For example, Scite and Avidnote both use repetitive phrases such as "This essay explores the relationship..." without clearly explaining what the relationship is. As another participant shared, after collecting information from AI tools, the challenge was organizing the content into a logical and coherent structure because AI attempted to indicate logical transitions with phrases like "therefore" and "as a result," even when the sentences were not actually connected by a cause-and-effect relationship. This difficulty aligns with Duncanson's argument that while AI tools can assist with generating ideas and refining writing, students still face challenges in organizing their thoughts and connecting various sections of their literature review into a cohesive whole (Duncanson, 2024).

3.4. Effectiveness and Future Directions for AI in Literature Review Writing

Although Nazari et al. (2021), Utami et al. (2023), and Talayhan (2023) all suggest that AI tools can enhance students' ability to effectively locate relevant sources needed for their research paper and generate a brief summary of each source's arguments, AI-generated content provided by Scite, Avidnote, and Elicit sometimes provide inaccurate academic information, superficial understanding of the sources, and illogical presentation of the ideas. Therefore, to maximize their effectiveness and address the problems caused by AI, students must use these tools responsibly to avoid overdependence, as noted by Zhang (2024). Also, participants suggested that workshops could incorporate more human tutoring to help them evaluate the quality of AI-generated content because tutors could provide a more detailed feedback while AI-generated writing often lacks depth in source analysis. Therefore, teacher should develop AI usage guidelines to ensure students stay on the right track in academic writing while allowing them to use AI.

4. Proper Use of AI Tools in Research Writing and the Teacher's Role in Guiding Students

4.1. Ethical Consideration of AI and Challenges to Academic Integrity

The integration of Artificial Intelligence (AI) tools in literature review writing offers students opportunities to improve their writing language, structure ideas, and receive feedback on their content quality. However, the use of AI tools also presents ethical considerations because many students submit AI-generated writing as their own. This overreliance on AI has led students to abandon conducting their own research, such as searching for literature or composing original content, undermining students' ability to think independently and develop their own writing skills. To engage students in the academic writing with the use of AI, teachers should emphasize that AI tools must be aids, not substitutes for the student's intellectual effort. Educators should emphasize academic integrity and provide clear guidelines for how to ethically incorporate AI into the writing process ("ChatGPT in higher education: Considerations for academic integrity and student learning," 2023).

4.2. Suggestions on How to Use AI Responsibly in Writing Literature Reviews

Instead of using AI to generate an essay, students should use AI tools as research databases during the early stages of writing, particularly for drafting essay outlines. For instance, Elicit can assist students in brainstorming ideas or generating initial drafts, helping them establish a foundation for further development. However, students should be actively engaged with the AI-generated content because the content should be a starting point rather than a final product, refining it to match their perspective and research objectives (Mahmud, 2023; Hidayatullah, 2024). Students can also use AI to get feedback on essay revision. For example, AI tools such as Grammarly can help in the revision phase by suggesting improvements in clarity, structure, and grammar (Alharbi, 2023; Nazari et al., 2021). However, students should critically assess these suggestions to ensure that the revisions align with the tone and academic standards of their work, avoiding over-reliance on AI-generated feedback.

4.3. Teachers' Role in Guiding the Use of AI Tools

Teachers should first guide students in understanding the specific academic criteria of a literature review prior to the introduction of AI, helping them evaluate AI-generated content more effectively (Nazim, 2024). Next, teachers should make it clear about the role of AI in different writing stages. For example, students can use AI for grammar checking and academic discussion, but not content generation. Students can be inspired by discussion with AI, yet they must use their words to produce their own arguments in writing. By setting clear guidelines, teachers can ensure students maintain academic integrity and use AI tools responsibly, distinguishing between helpful assistance and plagiarism (Mudawiy, 2024). Monitoring students' AI usage and providing constructive feedback on drafts can further enhance the students' writing, ensuring that AI complements their efforts rather than replacing them (Nazari et al., 2021).

5. Conclusion

The study highlights both the advantages and challenges of integrating AI tools such as Scite, Elicit, and Avidnote into academic writing for second-language learners. These tools enhance the efficiency of literature reviews, improve writing language, and provide immediate feedback. For example, participants found that AI tools helped them find sources for research, summarize academic materials, and generate a draft, reducing writing anxiety and boosting self-confidence. However, ethical concerns regarding over-reliance on AI and academic misconduct must be addressed, as some students resorted to directly copying AI-generated content without critical engagement. This potential act of plagiarism suggests the need for promoting responsible AI use to ensure students maintain academic integrity.

To maximize English second-language learners' writing efficiency while avoiding academic misconduct, AI tools should complement rather than replace students' intellectual efforts. Teachers should develop the ethical guidelines of using AI, encouraging students to refine AI-generated content to suit their personal research goals and defining the role of AI in writing. Furthermore, the feedback from participants suggests that AI fails to support more advanced aspects of academic writing, such as structuring literature reviews cohesively. Therefore, while AI integration increases writing efficiency and confidence, students still need human guidance to foster critical thinking skills. Combining the efforts of AI and human assistance, English second-language students are more likely to improve their writing outcomes while maintaining academic rigor: They can quickly receive and evaluate feedback from AI assistant to revise their original ideas accordingly.

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Empowering Remote-Area Students in English Speaking Skill through Digital Tools and Critical Use of GenAI

Soryaly CHAU^{1*}, Khon CHAU², Nguyen Phi Oanh CHAU³, Thanh Tien HUYNH⁴, Chi Huy NGUYEN⁵, Tien Phong NGUYEN⁶

¹The Education University of Hong Kong, Hong Kong SAR, China

^{1,2,4}An Giang University, VNU-HCM, Vietnam

³SOM English Center, Vietnam

⁵YINS Center, Vietnam

⁶A Kien Thanh Primary School, Vietnam

s1136219@s.eduhk.hk, ckhon@agu.edu.vn, chaunguyenphioanh@gmail.com, htien@agu.edu.vn, chihuy4work@gmail.com, nguyentienphong92@gmail.com

ABSTRACT

Enhancing English language capacity for young learners throughout the country, particularly remote-area students, emerges in the Vietnamese government's national foreign language development projects. The Ministry of Education and Training (MOET) has issued decrees and documental policies immediately to adopt the different contexts of schools in Vietnam to foster students with English language capacity productively, especially in academic writing. However, remote-area students face unique challenges compared to urban-area students. The paper first aims to explore students' challenges. Then, it examines the process of students using digital tools and generative AI (GenAI) to improve their academic writing skills using the teacher's instructions and lessons. Data was collected through 25 face-to-face interview participants, who were interviewed for 30 to 45 minutes together with their essay writing assignments' performance in six months. The interviews, after transcribing and translation (from Vietnamese to English), were analyzed using NVivo 12 for a systematic analysis. The findings of the study show the main themes: (1) the necessity of introducing and training the use of digital tools and GenAI; (2) the importance of evaluation and assessment; (3) the necessary supports from schools and teachers; (4) the national language and policy planning. Discussions and recommendations are valuable references for MOET and governmental authorities to reconsider the national language development projects throughout the years to prepare for effective students' literacy in academic writing.

KEYWORDS

empowering, remote-area students' literacy, academic writing, digital tools, critical use of GenAI

Navigating AI Integration in Education: Insights from a Hong Kong Institution

Ho-lam LAU
UOW College Hong Kong, Hong Kong SAR, China
hllau@uow.edu.au

ABSTRACT

The proliferation of artificial intelligence (AI) tools in education has transformed pedagogical practices globally. However, in Hong Kong, regulatory restrictions on prominent AI platforms create unique challenges, compelling users to employ virtual private networks for access. This study examines the adoption patterns and implications of AI tools among faculty and students at a Hong Kong higher education institution. Using mixed-methods research with surveys (n=64) and semi-structured interviews (n=30), it explores two dimensions: (1) students' utilization patterns and primary applications of AI technologies, and (2) the integration of AI tools in teaching methodologies across disciplines. Findings reveal significant disparities in AI tool accessibility and usage, influenced by technical proficiency and regional restrictions. Major AI tools like ChatGPT 4.0, Claude, Gemini, and Llama are not the first choice for local students, who primarily use POE (55%), ChatGPT 3.5 (36%), and Grammarly (34%) for language skills (58%) and research (48%). Educators express concerns about AI dependence and academic integrity, highlighting educational equity issues due to regional restrictions. Enhancing AI literacy among Hong Kong students is crucial for competitiveness. The study also presents case studies of AI integration in language teaching, programming education, and creative media production. It underscores the need for balanced AI integration in higher education, emphasizing ethical AI usage and academic rigor.

KEYWORDS

AI in education, educational equity, AI literacy, AI tools usage

A Professional Community for Language Teachers' TPACK development in the Digital Age

Lixun WANG^{1*}, Boyuan REN², Di ZOU³

^{1,2}The Education University of Hong Kong, Hong Kong SAR, China

³Hong Kong Polytechnic University, Hong Kong SAR, China

lixun@eduhk.hk

ABSTRACT

This study investigates a professional learning community (PLC) aimed at enhancing university language teachers' Technological Pedagogical and Content Knowledge (TPACK). Through online public sharing sessions focused on emerging technologies like AI and the metaverse, the research examined teachers' development across the seven TPACK domains. An online survey provided insights into participants' self-assessments of the usefulness of these sessions and their impacts on teaching practices. Additionally, semi-structured interviews with nine university teachers in Hong Kong offered deeper insights into the adoption of new tools post-PLC participation. Analysis of ten survey responses and nine interview transcripts revealed several key findings: (1) All participants expressed satisfaction with the sharing sessions, which facilitated peer learning and adaptation to new technologies; (2) Most teachers felt motivated by the rapid evolution of educational technologies to enhance their pedagogies; (3) Notably, teachers perceived varying benefits across the TPACK domains, influenced by their initial TPACK levels and their understanding of technology integration; and (4) Challenges in implementing TPACK were identified, highlighting the need for institutional support, appropriate technology selection, and student engagement. The study underscores the importance of collaborative efforts in successful TPACK implementation and offers implications for future university training programs aimed at fostering AI literacy among teachers.

KEYWORDS

AI and Metaverse in education, Professional learning community, University teacher training, TPACK, Educational technology

Enhancing students' science learning engagement and outcomes through game-based learning with intelligent agents in a virtual reality environment – LearningverseVR

Yanjie SONG^{1*}, Kaiyi WU², Jiachen FU³

^{1,2,3} The Education University of Hong Kong, Hong Kong SAR, China
ysong@eduhk.hk, kwu@eduhk.hk, fjiachen@eduhk.hk

ABSTRACT

The rapid evolution of artificial intelligence (AI) technology is revolutionising various fields, including education and the gaming industry. However, studies on how to enhance immersive digital game-based learning with AI and virtual reality (VR) technologies remain scarce. To address this gap, this study aims to develop and evaluate an immersive game-based learning platform – LearningverseVR for enhancing students' science learning engagement and outcomes. The design framework of LearningverseVR consists of two main components: game-based learning with intelligent agents and immersion with VR technologies. First, intelligent agents are used to create digital avatars with diverse personalities and backgrounds, enabling learners to interact with them without scripted dialogues, thus creating an interactive and immersive game-based learning environment. Second, this learning experience is enhanced by VR technology. The creation of the LearningverseVR platform provides novel perspectives on digital game-based learning. An empirical study was conducted in evaluating the effectiveness of game-based learning with intelligent agents in science learning engagement and outcomes in LearningverseVR, using an experiential instruction design on the topic of Newtonian mechanics in a secondary school. Twenty-seven participants were involved in the study. Data collection included pre- and post-engagement questionnaire, pre- and post-test, semi-structured interviews, and logged artifacts in the VR learning environment. Both qualitative and quantitative data analysis methods were adopted. The findings suggest that intelligent agents significantly enhanced students' science learning engagement and outcomes, offering a compelling case for broader adoption in VR applications in school education.

KEYWORDS

virtual reality, LearningverseVR, intelligent agent, game-based learning

Honing teacher's Socratic dialogue skills with generative artificial intelligence for the Mathematical Modeling Cycle

Mik Kei KUNG¹, Jeff Chak Fu WONG^{2*}

^{1,2}The Chinese University of Hong Kong, Hong Kong SAR, China
micky.1999@hotmail.com, jwong@math.cuhk.edu.hk

ABSTRACT

Generative artificial intelligence (AI), such as Asure OpenAI, is integrated into the RStudio online learning platform for the Mathematical Modeling Cycle (MMC), which is designed to address real-life problems. Using a conceptual and procedural approach, students gain a comprehensive understanding of the MMC by recognizing and defining the problem, identifying data sources, selecting guiding theories and principles, making valid and safe assumptions when necessary, determining suitable methods for problem-solving, verifying results, validating mathematical outcomes in real-life contexts, and presenting solutions. Each stage of the MMC includes illustrative examples that utilize Socratic dialogue skills alongside generative artificial intelligence. The interaction with tools like Copilot and POE (Proof of Evidence) highlights the importance of cross-referencing information, fact-checking, and developing critical thinking skills to enhance accuracy and reliability. Engaging with generative AI can improve access to knowledge, support complex and individualized learning, and alleviate instructional workload. Through hands-on learning experiences, students explore both deterministic and stochastic examples, enhancing their mathematical understanding and practical skills. This talk introduces the general framework of this site, and different real-life examples are used to benefit our secondary students.

KEYWORDS

Generative artificial intelligence, Mathematical Modeling Cycle, Socratic dialogue skills

Generative AI-Enabled Design: Enhancing Design Task Performance and Perceptions Among University Students

Jingxi LIU¹, Daner SUN^{2*}, Zhizi ZHENG³

^{1,2,3}Department of Mathematics and Information Technology, The Education University of Hong Kong, Hong Kong SAR, China

ljingxi@eduhk.hk, dsun@eduhk.hk, s1147994@s.eduhk.hk

ABSTRACT

This study investigates the role of generative AI, particularly tools like ChatGPT, in enabling and enhancing design tasks within educational technology development. The focus is on creating a Generative AI-Enabled Educational Website tailored for primary school students (ages 6-12). The project assesses design task performance and explores user perspectives regarding the adoption of generative AI in the design process through a comprehensive survey. The primary objective is to develop a visually appealing and highly interactive website that promotes active and enjoyable learning while addressing the diverse needs of young learners. The design process integrates generative AI to brainstorm ideas, refine solutions, and optimize creativity and efficiency. Key deliverables include a feature summary, design prototypes (wireframes and mockups), and descriptions of interactive elements such as quizzes, animations, and games. Emphasis is placed on user interface design, incorporating child-friendly visuals, colors, and navigation to enhance accessibility. To evaluate the performance of generative AI in the design process, two components are examined: (1) design outcomes, measured through task execution and quality of deliverables, and (2) user perspectives gathered through an online survey. The survey assesses participants' perceptions of generative AI's value, usability, and effectiveness in improving design efficiency, creativity, and problem-solving.

KEYWORDS

Generative AI, Design Performance, Students Perceptions, University Levels

擊劍教學與訓練中融合元宇宙技術的研究

A Proposed study on Integration of Metaverse Technologies in Fencing Instruction and Training

趙珩捷^{1*}, 楊茵²

^{1,2}數學與資訊科技學系, 香港教育大學, 香港, 中国
s1157932@s.eduhk.hk, yyin@eduhk.hk

摘要

隨著動作捕捉技術的進步, 研究如何將運動員的訓練和學習引入虛擬實境, 以提高運動整體表現, 成為當前的研究重點。擊劍涉及複雜的資訊處理、刺激感知, 與戰術和策略緊密相關。利用虛擬空間訓練可以提升這些能力, 同時降低時間和空間成本。其次, 擊劍是一項接觸性的體育活動, 儘管裝備專業, 仍然存在受傷的風險, 透過虛擬實境進行擊劍可以顯著降低受傷概率。教練可以透過遠程指導或人工智能的動作識別技術進行調整。此研究將探討元宇宙技術提升擊劍運動水準的可行性, 特別是對運動員的資訊處理和感知訓練如何提高反應速度和劍尖準確度。研究將採用混合方法, 結合文獻回顧和焦點訪談, 收集教練和運動員對於元宇宙技術應用於擊劍訓練的看法和經驗。研究將評估元宇宙實施擊劍教育的有效性和對提高運動水準的潛力, 同時提供一個無縫環境, 使運動員能在虛擬空間進行訓練, 獲得即時反饋和個性化指導, 提高訓練的便利性和效果。

關鍵字

虛擬空間; 元宇宙; 擊劍運動; 用戶感受; 體育教育

基於“STEM 創新教育”課程的職前教師跨學科能力培養策略

Cultivating Strategies for Preservice Teachers' Interdisciplinary Competence Based on "STEM Innovative Education" Curriculum

朱敏捷^{1*}、劉雪旋²、覃宗傑³、張譽尹⁴、黃子蕙⁵

^{1,2,3,4,5} 華南師範大學教育信息技術學院，廣東廣州

1035908703@qq.com, liuxueni@m.scnu.edu.cn, 1927087955@qq.com, 2023020891@m.scnu.edu.cn,

1095232979@qq.com

【摘要】職前教師作為未來教育的主力軍，其培養受到廣泛重視。當前職前教師培養過程中，職前教師的跨學科能力培養尚未得到足夠的重視。基於此，本研究採用准實驗研究法，探究“STEM 創新教育”課程對職前教師跨學科能力培養的效果，構建了職前教師跨學科能力測評量表，對持續 6 周的課程 126 名職前教師進行問卷調查。研究結果表明，職前教師跨學科能力水準不均衡、“STEM 創新教育”課程能夠促進職前教師跨學科能力提升。提出了促進跨學科能力各維度協同發展、開發職前教師跨學科課程體系、加強校企合作拓寬職前教師跨學科能力實踐領域三條培養策略。

【關鍵字】STEM 創新教育；職前教師；跨學科能力

Abstract: Pre-service teacher training, vital for future education, often lacks focus on interdisciplinary competence. This study used a quasi-experimental method to explore the impact of a “STEM Innovation Education” program on developing such competence. An Interdisciplinary Competence Scale was designed, and a survey was conducted with 126 pre-service teachers over six weeks. Results showed that their interdisciplinary competence was uneven but improved significantly through the program. The study recommended three strategies: fostering balanced growth across different competence dimensions, creating specialized interdisciplinary curricula, and enhancing school-enterprise collaboration to expand practical training opportunities, thus strengthening real-world interdisciplinary applications for pre-service teachers.

Keywords: STEM Innovative Education, Preservice Teachers, Interdisciplinary Competence

1. 問題的提出

在當今快速變化的世界中，教育領域正面臨著前所未有的挑戰。隨著科技的迅猛發展和全球化的深入，社會對於人才的需求已經從單一學科的專業型轉向跨學科綜合型，跨學科能力的培養顯得尤為重要。職前教師作為未來教育的主力軍，其跨學科能力培養受到廣泛重視。《國家中長期教育改革和發展規劃綱要（2010-2020 年）》提出了“跨學科、跨領域的科研與教學”的發展任務（中華人民共和國教育部,2010）。《關於全面深化課程改革落實立德樹人根本任務的意見》明確改革的重點是“基於核心素養，在發揮各學科獨特育人功能的基礎上，充分施展學科間綜合育人的功能，開展跨學科教育活動，將相關學科的教育內容有機整合，提高學生綜合分析問題、解決問題的能力”（中華人民共和國教育部,2014）。《普通高等學校師範類專業認證實施辦法（暫行）》在職前教師的畢業要求中規定“作為未來教師應具有將學科與實際聯繫的學科素養和運用批判性思維方法，學會分析和解決教育教學問題的學會反思的能力”（中華人民共和國教育部,2017）。《義務教育課程標準（2022 年版）》明確提出了跨學科學習理念（中華人民共和國教育部,2020）。Capraro 等人（2017）在其研究中探討了通過項目式學習提升職前教師跨學科能力的有效性。歐盟委員會（European Commission, 2017）發佈的《教育與培訓 2020 工作計畫》中，將跨學科能力作為教育品質提升的關鍵指標之一。職前教師作為未來教師的“儲備軍”，職前教師擁有跨學科能力已成為達成高品質人才培養目標的要求和基礎，也是未來勝任教師職業崗位的需要。然而，當前職前教師的培養過程中，跨學科能力的培養尚未得到足夠的重視，這在一定程度上限制了他們未來在教育實踐中的創新和適應能力。

STEM 教育已成為跨學科能力的主流培養模式。STEM 教育起源于美國，根本目的是提升大學生的科學類學科整合能力，國外學校許多課程都強調採用 STEM 教學方式。《義務教育小學科學課程標準》提出“宣導跨學科學習方式，認為 STEAM 是一項以科學、技術、工程、藝

術、數學為一體，以項目學習、問題解決為導向的課程組織方式，有利於學生創新能力的培養”。陳小敏（2019）研究 STEM 教育和小學跨學科學習融合，認為跨學科能力是個體或團體在解決複雜的實際問題時，依託多學科知識，在不同學科知識探索整合的過程中，所表現出來的多學科知識儲備、創新素養、團隊合作以及運用實踐能力。實踐證明，STEM 教育為學生科學探究思維的培養帶來了革命性變化，能幫助學生在工程設計和科技探索中整合概念和過程知識，培養學生解決問題和創造性設計的能力，有助於培養具有創新精神與實踐能力的複合型人才。在師範院校職前教師培養課程體系中，開設 STEM 通識課程來培養師範生的跨學科能力是非常必要的。因為通識課程本質上就是鼓勵學科之間的相互滲透，提倡跨學科融合的。本研究目標是以 H 校“STEM 創新教育”為例，圍繞兩個問題開展調查研究：1. 師範生跨學科能力現狀如何？2. 開展 STEM 通識課程對師範生跨學科能力培養是否有幫助？最後分析基於“STEM 創新教育”課程提升職前教師跨學科能力的途徑，為職前教師培養改革提供借鑒。

2. 研究設計

2.1. 研究流程

為了探究“STEM 創新課程”對職前教師跨學科能力培養的效果，本研究面向 H 校 2020 級通識課程“STEM 創新教育”隨機招募了 126 名職前教師（見表 1），所有參與者之前均未接觸過“STEM 創新教育”。

表 1 學生基本資訊情況

變數	具體分類	人數	百分比 (%)
性別	男	90	71.4
	女	36	28.6

在本次實驗中，研究團隊與 126 名職前教師進行了互動，幫助每位職前教師完成“STEM 創新教育”課程（具體的實驗流程如圖 1 所示）。第 1 周，在“STEM 創新教育”課程開始前，首先對職前教師進行實驗準備說明，幫助職前教師更好地開展課程學習，並對職前教師發放跨學科能力前測量表。在“STEM 創新教育”課程開展過程中，職前教師首先線上完成為期 4 周的自主學習，對 STEM 專案的實踐流程、STEM 的經典教學實踐案例進行初步學習，在第 6 周時，線下到 STEM 創新教育實驗室完成“智慧主題”的 STEM 專案，並在課程學習結束後對職前教師發放跨學科能力後測量表。

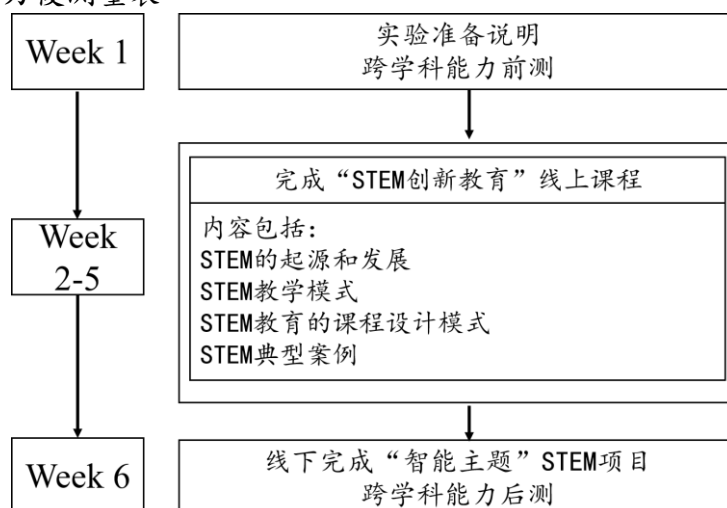


圖 1 實驗流程

2.2. 職前教師跨學科能力量表

現有研究對職前教師跨學科能力研究較少，更多是對於“教師跨學科能力”的研究。對於教師跨學科能力的內涵尚無統一的定義，陳嬋等（2006）認為，個體整合不同學科知識來應對複雜多變的情境的能力就是跨學科能力。王素（2017）認為，教師跨學科能力除了一般的教學能

力以外，還要正確理解跨學科課程，能採用相應的教學方法及整合相關資源來開展跨學科教學。王光明等（2017）提出要關注不同學科間的知識聯繫，通過建構知識有效融入實際問題。在綜合了現有研究的基礎上，本研究進一步明確跨學科能力的核心要素，並據此構建一個全面的評估框架。本研究認為跨學科能力是評估職前教師跨學科素養的關鍵指標，涉及多學科知識儲備、創新表現、團隊合作、實踐運用等要素。本研究以此作為評價標準，參照教師跨學科能力量表（陳小敏，2019）、Interdisciplinary Work and Learning Survey（Gardner, S. K et al., 2018）、Dispositif d’Evaluation des Compétences Interdisciplinaires（Gouraud & Chabanne, 2016），設計了職前教師跨學科能力量表（Cronbach’s $\alpha=0.94$ ），該量表包含四個維度（見表2）：一是多學科知識儲備，二是創新表現，三是團隊合作，四是實踐運用。採用李克特五分量表進行評定，1分代表‘非常不符合’，2分代表‘不符合’，3分代表‘中立’，4分代表‘符合’，5分代表‘非常符合’。

表 2 跨學科能力量表特質題項設置

維度	題項描述
多學科知識儲備	瞭解掌握一門及以上學科知識、可以進行多學科知識的互相滲透
創新表現	有創新意識、創新思維、運用創新方法解決問題
團隊合作	有合作意識、一定的組織交流能力、能夠適應小組角色
實踐運用	能運用跨學科能力去解決問題

3. 研究結果

3.1. 職前教師跨學科能力四個維度發展水準不均衡

為了對職前教師跨學科能力情況獲得整體性的認識，本研究以中值 3 作為比對值進行了單樣本 T 檢驗，結果如表 3 所示。

表 3 職前教師跨學科能力總體描述

維度	Mean	SD	t
多學科知識儲備	3.055	0.397	1.570
創新表現	3.622	0.253	27.578
團隊合作	3.990	0.346	32.155
實踐運用	3.984	0.326	33.864

可以看出，職前教師跨學科能力現狀不均衡。在收回 126 個有效樣本中，創新能力、團隊合作、實踐運用三個維度均值高於中值 3（ $p<0.05$ ），說明職前教師在創新能力、團隊合作、實踐運用三個維度標準差均較小，資料相對集中，整體良好。但在多學科知識儲備能力維度整體水準不高，均值為 3.055，較接近中值 3（ $p>0.05$ ），認為多學科知識儲備能力的平均值與中值 3 無顯著性差異。其原因可能是單科教育體系下培養的職前教師，知識結構較單一，缺乏多學科知識儲備能力

3.2. 開展“STEM 創新教育”課程對職前教師跨學科能力有積極作用

在“STEM 創新教育”課程結束後，後測根據前測對應的四個維度設置相應的課後自我評價，部分題項採用 5 分制李克特量表格式，通過相對應的對比題項所獲得的平均值來測查職前教師總體水準的培養程度，結果如表 4 所示。

表 4 前測後測配對樣本統計表

	Mean	Standard Deviation	Standard Error of the Mean
多學科知3. 在平時，我注重多學科知識的積累。（前測）	3.04	0.427	0.038
識儲備 21. 我能運用多學科知識完成小組任務	3.94	0.777	0.069

	4. 我可以利用多學科視角對同一問題進行整體性描述。(前測)	3.06	0.365	0.032
	25. 我能識別問題中滲透了哪些學科知識。	3.87	0.741	0.066
	5. 在教學實踐中，我認為知識需要依賴情境獲得和利用。(前測)	3.07	0.423	0.038
	26. 完成任務過程中，我對多個學科知識進行實踐應用	3.90	0.747	0.067
	7. 我喜歡先進有趣的事物，願意為新想法花時間和精力。(前測)	3.03	0.251	0.022
創新表現	22. 我能在完成任務的基礎上對作品進行創新	3.78	0.819	0.073
	8. 我覺得需要把握時代的變遷，緊跟教育改革發展的步伐。(前測)	3.09	0.358	0.032
	27. 處理實驗的複雜問題是我會無所適從。	3.42	0.999	0.089
團隊合作	14. 當有人質疑我的觀點時，我能與其很好地交流並達成共識。(前測)	3.99	0.346	0.031
	23. 我能和小組成員團隊協助分工完成任務	4.29	0.76	0.068
	17. 我能將複雜的問題進行簡化，並用精確的語言提出恰當的假設。(前測)	3.99	0.346	0.031
	30. 我能及時發現組員的錯誤，並給出提示。	3.95	0.679	0.061
實踐運用	19. 我能清楚解決問題過程需要哪些技術支援。(前測)	3.97	0.308	0.027
	32. 我能將複雜的內容轉為通俗易懂的語言來回饋實驗結果。	3.96	0.742	0.066

從上表可以看出，跨學科能力維度中多學科知識儲備能力、創新表現和團隊合作都得到了提升。其中，“多學科知識儲備”分別提升了0.9、0.81和0.83，說明開展STEM創新教學課程，使得職前教師整體多學科知識儲備能力增強；“團隊合作”提高了0.3，說明通過課堂中的團隊活動，使得職前教師在處理問題時能採取他人意見；“創新表現”分別提升了0.75和0.33，表示職前教師創新意識、創新思維、運用創新方法解決問題能力得到提升，但跨學科能力維度中的實踐運用卻下降了0.03，表明職前教師在進行“STEM創新教育”課程學習的過程中解決跨學科問題時遇到了困難，這說明了提升跨學科能力培養的必要性，需加強跨學科實踐能力的實踐訓練。

進而探究四個維度之間有無相關性（見表5），相關顯著性檢驗可知跨學科能力多學科知識儲備、創新表現、團隊合作和實踐運用四個維度兩兩之間呈現線性正相關，由此可得跨學科能力培養四個方面缺一不可。

表 5 跨學科能力量表維度的相關分析

		多學科知識儲備	創新表現	團隊合作	實踐運用
多學科知識儲備	Pearson Correlation	1.000	0.902**	0.836**	0.837**
	Significance (two-tailed)	.	0.000	0.000	0.000
	N	126.000	126.000	126.000	126.000
創新表現	Pearson Correlation	0.902**	1.000	0.952**	0.952**
	Significance (two-tailed)	0.000	.	0.000	0.000
	N	126.000	126.000	126.000	126.000

團隊合作	Pearson Correlation	0.836**	0.952**	1.000	1.000**
	Significance (two-tailed)	0.000	0.000	.	0.000
	N	126.000	126.000	126.000	126.000
實踐運用	Pearson Correlation	0.837**	0.952**	1.000**	1.000
	Significance (two-tailed)	0.000	0.000	0.000	.
	N	126.000	126.000	126.000	126.000

通過問卷調查的結果分析，研究表明：（1）職前教師跨學科能力水準不均衡，其中創新表現、團隊合作和實踐運用維度水準表現相對良好，但多學科知識儲備維度表現不高，這說明相較於其他維度職前教師總體的多學科知識儲備能力較弱。（2）開展“STEM 創新教育”課程對職前教師整體跨學科能力有所提升，但實踐運用能力表現不明顯。這說明通識課程跨學科培養模式是有效的，但由於學生跨學科知識不足、解決跨學科問題能力不夠、訓練時間較短等因素，學生的實踐能力提升不明顯。

4. 研究結論與啟示

學科之間的融合交叉成為當今教育的主要趨勢，無論是核心素養的追求與內在特徵，還是新課程標準對跨學科的要求等，都表明教育需要關注發展跨學科能力。目前，關於職前教師跨學科能力研究比較稀少，以“STEM 創新教育”課程為主的通識課程是高校職前教師跨學科能力培養的主要方式，本研究旨在為開展“STEM 創新教育”課程下職前教師跨學科能力研究提供一些經驗。針對基於“STEM 創新教育”課程職前教師跨學科能力培養的研究結果，本文提出以下建議：

4.1. 加強職前教師多學科知識儲備能力培養，促進跨學科能力各維度協同發展

當前職前教師跨學科能力四個維度的水準存在失衡現象，多學科知識儲備水準顯著低於其他三個維度，因此有必要在跨學科能力培養過程中加強職前教師多學科知識儲備能力的培養，促進跨學科能力各維度協同發展。首先，要加強多學科知識課程內容的融合。如，在職前教師單科教育培養體系中滲透相關學科知識，引導職前教師積極對其他學科進行探索、實踐。其次，通過評價引導職前教師主動進行跨學科知識學習，從而促進跨學科能力各維度協同發展。

4.2. 積極開發職前教師跨學科課程培養體系，培養複合型人才

研究表明，開展 STEM 創新教育課程有利於職前教師跨學科能力培養。STEM 教育課程不同於傳統學科課程，採用跨學科融合的教學理念，工程技術實踐模式，專案化問題設計與實施方式。將 STEAM 理念融入高校職前教師培養通識課程，優化職前教師的知識結構，建立跨學科培養體系，能避免知識的分割和學科的單一化。因此，學校應重視“STEM 創新教育”通識必修課在職前教師培養過程中的作用，引導教師積極探索開發更多、更優職前教師跨學科能力培養課程，逐步完善職前教師跨學科課程培養體系，提升職前教師人才培養品質，培養複合型人才，滿足時代的發展需要。

4.3. 拓寬實踐領域，加強校企合作，提高職前教師跨學科能力

研究表明，開展 STEM 創新教育課程對實踐運用能力作用不明顯。跨學科能力的提升，不僅要學習多學科的知識，還要加強師範生跨學科的實踐操作能力，拓寬實踐領域，這也是師範生將書本化知識與實際教育教學實踐相結合的重要樞紐。學校應積極促進校企合作，充分發揮企業的技術裝備優勢和高校的人力資源優勢。通過企業與高校人才培養無縫對接，為師範生教育見習、教育實習提供支點。在實現校企合作共贏的基礎上，拓寬師範生實踐領域，促進其跨學科能力提升，增強就業競爭力。

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在 AIoT STEM 實作課程運用 6E 教學模式結合自我效能策略提升學生之學習表現

與社會情緒學習之研究

Using 6E model combined with self-efficacy strategies to enhance students'

learning performance and social-emotional learning in the AIOT STEM hands-on activities

Hsien-Sheng HSIAO^{1*}, Yu-Chun HSU², Jheng-Han CHEN³

^{1,2,3}Department of Technology Application and Human Resource Development, National Taiwan Normal University, Taiwan

^{1,3}Institute for Research Excellence in Learning Sciences, National Taiwan Normal University, Taiwan
hssiu@ntnu.edu.tw, oswin0214hsu@gmail.com, as941414@gmail.com

摘要

本研究探討 AIoT STEM 教育對高中生 STEM 知識、自我效能、社會情緒學習 (SEL) 及實作表現的影響，並結合 6E 教學模式與自我效能策略。研究背景強調 STEM 人才對國家發展的重要性，並指出社會情緒學習在個體成功中的作用。儘管已有許多關於 AIoT STEM 課程的研究，但將 STEM 與社會情緒學習結合的研究較為不足。研究對象為台北市某高中的 170 名學生，實驗組 108 名學生接受 6E 教學模式與自我效能策略，對照組 62 名學生僅接受 6E 教學模式。研究採用準實驗設計，實驗前後進行 STEM 知識、自我效能、社會情緒學習及實作表現測評。經共變數分析後，結果顯示實驗組在 STEM 知識和實作表現上優於對照組。然而，兩組在自我效能和社會情緒學習上的表現未達顯著差異。研究結果表明，將自我效能策略融入 AIoT STEM 課程能顯著提升學習者的 STEM 知識及實作表現，但對自我效能與社會情緒學習的影響並不顯著。這些發現為未來 AIoT STEM 課程的設計提供了參考，特別是在如何有效結合 STEM 與社會情緒學習方面。

關鍵字

AIoT STEM；自我效能策略；學習表現；社會情緒學習

Strand

Virtual and Blended Teaching and Learning

虛擬與混合教學與學習

The Impact of BookRoll on the Digital Transformation of Self-Regulated Learning in Higher Education

Elaine LAM^{1*}, James KO²

^{1,2}The Education University of Hong Kong, Hong Kong SAR, China
elaine@s.eduhk.hk, jamesko@eduhk.hk

ABSTRACT

The rise of online learning in higher education has transformed the educational landscape, particularly with platforms like Moodle gaining traction among students in Asia. This study explores the integration of BookRoll within Moodle to enhance students' reading experiences and engagement but highlights the underexplored role of self-regulatory strategies in its use. Self-regulated learning (SRL) is essential for students to effectively plan, monitor, and adapt their learning strategies, while Cognitive Apprenticeship (CA) focuses on developing conceptual knowledge through social learning. This paper examines how CA principles can augment BookRoll's functionality to support SRL.

To address research gaps, three questions are posed: (RQ1) How do students engage with BookRoll? (RQ2) How does BookRoll affect students' self-regulated learning? (RQ3) What are the advantages and drawbacks of BookRoll for students and staff, and what improvements can be made?

Data from activity logs, interviews, and theoretical analyses reveal that students actively use features like "red markers," with high achievers more engaged in memo creation. Interviews indicate that BookRoll supports students during the Performance and Appraisal phases of SRL, although limited tutor-student interaction is a concern. Incorporating CA principles, such as post-reading feedback from tutors, could significantly enhance learning experiences and outcomes.

KEYWORDS

Self-regulated learning, Cognitive Apprenticeship, Online Learning, Educational Technology, Technology Integration

Engaging Culturally and Linguistically Diverse (CALD) Adult Learners in Online Learning

Yan ZHOU

Victoria University, Melbourne, Australia
yanzwx891@gmail.com, yan.zhou@vu.edu.au

ABSTRACT

In a globalised education environment, many adult learners from culturally and linguistically diverse (CALD) backgrounds are enrolled in vocational education and training (VET) or higher education courses where English is used as the medium of instruction. Both learners and educators face unique challenges in the online teaching and learning space, including issues around engagement and participation, achieving desired outcomes, creating culturally safe environments, and ensuring fair and equitable practices. This study will draw on the Australian VET context, setting the scene in an adult classroom where English is not the subject, but the language through which vocational skills are learned. Using a range of secondary and primary data, including LinkedIn surveys, grey literature, research articles, and the author's lived experience as a VET teacher, this study highlights the challenges of engaging CALD learners in both synchronous (e.g., classes conducted on Zoom) and asynchronous online learning (e.g., self-paced learning on Learning Management Systems - LMS) settings. Some prominent challenges identified include limited confidence, lack of participation, hesitation to seek help, and poor performance in assessments. This study also offers practical strategies to address these challenges. Malcolm Knowles' theory of andragogy and Stephen Brookfield's critical lenses of reflection are employed to interpret and discuss the findings. The aim is to stimulate interest and encourage discussion on online teaching and learning, with a particular focus on promoting inclusivity, psychological safety, and fostering positive learner identities. Educators are encouraged to adopt a learner-centred approach in their interactions with CALD learners, demonstrating respect, empathy, and cultural and linguistic awareness in order to create a supportive and inclusive online learning environment.

KEYWORDS

Online teaching and learning, adult learning, Culturally and Linguistically Diverse (CALD) learners, Vocational Education and Training (VET), Andragogy

GitHub as a Supplementary Educational Tool to Improve Online Collaboration & Communication, Problem-solving, and Learning-to-learn Attributes:

Implementation and Results

Li-Ta HSU¹, Man-Hin CHENG², Weisong WEN³, Boyang LI⁴, Chiyung WEN⁵, Xiaoyu LUO⁶, Ruijie XU⁷

^{1,2,3,5,6,7}The Hong Kong Polytechnic University, Hong Kong SAR, China

⁴University of Newcastle, Australia

lt.hsu@polyu.edu.hk, manhin.cheng@connect.polyu.hk, welson.wen@polyu.edu.hk, boyang.li@newcastle.edu.au, chihyung.wen@polyu.edu.hk, xiaoyu.luo@polyu.edu.hk, ruijie.xu@connect.polyu.hk

Abstract: As blended learning becomes increasingly crucial in higher education, GitHub has emerged as a powerful tool for facilitating online collaborative programming and project-based learning. This paper investigates how integrating the GitHub tool into an undergraduate engineering course affects four crucial learning attributes: online collaboration skills, online communication skills, problem-solving skills, and learning-to-learn abilities. The research employed a mixed-methods approach, analyzing data from pre- and post-course questionnaires, digital collaboration metrics, and student reports in a first-year engineering class. Results demonstrated significant improvements across all learning attributes, with increases ranging from 33% to 45%. The study validated two key hypotheses: the positive impact of GitHub-based pedagogy on learning attributes and a strong correlation ($R = 0.857$) between GitHub engagement and academic performance. When combined with Contributing Student Pedagogy (CSP), GitHub created an effective peer-learning environment that enhanced both technical and collaborative capabilities. These findings suggest that GitHub integration in education improves specific learning attributes and provides a structured environment for professional skill development, aligning with modern educational needs and pedagogical principles.

Keywords: Blended Teaching and Learning, GitHub, Learning-to-Learn, Problem-solving, Online Collaboration.

1. Introduction

As higher education adapts to an increasingly digital world, the integration of virtual collaboration tools has become crucial for enhancing student learning outcomes (Szymkowiak et al., 2021; Xie et al., 2020). Traditional in-person teaching methods are evolving to incorporate online platforms, transforming educators' roles from mere information providers to learning facilitators. This shift has led to increased research on virtual and blended teaching methods (Kolm et al., 2022), particularly focusing on developing students' collaboration, communication, and problem-solving capabilities. Recent studies have highlighted that conventional academic metrics alone may not fully capture students' learning capabilities (Badcock et al., 2010). Additional factors, such as those outlined in the 4C Learning Model (Constructive, Critical, Creativity, Collaborative), significantly influence student achievement (Supena et al., 2021). Furthermore, research indicates that effective online communication and collaboration skills are increasingly vital in modern education (Martin et al., 2020; Ware, 2013), particularly as virtual teamwork becomes standard in professional settings. This paper presents a novel blended learning approach that integrates GitHub, a widely used collaborative platform in the programming community, into undergraduate engineering education. Unlike previous implementations where GitHub served merely as an optional tool (Feliciano et al., 2016), our approach mandates its use and redesigns course content to emphasize self-directed learning. The study specifically examines four crucial learning attributes: online collaboration skills, online communication proficiency, problem-solving capabilities, and learning-to-learn ability. These four learning attributes were selected based on their critical importance in modern engineering education and professional practice. Online collaboration and communication skills are essential for virtual teamwork, while problem-solving capabilities represent core engineering competencies. The learning-to-learn attribute was chosen for its importance in continuous professional development, particularly in rapidly evolving technical fields where self-directed learning is crucial for long-term success. Our research extends existing literature in two significant aspects. First, we introduce GitHub to first-year students, rather than focusing on senior students (Zagalsky et al., 2015), to evaluate learning attribute changes at an earlier stage of their academic journey. Second, we incorporate Contributing Student Pedagogy (CSP) principles (Hamer et al., 2008), creating an environment where students actively contribute to their peers' learning through GitHub's collaborative features. This approach aligns with research suggesting that technology-facilitated collaboration enhances student engagement and motivation.

1.1. Hypothesis

Based on prior research, this study examines two primary hypotheses: first, that GitHub integration in teaching methodology enhances students' performance across four learning attributes; and second, that students' GitHub engagement

levels positively correlate with their academic performance, as measured through platform metrics such as commits and merges (Beckman et al., 2021). To investigate these hypotheses, we aim to implement GitHub integration in a compulsory first-year engineering course, leverage its features to create a flipped classroom environment promoting self-directed learning, and evaluate the effectiveness of this blended approach through both quantitative and qualitative methods.

Figure 1 illustrates the systematic framework for developing and evaluating the proposed GitHub-based pedagogy. The process begins with the design of GitHub-based pedagogy for a Year-1 subject, incorporating open-source materials and self-learning resources. The effectiveness of this pedagogical approach is evaluated through pre- and post-course questionnaires, supplemented by analysis of students' coursework and GitHub activity data.

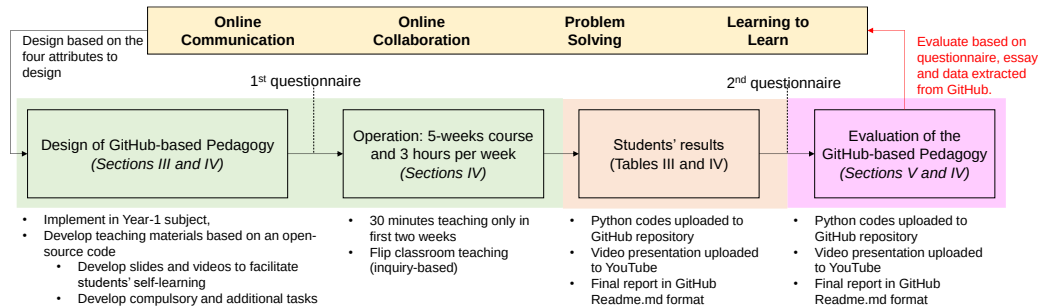


Figure 1. Overview of the development and evaluation of the proposed GitHub-based pedagogy. The teaching material can be found at: https://github.com/qmohsu/PolyU_ENG1003_AAE_FP.

2. Materials and Methods

2.1. GitHub Integration and Course Design

GitHub, a Version Control System (VCS)-based platform, was selected as the primary collaboration tool for this study (Dabbish et al., 2012). While traditionally used for software development, GitHub's features align well with our targeted learning attributes: online communication (COM), online collaboration (COL), problem-solving (PS), and learning-to-learn (L2L) capabilities. Key features utilized include commit history tracking, branch management, and collaborative documentation tools.

The unique feature of GitHub-based pedagogy is embedding industry practices like version control, code reviews, and agile workflows via GitHub to cultivate technical agility and collaborative literacy. Adopting Contributing Student Pedagogy (CSP), transforms students from passive learners into active contributors, fostering autonomy and accountability through peer-driven project co-creation and the learning attributes.

The study was conducted in a first-year engineering course (ENG1003: Freshman Seminar for Engineering) at the Hong Kong Polytechnic University during *Fall 2021*. Fifty undergraduate students (43 males, 7 females) from diverse backgrounds participated, with 29 local students and 21 international students. Students were organized into ten groups of five, ensuring diversity in each team by including at least one international student. The course employed a flipped classroom approach, providing minimal fixed pathways to encourage student autonomy and self-directed learning. The teaching team consisted of one instructor and three teaching assistants who monitored progress and provided guidance as needed.

2.2. Project Structure and Assessment

The main project focused on modifying an A* path planning algorithm in Python, chosen for its fundamental relevance to engineering and appropriate complexity level for first-year students. Figure 2 is the showcase of the GitHub collaborating project. The up-left is the *Readme.md* description of the group project. Then down-left shows that the students need to modify the Python code to design the shortest route in the red line. The right two figures show the example of the merged history of a group of students. The *merge* function allows students to trace the changes in the code made by other group mates.

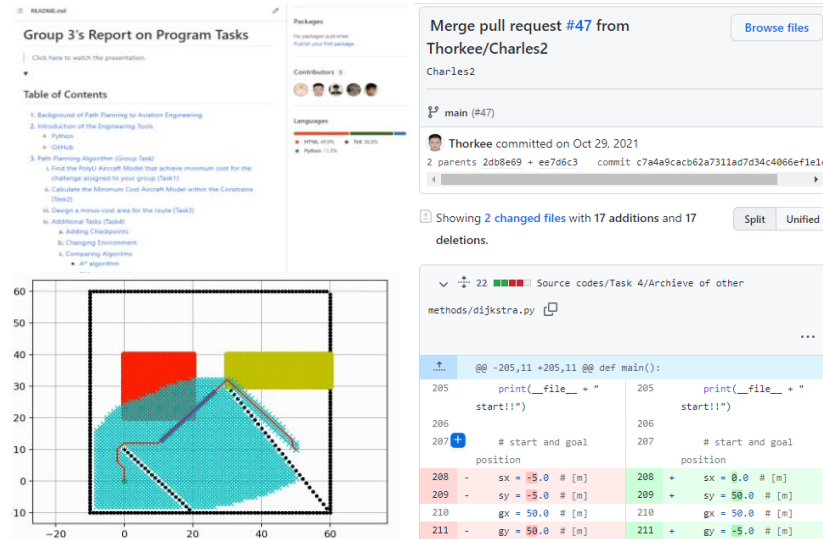


Figure 2. Example of students' [final repository](#).

Assessment components were designed to evaluate multiple learning attributes as listed in table 1:

Table 1. The course assessment component, method and their associated expected learning attributes.

Assessment Component	Assessment Method	Attributes
Python codes and results uploaded to the GitHub repository	Check the students' GitHub repository on the history of commits and merge	PS, L2L, COM, COL
Video presentation uploaded to YouTube	Evaluate the students' presentation skills	COM, COL
Final report written in GitHub Readme.md	Evaluate the written report considering the academic	PS, L2L, COL

2.3. Data Collection and Analysis

The study used both quantitative and qualitative methods to evaluate GitHub-based pedagogy's effectiveness. The quantitative assessment involved pre- and post-course questionnaires using a 5-point Likert scale to measure students' self-perceived abilities in four learning attributes. We also analyzed GitHub metrics like commit frequencies and collaboration patterns to measure student engagement and team dynamics. The qualitative component included analyzing student project reports and teaching team observations. Students reflected on their learning outcomes while instructors documented group dynamics, problem-solving approaches, and communication patterns throughout the project.

This combined methodology helped validate GitHub's effectiveness in engineering education while providing detailed insights into learning processes. The analysis focused on changes in student performance across learning attributes, collaborative learning effectiveness through interaction patterns, and the impact of the flipped classroom approach on engagement.

3. Results and Discussions

Our study evaluated the effectiveness of GitHub-based pedagogy through pre- and post-course questionnaires, focusing on four key learning attributes: online communication, collaboration, problem-solving, and learning-to-learn (L2L). The analysis incorporated both quantitative data from questionnaires (n1=33, n2=28) and qualitative feedback from student reports.

3.1. Quantitative Analysis

The pre-course assessment revealed limited initial confidence across all attributes, with only 38.9% positive responses overall. Students showed hesitation toward online communication, with 70% preferring face-to-face interaction. Only 24.2% expressed positive attitudes toward online collaboration, reflecting limited prior exposure to virtual teamwork environments.

Paired t-tests were conducted to evaluate changes in students' self-reported abilities. Post-course results demonstrated significant improvements across all attributes:

- **Online Communication** showed highly significant improvement ($t(27) = 3.21, p < 0.01$), with mean response increasing from 2.677 to 3.726
- **Online Collaboration** improved significantly ($t(27) = 2.10, p < 0.05$), with mean scores rising from 3.046 to 3.572
- **Problem-solving** demonstrated significant gains ($t(27) = 2.45, p < 0.05$), showing the largest improvement from 3.283 to 4.071
- **Learning to Learn** capabilities significantly increased ($t(27) = 2.26, p < 0.05$), with means improving from 3.371 to 3.964

The overall positive response rate rose substantially from 38.9% to 68.9%, while negative responses decreased from 28.4% to 8.7%. However, 28% of students maintained some reservations toward online collaboration, suggesting a persistent preference for face-to-face interaction despite improved digital proficiency.

3.2. Qualitative Analysis

Student reports revealed significant developments across all four attributes:

- **Online Communication**

Students reported enhanced intra- and cross-group communication abilities. Initially hesitant about virtual interaction, they gradually adapted to online platforms, developing effective remote communication strategies. As one student noted: "Through effective online communication and collaboration, I was able to contribute meaningfully and support my group members" (YZX, Group 4).

- **Online Collaboration**

GitHub's features facilitated improved team coordination and work distribution. Students appreciated the platform's ability to track contributions and manage code versions. "GitHub excels in consolidating team efforts... It creates branches for each team member to upload their work, which can then be merged into the main repository" (FCL, Group 1).

- **Problem-solving**

The platform fostered independent problem-solving skills through access to resources and peer solutions. Students developed proficiency in searching for and adapting existing code solutions. "This project fortified my proficiency in troubleshooting. Confronted with coding errors, I navigated online resources and sought assistance from peers" (LWW, Group 5).

- **Learning to Learn**

Students demonstrated increased self-motivation and autonomous learning capabilities. The project structure encouraged independent exploration and peer learning. "Self-motivation emerged as a pivotal factor in achieving operational efficiency" (SJT, Group 2).

3.3. GitHub Activity Analysis

Analysis of GitHub metrics revealed a strong positive correlation between platform engagement and academic performance. Table 5 shows the relationship between GitHub activity (commits and merges) and final grades across ten student groups. The highest-performing groups (3 and 10) recorded significantly more commits (463 and 411 respectively) compared to lower-performing groups.

Pearson correlation analysis between group grade points and commit numbers yielded $R = 0.857$, indicating a strong positive relationship between GitHub engagement and academic performance. The two highest-performing groups also demonstrated superior code quality, suggesting that increased platform interaction contributed to better learning outcomes.

Key patterns emerged:

- High-performing groups (A/A+) averaged >400 commits
- Mid-range groups (B/B+) showed moderate activity (150-250 commits)
- Lower-performing groups (C+) recorded <100 commits

These results suggest that active engagement with GitHub's collaborative features significantly influences learning outcomes and project quality. The combination of quantitative improvements across all learning attributes and qualitative feedback demonstrates the effectiveness of GitHub-based pedagogy in enhancing students' technical and collaborative capabilities.

3.4. Hypothesis Testing

The study tested two primary hypotheses regarding GitHub's educational impact. The first hypothesis (H1) proposed that GitHub integration would enhance students' learning attributes. Paired t-tests of pre- and post-course data supported this hypothesis, showing varying degrees of improvement across all attributes as mentioned in the quantitative analysis subsection. The second hypothesis (H2) proposed a positive correlation between GitHub engagement and academic performance. The analysis supported this hypothesis, with high-performing groups (A/A+) recording over 400 commits, while lower-performing groups (C+) showed fewer than 100 commits. Repository statistics demonstrated a strong correlation with academic achievement ($R = 0.857$).

The validation of both hypotheses confirms GitHub's effectiveness as an educational platform when integrated with Contributing Student Pedagogy (CSP). The platform transformed traditional learning into interactive, peer-driven

environments where students contributed to collective knowledge through code sharing, reviews, and collaborative problem-solving

3.5. Limitations

Despite strong support for both hypotheses, several methodological limitations warrant consideration. While self-reported data were supplemented with instructor evaluations and GitHub metrics, potential response bias remains. The immediate post-course assessment precludes analysis of longitudinal effects on skill retention. This research was not experimental, meaning it cannot establish causal relationships between GitHub-based pedagogy and learning outcomes. While quantitative data showed a correlation with skill improvement, confounding variables (e.g., prior student motivation, instructor support and so on) may have influenced results. Future research should prioritize controlled, longitudinal, and cross-disciplinary studies to validate its impact and optimize implementation.

4. Conclusions

This study demonstrated that GitHub integration in undergraduate education significantly enhanced students' learning attributes, including online **communication, collaboration, problem-solving skills, and learning-to-learn abilities**. Our findings validated both hypotheses: the positive impact of GitHub-based pedagogy on learning attributes and the strong correlation between GitHub engagement and academic performance. The platform proved particularly effective in supporting Contributing Student Pedagogy, creating an environment conducive to peer learning and professional skill development. GitHub's version control and monitoring capabilities suggest its potential as a comprehensive Learning Management System. While acknowledging limitations in self-reported data and short-term evaluation, the study's positive outcomes have prompted expanded implementation across various departments and the development of specialized workshops. Future research will focus on longitudinal studies with larger sample sizes, exploring GitHub's effectiveness across different disciplines, and developing streamlined workflows for broader educational integration. These findings contribute valuable insights for the future of technology-enhanced learning in higher education.

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Digital Applications for Ear Training: A survey

David MUNIVE¹, Philippe LALITTE², Victoria EYHARABIDE³

^{1,2}IReMus Laboratory, Sorbonne University, Paris, France

³STIH Laboratory, Sorbonne University, Paris, France

david_andres.munive_benites@etu.sorbonne-universite.fr, philippe.lalitte@sorbonne-universite.fr,

maria-victoria.eyharabide@sorbonne-universite.fr

Abstract: Numerous articles, reports, and theses describe and review the opportunities and limitations of software development for aural skills instruction. This field of research has existed for several decades, from the beginning of computer-assisted instruction to the present. Nevertheless, to our knowledge, there are no modern attempts to make a comprehensive literature review of ear training software. In this systematic review, we analyze 190 approaches focusing on the evolution of the software, evaluation method, pedagogical approach, gamification features, type of content, and technology characteristics.

Keywords: ear training, computer-assisted instruction, e-learning, music learning app, aural skills learning

1. Introduction

Technology has transformed education, especially with the democratization of mobile devices and wireless networks. The COVID-19 pandemic has accelerated this trend, suddenly forcing teachers and institutions to adapt to online education (García-Morales et al., 2021). While concepts like blended learning or flipped classrooms existed before, they gained attention during the crisis. This paper surveys and discusses digital applications for ear training, focusing on the type of skills studied, characteristics of implementation, pedagogical approach, gamification, and evaluation methods. Section 2 presents the survey methodology and selection criteria, Section 3 presents and compares the results, and Section 4 discusses the surveyed works in depth. Finally, Section 5 presents overall conclusions and future directions.

2. Related works

There is abundant literature on software for music learning, specifically ear training (Gouzouasis & Bakan, 2011). The use of software dates to early educational software (also known as Computer Assisted Instruction or CAI) and has its roots in programmed learning (Troutner, 1991). Recent reviews have explored mobile technology for music education (Liu et al., 2021) and music technology for creativity in late life (Creech, 2019).

In the late 1950s, PLATO (Programmed Logic for Automatic Teaching Operation) emerged as a system for music learning. By the mid-1960s, music education journals listed ear training and sight reading methods based on programmed instruction (Kuhn & Allvin, 1967). Over the following decades, there was a proliferation of literature about learning technologies that focused on all aspects of music. Since then, new technologies like the internet or mobile devices have broadened the approaches for ear training.

Webster (2012) has reviewed the evolution of digital technologies in music learning. He has found that students are eager to learn with technology; however, there is a lack of integration and equity in the accessibility of the tools. Liu et al. (2021) reviewed mobile technology-supported music education research from 2008 to 2019. They analyzed 31 articles, finding that the primary research was focused on teachers' experience in adopting technology, appropriate use of mobile technology in music education, and future trends of mobile learning in music.

While research on music education and technology is growing, to our knowledge, there has not been an extensive literature review that considers the evolution of this technology specifically applied to ear training. This survey aims to fill this gap by analyzing related works regarding gamification, pedagogy, and evaluation methods.

2.1. Paper selection

This review is based on PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses, Page et al., 2021), a framework used for reviews in different fields. The initial and subsequent searches were conducted in November 2022 and April 2024, respectively. The search queries used were (in English, Spanish, and French): ear training app, ear training software, ear training technology, musical ear training program, mobile learning music, aural skills software, music learning software, ear training serious game, Meludia, EarMaster, GNU Solfege, Auralia and Musition.

After screening 5600 journal articles and master's and doctoral dissertations, 568 were retained due to their title and abstracts. After excluding duplicates, unavailability of full text, non-English/Spanish/French articles, posters, and editorial/opinion articles, 363 sources remained. After a complete examination, 190 articles focused on the development of aural skills using digital technology were left for analysis. We excluded the articles that focused on music notation software, improvisation, composition, instrument learning, auditory training for medical conditions (like cochlear implants), or technical auditory training (for sound engineers). Since improvisation and composition are crucial for ear training (Karpinski, 2000), we limited the scope to software designed explicitly for ear training.

3. Results

Our analysis reveals that fifty-five percent (55%) of studies focused on developing or testing their digital tool, twenty-six point nine percent (26.9%) studied integrating existing tools, and seventeen point four percent (17.4%) reviewed existing technology. Sixty-two point four percent (62.4%) of studies included an empirical study in which the tool or the pedagogical framework, including technology, was tested in learners.

3.1. The Evolution of Research on Auditory Learning Software

The evolution of these tools has gone hand in hand with technological advancements, from the first computer systems to modern mobile devices. Early systems relied on audio tapes (Garton, 1981) or university computer labs (Swanzy, 1976). Ear training courses were also available on CDs and used with analog recording devices (Spangler, 1999). The popularization of desktop computers led to consumer ear training software, followed by internet-based (Coffman & Smallwood, 1986) and personal digital assistant applications (Paananen & Myllykoski, 2009). Mobile devices and wireless technology have expanded the possibilities, including pitch recognition algorithms (Petty & Henry, 2014). Interactive whiteboards (Šulentić Begić et al., 2024) and learning management systems (Sébastien et al., 2007) have also been used for teaching listening skills. Recent developments in deep learning (Ventura, 2021), artificial intelligence (Zhang, 2020), and data mining (Zou, 2020) are enabling personalized experiences. Virtual (Shvets & Darkazanli, 2022) and augmented reality (Serafin et al., 2017) are promising tools.

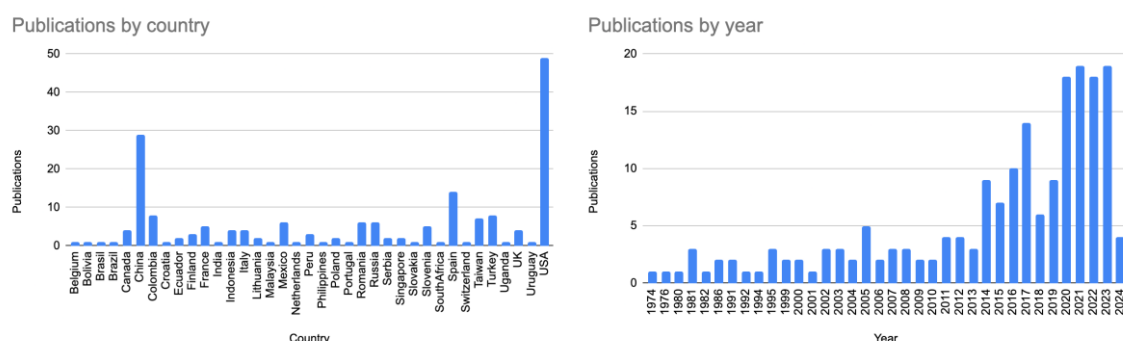


Figure 1. Publications distribution (a) by country and (b) by year.

We observe an increasing global interest in the subject with an explosion of research (78 studies) in the last 5 years. English is the most common language, regardless of the origin of the study. The USA (49 studies) and China (29 studies) are currently leading the production of this research.

3.2. Evaluation method

Among the 190 articles analyzed, only 108 studies evaluated ear training software. The primary methods were comparing control and experimental groups or assessing the evolution of a single group involving pre and post-tests. Thirty-eight percent (38%) of the studies combined quantitative measures of improvement in auditory skills and an attitudinal questionnaire. Eighteen percent (18%) of the publications focused solely on participants' perceptions. Eleven articles studied other aspects, such as comparisons between a tool and EarMaster, the use of different audio on the same platform, the use of a video game versus the tool, the comparison of the tool with active methodologies, etc. While these approaches vary, they all draw from the broader field of computer-assisted learning. Despite the challenge of analyzing these diverse studies, they highlight the wealth of insights into the multifaceted subject of ear training software.

3.3. Pedagogical approach

Most studies focused on ear training "drills" (identifying and performing small, isolated musical elements). Still, there is growing interest in interactive approaches (40 studies). Estep (2005) combined visual, auditory, and kinesthetic elements. Henik (2002) successfully explored the dual-coding theory by playing intervals and having participants draw. Huang and Chu (2020) studied multi-sensory feedback, and Lapidus (2002) compared immediate and delayed feedback. Shen and Wu (2023) used statistical models and MIDI to provide visual feedback on vocal performance. Pitch recognition has also attracted increased interest (Petty & Henry, 2014).

Active pedagogies like Kodály and Gordon's approaches were explored in several studies ((Holguin, 2017; Nedelcuț & Demian, 2021; Wang, 2023). The use of relevant music contexts was explored by Kiraly (2003), Könik (2003) (Parshina & Karpushina, 2020), (Guédy et al., 2007), Benedek(2019), and Chong (2019).

Cheng, M. H. M., Xu, G., Cheng, G., Kong, S. C., Song, Y., Erni, J. N., Chen, J., & Macfarlane, B., Yeung, S. S. (Eds.). (2025). *Proceedings of the International Conference on Learning and Teaching 2025 (ICLT 2025)*. Hong Kong SAR: The Education University of Hong Kong.

Virtual reality is emerging as a promising tool. Pedersen et al. (2020) used VR for multimodal cues for interval recognition. Shvets and Darkazanli (2022) designed a VR environment to visualize harmony, and Pesek et al. (2023) created a VR drumming game that proved engaging and beneficial for learning.

3.4. Gamification

The approaches vary between game-based and gamified learning platforms. Children's Music Journey (McKinnon, 2005) and SAMI (Paule-Ruiz et al., 2017) are at the intersection of serious games and learning platforms, incorporating storytelling and interactive elements. Raziūnaitė et al. (2018) and Respino et al. (2011) also used game-based approaches considering age, tactile interaction, creativity, and other factors as described by the guidelines of Chung and Wu (2017).

In contrast, we find gamified platforms based on the Kodály (Demian & Nedelcuț, 2021) and Gordon's method (Wang, 2023). While game elements can enhance motivation, excessive complexity can hinder learning. Platforms like iCLef (Baratè, 2013), Troubadour (Pesek et al., 2020), Aglaya Play (Murillo et al., 2020), Auralbook (Chen, 2015), LeApp (Lescano Contador, 2020), EarMaster (Cruz Lara, 2012), and those described by Richards (2022) integrate elements like points, badges, and levels, making them suitable for experienced/adult users.

3.5. Content: type of aural skills studied

Most studies focused on intervals, melodies, chords, and harmony. Intonation (the skill of singing in pitch) is a recent possibility that has become possible due to the improvement of voice recognition technology. In most cases (86,3%), digital tools were used to supplement traditional teaching. Only 13,7% of cases relied only on software.

Dominguez-Lloria (2024) analyzed 50 ear-training apps for elementary school children, finding that most lacked strong educational principles, focused heavily on listening to music, and didn't use game-based engagement. Based on the findings, they created a set of guidelines for app selection. They highlighted the need for research in effective music education app design. Eunhye Lee (2021) reviewed 100 music learning apps for children, evaluating them across six areas: cognitive, hand-eye coordination, affective, design, convenience, and educational function. While the apps scored high in design, the cognitive and affective areas scored lower. The highest-scoring apps offered personalized learning at a low cost.

3.6. Characteristics of implementation

Among the 107 studies that integrated the software into the curriculum, 93% showed positive results, 5% were neutral, and 2% were negative. In most cases, CAI was used alongside regular courses with teacher supervision. The implementation phase implied using the tools during and after lectures. In 83% of the studies, users reported higher motivation because of the software. However, detailed descriptions of student attitudes and performance were lacking in 48% of studies. The users used the tool between 1 year, 5 weeks, and 1 semester. There were 8 cases in which the individuals were examined after only one use of the software. While there's no standard implementation methodology, many studies compared experimental groups using the software to control groups who did not.

3.7. Types of software studied

Half the studies tested technology developed by the research team or specifically designed for the research. In contrast, 25 studies did not specify the software. EarMaster was used in 7%, followed by Auralia, SmartMusic, GNU Solfege, Practica Musica, and MacGAMUT. Music notation software was used in 11 studies and digital audio workstations (DAWs), such as Audacity, GarageBand, or Cubase, were also employed. Three percent of the studies used Moodle for ear training exercises.

3.8. Limitations

Limitations have not been extensively detailed in most of the studies. Still, early studies report having just a few computers, leading to student frustration. Even though CAI was popular (especially in the USA) in the 1990s (Spangler, 1999), this technology was not accessible to a vast music student population worldwide. Additionally, even in later decades, technology integration was complex due to the lack of comfort of teachers towards technology (Dorfman, 2008). In 2017, only a fraction of the teachers in Canada adopted digital tools (Pomerleau Turcotte et al., 2017). Poor sound quality was another issue that was mostly overcome (Pembroke, 1986).

4. Discussion

The COVID-19 pandemic accelerated the research and adoption of digital learning tools (Lewis & Maas, 2022). It is also possible that the rise in research available in the last few years is related to increased accessibility and the number of online publications and journals.

Much (44%) of research was dedicated to reviewing or integrating technology into the classroom. However, most of the studies describe the development of a new tool, with only 61.1% describing the evaluation of the tool. Furthermore, there is

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a lack of consistency in the evaluation and description of results. Variations in evaluation and description hinder comparisons, possibly due to cultural and instructional disparities in music education. Even though this issue may be part of the difficulty in measuring musical skills and knowledge, using a standardized implementation framework would benefit research on this topic.

The transfer of knowledge and the value of drills and dictation were beyond the scope of this study (Karpinski, 2000). Nevertheless, we found studies (Heinsen & Heinsen, 2019) that look for ways to apply ear training to practical tasks for skill transfer. Through VR and AR technologies, some studies have explored multi-sensory feedback for aural training. Automated testing and pitch recognition systems are also being developed to provide real-time feedback on performance.

Students are generally motivated to use the tools, especially if they can choose whether to use them or not. Since most early development was part of psychology studies, reflection on ear training methods has always been described. Killam and Scott (1981) focused on developing attention and memory, and more recent research incorporates active pedagogies (Holguin, 2017) or gamification (Pesek et al., 2020).

The common trend in the evolution of this field is to enhance ear training through various interaction methods, contextualization of examples, and gamification. VR and AR align as promising for providing immersive experiences that foster engagement and accelerate understanding of musical concepts.

5. Conclusion

The evolution of computer-assisted instruction for ear training is as old as the beginning of digital technologies. Over the years, the capabilities of computers have allowed for more complexity in the kinds of exercises they can incorporate. The democratization of technology has made the incremental use of these tools for education possible. The shift of focus has been possible also due to the evolution of pedagogy; however, there is still room for improvement. Promising paths for optimizing these tools include focusing on contextualizing the musical elements. New ways to provide feedback are needed, but most importantly, the music educators' perspectives and the latest research findings in music cognition and neuro-pedagogy should be considered.

6. Limitations

Some early CAI studies were unavailable because they exist only as physical publications. In addition, some 2024 publications might be missing due to indexing delays. Research on the topic keeps expanding exponentially.

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Renouncing or Reaffirming: A Qualitative Study of Parents' Experiences During the School Closure Period and Their Perceptions of Online Tutoring in Post- Pandemic Times

Yuk Tin Yvette LEUNG

Department of International Education, The Education University of Hong Kong, Hong Kong SAR, China
yytleung@eduhk.hk

ABSTRACT

The global COVID-19 pandemic has profoundly impacted not just educational practices of formal schooling but those in the shadow. Tutorial centers adjusted their regular operations to comply with government's social-distancing measures aimed at curbing the pandemic, resulting in many tutoring sessions being delivered online. The switch of mode has raised questions regarding parents' perception of such change and their perceived effectiveness of online tutoring. More importantly, in the post-pandemic period when more online learning opportunities are made available, it is important to understand whether parents embrace such flexibility, and their views towards what constitutes a good tutoring experience. Using a qualitative approach conducting semi-structured interviews with 41 parents from a local government-aided secondary school in Hong Kong, this paper presents the perceived challenges of online classes during the school closure period experienced by parents interviewed and on how their experiences have reaffirmed or renounced their choice of tutoring after the resumption of in-person classes. Findings suggest that parents interviewed expressed online classes as ineffective for students' learning due to the inadequate interaction with teachers and distractions from home surroundings. Parents tend to opt for in-person tutoring for the purpose of increased class engagement and personalized support while the pandemic has also made online tutoring an alternative for some parents. By offering an in-depth understanding of parents' perceived role of tutors, this paper argues that tutors are the most important parameter affecting parents' choice of tutoring mode, but not the flexibility or convenience that the mode offers.

KEYWORDS

Online Learning, Private Tutors, Parents, COVID-19, School Closure

Goal-Setting Accuracy as A Predictor of Higher High-Stakes Test Scores

Maxim BOITCOV^{1*}, Kseniia ADAMOVICH²

^{1,2}HSE University, Russia

mboitsov@hse.ru, kadamovich@hse.ru

ABSTRACT

Self-regulated learning (SRL) is an important aspect of online education and a predictor of high academic achievement. It is a cyclical process aimed at achieving personal educational goals and organized in three phases: forethought, performance and self-reflection. A vital part of the forethought phase of SRL is goal-setting. Students need to set realistic and achievable goals in order to utilize effective learning strategies. However, there still is debate whether it is better to set higher goals, or to be more conservative and realistic. Current study used panel data of 426 students of an online course to conduct regression modelling of the relationship between the fact of setting educational goals, goal setting accuracy and academic achievement. During the course students had to pass 5 high-stakes tests and were asked to set goals before each test. We hypothesize that setting realistic educational goals is associated with greater test performance. Exploratory analysis results show that higher achieving students tend to underestimate test scores and an opposite picture for lower achieving students, which supports the presence of Dunning–Kruger effect in online education. Panel data regression suggests a positive relationship between goal-setting accuracy and test scores. These results add to the discussion on goal-setting and SRL in an online course setting, and may be useful for practitioners, since they suggest that pushing students to set higher goals may not be useful.

KEYWORDS

Self-regulated learning, goal-setting, online education

The Impact of Online Collaborative Learning with Notion on the Vocational High School Student Learning Performance in English

YU Cheng-En¹, JENG Hi-Lian²

^{1,2}National Taiwan University of Science and Technology, Taiwan
chengenyu0423@gmail.com, JENGHL@mail.ntust.edu.tw

Abstract: *This study investigates the impact of Online Collaborative Learning with Notion (OCLN) in high school English courses. A total of 39 students from one class at a vocational high school in Taiwan participate in a month-long course, totaling 12 hours, focusing on English vocabulary, sentence structures, and reading analyses related to city planning. Students engage in online collaborative learning through Notion, completing assigned tasks and activities in a structured online environment. Data are collected using a questionnaire adapted from previous studies and Online Collaborative Learning (OCL) theory to assess student learning performance across seven key dimensions. The study aims to evaluate how OCLN enhances students' ability to collaborate, communicate, and engage with course content more effectively. It is expected that OCLN will significantly improve students' learning performance. This research provides practical insights into the integration of digital tools in language learning, demonstrating how an online collaborative environment can facilitate active learning, engagement, and comprehension. The findings will offer valuable implications for educators seeking to incorporate technology-enhanced collaborative learning strategies in English instruction.*

Keywords: online collaborative learning, Notion, student learning performance, English learning, vocational high school students

1. Introduction

1.1. Background of the Study

The rapid advancements in the digital age have significantly transformed educational methods, enhanced learning efficiency, teacher-student interaction, and student engagement while also introducing new learning possibilities. In contemporary education, Online Collaborative Learning (OCL) has emerged as a powerful pedagogical approach that promotes student engagement, teamwork, and critical thinking through the integration of digital tools and platforms. Research has consistently shown that OCL contributes to improved academic performance, deeper learning, prolonged knowledge retention, enhanced problem-solving abilities, and the development of higher-order critical thinking skills (Bernard et al., 2016; Fischer & Wecker, 2014; Heo et al., 2010; Laal et al., 2012). OCL extends collaborative learning from conventional face-to-face settings to an online environment, allowing students of varying performance levels to engage in mutual learning through digital interactions (Chan et al., 2023). Rooted in cognitive development theories, OCL integrates key concepts such as conversational learning (Pask, 1975), deep learning (Entwistle, 2000; Marton & Säljö, 1997), academic knowledge progression (Laurillard, 2001), and knowledge construction (Bereiter & Scardamalia, 2006). When effectively implemented, OCL can enhance learning outcomes, sometimes even surpassing the effectiveness of traditional in-person discussions (Bates, 2015).

Online collaborative tools can foster more active learning behaviors (Aldayel et al., 2022). Among the many digital tools that support OCL, Notion has emerged as a highly effective platform due to its collaborative features, which enhance the organization and management of learning resources. Notion allows students and teachers to collaboratively edit documents, track progress in real-time, and facilitate immediate communication, creating an interactive and structured digital learning environment. By integrating Notion into OCL, students benefit from a dynamic and interactive learning environment, where they can organize, generate, and categorize ideas, enhancing both content comprehension and collaborative skills.

This study investigates the impact of Online Collaborative Learning with Notion (OCLN) in vocational high school English courses. A total of 39 students from one class at a Taiwan vocational high school participate in a month-long course (totaling 12 hours) focused on English vocabulary, sentence structures, and reading analyses related to city planning. Students engage in collaborative learning through Notion, actively working on assigned tasks and activities in an online learning environment. To evaluate the effectiveness of OCLN, data are collected using a questionnaire adapted from previous research and OCL theory. Student collaborative learning performance is assessed across seven key dimensions: online collaborative tools, peer collaboration, student engagement, idea generation, idea organization, intellectual convergence, and student learning outcomes.

1.2. Background of the Study

This study aims to investigate the impact of Online Collaborative Learning with Notion (OCLN) on vocational high school students' English learning performance. By integrating Notion as a collaborative digital tool, the study explores how an interactive online learning environment enhances students' engagement, teamwork, and comprehension in English courses. Specifically, the research examines how OCLN facilitates students' ability to collaborate effectively, generate and organize ideas, and manage learning resources in an online setting.

The study seeks to answer the following research question:

1. Does students' online collaborative learning performance significantly improve after participating in Online Collaborative Learning with Notion (OCLN)?
2. Which dimensions of online collaborative learning performance show the most significant improvement after implementing OCLN?

2. METHODOLOGY

2.1. Research Design

The purpose of this study was to investigate the impact of online collaborative learning with Notion in vocational high school English courses. Based on the research purpose, the research design is illustrated in Figure 2-1. The study focuses solely on OCLN, with students engaging in a structured online collaborative learning process using Notion as the primary digital tool. The independent variable is Online Collaborative Learning with Notion (OCLN), while the dependent variables include Online Collaborative Learning Performance, measured by a questionnaire based on OCL theory, which assesses seven dimensions.

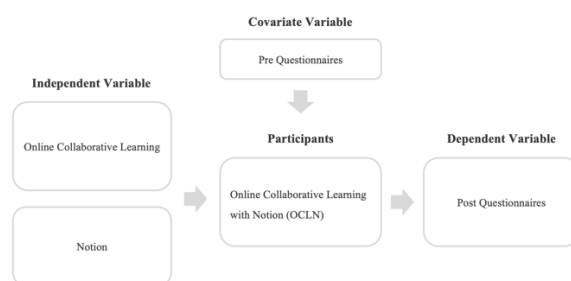


Figure 2-1. Example of figure.

2.2. Procedure

The participants, comprising 39 students from the Department of Applied Foreign Languages (DAFL), engage in a structured OCLN-based learning approach to assess its effectiveness in enhancing collaborative learning performance, engagement, and content comprehension. Before the course begins, participants complete a pre-questionnaire assessing their collaborative learning performance. All students sign an informed consent form, and legal guardians provide consent for their participation. Once finalized, students participate in an introductory session conducted by the instructor. This session includes A self-introduction activity to familiarize students with the online learning environment, and training on using Notion as a collaborative platform. The students engage in a month-long course (12 hours total) focused on English vocabulary, sentence structures, and reading analysis related to city planning. The instructional approach integrates online and offline learning activities while emphasizing collaborative work through Notion. After the course, students complete a post-questionnaire to assess changes in online collaborative learning performance based on seven key dimensions.

2.3. Instruments

This study employs four instruments: Notion and Online Collaborative Learning Theory Questionnaires. The details of each research tool are described as follows:

2.3.1 Notion

This study utilizes Notion as an online learning environment, integrating it with online collaborative learning (OCL) to enhance student engagement and interaction. The teaching materials within Notion are carefully curated by collaborating teachers and include the English course unit "City Planning: Building a Better Future." All course content is embedded within Notion, creating an "all-in-one" digital learning environment, as illustrated in Figure 2-2. Participants access the learning materials through a designated link within Notion, which directs them to specific blocks containing lesson content, resources, and collaborative tasks. The instructional design incorporates collaborative task activities (Figure 2-3), where participants actively engage in co-editing, sharing ideas, and responding to peers' comments directly on the platform. Upon completing each task, participants receive instant feedback from the instructor, enabling them to refine their work and enhance their collaborative learning experience.

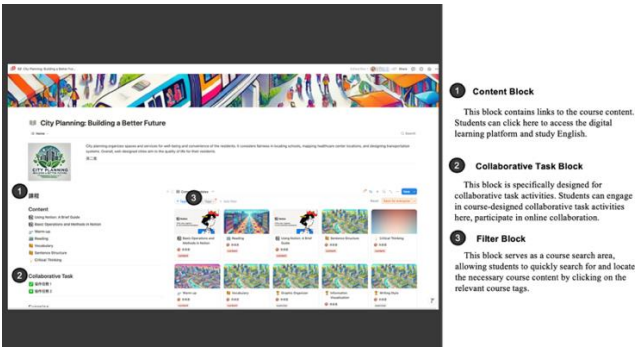


Figure2-2. Online Learning Environment within Notion

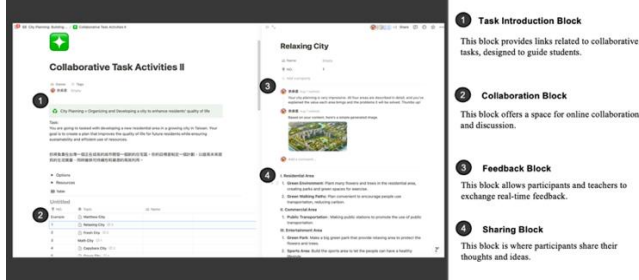


Figure2-3. Collaborative Task Activities

2.3.2 Online Collaborative Learning Performance Questionnaire

This study uses the "Online Collaborative Learning Performance Questionnaire," developed based on previous research on online collaborative learning (Chan et al., 2023; Hernández-Sellés et al., 2019; Isaac et al., 2019; Qureshi et al., 2021) and OCL theory (Harasim, 2012). The questionnaire is adapted and modified from prior research (Chan et al., 2023) to tailor to the context of online collaborative learning, aims to understand the online collaborative learning performance of vocational high school students using Notion for studying English. The questionnaire included 33 items designed to assess seven factors: online collaborative tools, collaboration with peers, student engagement, idea generating, idea organizing, intellectual convergence, and student learning outcomes. Each item was measured on a five-point Likert scale, ranging from “1 = strongly disagree” to “5 = strongly agree.” The composite reliability for these dimensions is 0.88 for online collaborative tools, 0.87 for collaboration with peers, 0.86 for student engagement, 0.86 for idea generating, 0.86 for idea organizing, 0.87 for intellectual convergence, and 0.89 for student learning outcomes. Each composite reliability value of 0.7 or higher is typically considered acceptable, which represent the internal consistency of a set of indicators are consistently measuring the intended concept.

3. Finding

The results indicate that all factors showed statistically significant differences between the pre- and post-test ($p < .05$). Notably, the Student Engagement factor demonstrated the highest t-value ($t = 2.58, p = .000$), suggesting an improvement in students' ability to evaluate and monitor their collaborative learning performance. The effect size for this factor ($d = 0.40$) suggests a moderate impact of the online collaborative learning experience on students' self-evaluation and monitoring skills.

On the other hand, factors such as Online Collaborative Tools and Collaboration with Peers also showed significant changes ($p = .000$), but their effect sizes were relatively small ($d = 0.21$), indicating a small yet meaningful improvement in students' critical thinking and problem management abilities.

In contrast, Idea generating, Idea Organizing, Intellectual Convergence, and Student Learning Outcome demonstrated smaller t-values and lower effect sizes ($d < 0.15$), indicating minimal changes in these aspects of online collaborative learning performance. Although the changes were statistically significant, the practical significance remains limited. Overall, these findings suggest that online collaborative learning had the greatest impact on students' self-evaluation and monitoring abilities. Meanwhile, other factors exhibited statistically significant differences but with limited significance, suggesting the need for further instructional enhancements to strengthen these areas of collaborative learning.

Table 1. Paired Sample t-test Results for the Pre- and Post-Test of the OCLN Seven Factors of Online Collaborative Learning Performance Questionnaire.

	N	t	df	p	d
Online Collaborative Tools	39	1.49	38	.000	0.21
Collaboration with Peers	39	1.54	38	.000	0.21

Student Engagement	39	2.58	38	.000	0.40
Idea Generating	39	-.73	38	.002	0.12
Idea Organizing	39	-.68	38	.000	0.09
Intellectual Convergence	39	-.27	38	.000	0.04
Student Learning Outcome	39	0.43	38	.011	0.07

* $p < .05$; ** $p < .01$

4. Discussion

This study aimed to evaluate the impact of Online Collaborative Learning with Notion (OCLN) on students' online collaborative learning performance by examining pre- and post-test differences. The findings provide insights into how OCLN influences students' engagement, collaboration, and overall learning outcomes.

4.1. Does students' online collaborative learning performance significantly improve after participating in Online Collaborative Learning with Notion (OCLN)?

The results indicate that all seven dimensions of online collaborative learning performance showed statistically significant improvements after the implementation of OCLN ($p < .05$). This suggests that Notion-based online collaborative learning effectively enhances students' ability to engage in digital collaboration, interact with peers, and participate in knowledge construction activities. However, despite statistical significance, the effect sizes of several dimensions were relatively small ($d < 0.15$), indicating that while students showed measurable improvements, the practical impact may vary depending on the specific aspect of learning performance. Besides, students engaged in collaborative tasks, their ability to generate and structure ideas, converge intellectually, and translate learning into outcomes showed only minimal improvements. This highlights the need for further instructional interventions, such as scaffolding strategies or guided reflection activities, to reinforce students' development in these areas.

4.2. Which dimensions of online collaborative learning performance show the most significant improvement after implementing OCLN?

Among the seven dimensions, Student Engagement exhibited the highest improvement, with a moderate effect size ($d = 0.40$). This suggests that OCLN played a crucial role in increasing students' motivation, participation, and self-regulation in the collaborative learning process. The interactive features of Notion, such as real-time collaboration, commenting, and content organization, likely contributed to this enhanced engagement, allowing students to actively participate and monitor their learning progress. On the other hand, Idea Generation, Idea Organization, Intellectual Convergence, and Student Learning Outcomes exhibited smaller improvement, indicating that while students engaged with collaborative tasks, the depth of knowledge construction and synthesis remained relatively limited. One possible explanation is that the integration of Notion facilitated collaboration but did not inherently guide students toward deeper cognitive processing. Future instructional designs could incorporate explicit training on knowledge structuring and reflection strategies to enhance students' ability to generate, organize, and integrate ideas more effectively.

5. Conclusion

The findings of this study highlight the effectiveness of Online Collaborative Learning with Notion (OCLN) in vocational high school English courses, particularly in fostering student engagement and peer collaboration. The results indicate that students demonstrated significant improvements across all dimensions of online collaborative learning performance after participating in OCLN, with Student Engagement showing the highest improvement. This suggests that the integration of Notion as a collaborative learning tool effectively motivates students, encourages active participation, and enhances their ability to monitor and regulate their learning processes. However, while OCLN successfully enhances engagement and teamwork, its impact on higher-order cognitive processes, such as idea structuring, intellectual convergence, and knowledge integration, remains limited. The future research should explore more effects of OCLN on student learning performance, as well as the instructional design strategies that can enhance both engagement and cognitive processing skills. The educators must incorporate pedagogical strategies that foster deeper cognitive engagement, ensuring that students not only collaborate effectively but also develop higher-order thinking skills essential for academic and professional success.

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Rewriting Traditional In-person Environment Design with Vertical Studio:

Merging Technology and Collective Inquiry

Gerhard BRUYNS¹, Chun Chuen Billy CHAN², Daneil ELKIN³

^{1,3}The Hong Kong Polytechnic University, Hong Kong SAR, China

²The University of New South Wales, Sydney, Australia

gerhard.bruyns@polyu.edu.hk, billy.chan@unsw.edu.au, daniel.k.elkin@polyu.edu.hk

Abstract: *This paper explores the implementation of collective inquiry, described by Slotta et al. (2018) as a pedagogical approach, within an undergraduate design program. Referred to as the Vertical Studio (V.S.), this model demonstrates how a multi-cohort student community can effectively establish a robust learning environment for remote learning. These challenges include establishing an epistemological context, scaffolding and sharing knowledge, as well as fostering teacher- and student-led productive discourse. Outcomes are shown utilizing student work artifacts as illustrative examples. The paper concludes by discussing the lessons learned and insights gained from applying the pedagogy to design-related disciplines.*

Keywords: Collective Inquiry, Design Pedagogies, Vertical Studio, Scaffolding Knowledge

1. Introduction

One of the key challenges in design education is to articulate a sustained renewal of knowledge transfer and, in parallel, appropriate technological tools. For the environmental sciences, this includes the necessity of creating a balance between core design skills with environmental methodologies and spatial and material proficiency. It also includes the development of critical frameworks that best connect with Razzouk's et al., (2012) concept of design thinking as experiential, hands-on learning.

In the past two decades, the dependency on technology in design education has influenced curriculum reform across various disciplines such as Environment and established desired meta-competencies, including multidisciplinary teamwork and self-directed learning practices (Lloyd, et al., 2004). The urgency and persistence of COVID-19 further compelled almost all design institutions to evaluate online and hybrid learning modalities to circumvent the 'group' experience characteristic of traditional studio environments, particularly the communal network fostered through peer collaboration.

This paper builds on Slotta's et al., (2018) concepts of collective inquiry within design pedagogy. Reporting on the outcomes of a single classroom format for multiple cohorts within one program, termed Vertical Studio (V.S.), the paper expands on the mechanization and implementation of a collective pedagogy that balances hybrid technologies with experiential learning goals per study year for project-based learning.

2. Collective Inquiry and Design Pedagogy

Slotta et al., (2018) characterise collective inquiry as an educational approach wherein all students in a classroom, or across several classrooms, engage in a coordinated learning endeavour with clearly defined objectives for both the subject matter and its practical application. They further indicate through Bielaczyc and Collins (1999), that participants engage either individually or in small groups, collaboratively developing a coherent comprehension of their learning community's objective. Individuals' observations, ideas, or artefacts are consolidated into a centralised community knowledge repository. Students are made aware of "the whole is greater than the sum of its parts" (p. 308) as they augment their peers' contributions, organise content, synthesise ideas, identify shortcomings, and draw inspiration. This method is linked to a broader categorisation of educational strategies, as students participate as a scientific collective, resembling genuine scientific practice. They are encouraged to develop their own research paths, improve each other's results, collaborate with peers, and foster shared observational data. Hereafter, four sections will discuss the adaptation of the pedagogy in an undergraduate environment design course.

2.1. Establishing an epistemological context

To establish the transformative role of technology and pedagogy, we interpret an epistemological context as technological appropriateness in education settings, which, when considered collectively, does not inherently enhance or magnify the significance of technology. Teaching and learning are anchored on project-based learning (a specific form of inquiry-based learning that occurs within a defined project and is typically collaborative). As model, project-based learning directly feeds into an experiential learning cycle that generalizes, internalizes, and conceptualizes students' understanding of design, environmental qualities, spatial engagement, and user interfaces (Savery et al., 1995).

By querying the standard approach of studio-based learning in design education, from linear and in-person to vertical and remote learning, the Environment and Interior Design unit uniquely removes form the traditional ‘silo’ studio format and incorporates a vertical mixed-year model within its formal curriculum, referred to as the Vertical Studio (V.S.).

From within an education programme that focuses on spatial and interior questions, the V.S. represents a pedagogical shift linked to project-based assignments. This is achieved by integrating the skills and learning outcomes from all years of study into a singular project-based environment. The V.S. setting occurs at the commencement of one semester each academic year, utilising prior vertical studios, each framed under a project and characterised by a specific thematic framework.

To integrate experiential learning into evolving technology in design, V.S., as a pedagogy, critically queries digital or analogue technology before its merger with (online) project-based education. We question the premiums placed on the application of software as a tool in education models that depend on in-person engagement for technology’s protocol acquisition, testing, and feedback cycles require additional nurturing in what West (2012) defines as trust filters, in order not to derail the original aims of educational programmes.

From our spatial perspective, the appropriateness of spatial scanning applications to assessing the physical environment, which cannot be measured through traditional means (i.e., site, spatial measurability, and behavioural studies), has increased exponentially. The need for face-to-face ‘critiques’ (i.e., in-person reviews of work), student experiences of the studio setting as a creative space, and peer-to-peer engagement in cohorts, each with designated task divisions, collectively shift once any of these constants is replaced with technology-only incentives driven by software platforms and applications. For example, utilising mobile phone scanning applications and hybrid platforms like Conceptboard and Microsoft Teams enable the visual presentation of student work for discussion, the sharing of processes and workflows, the archiving and documenting of outcomes, and the facilitation of interactions and communication between students and educators either synchronously or asynchronously inside and/or outside the classroom seamlessly.

2.2. Scaffolding inquiry learning for advancing collative and individual learning

Unlike previous vertical studios, due to the uniqueness of the COVID-19 scenario— teaching technology through other technologies in a contactless setting— the 2021 V.S. had to be restructured to suit an off-campus educational mode. It needed to accommodate a dual adaptation, extending beyond the initial objective of enhancing students' computer draughting and 3D software skills, while also instructing technology through alternative technologies. Our observations indicate that this initiative enhanced student exposure to mobile technologies through the introduction of novel digital plug-in applications and mobile surveying technologies in application format.

In this endeavour, the V.S. Collective Model is tailored to scaffold the pedagogical setting and technology transfer for remote learning. The model delineates a sequential process for peer objectives, outcomes, and contact points to interlink parallel year-specific exercises by establishing a ‘vertical’ connection within an online studio setting.

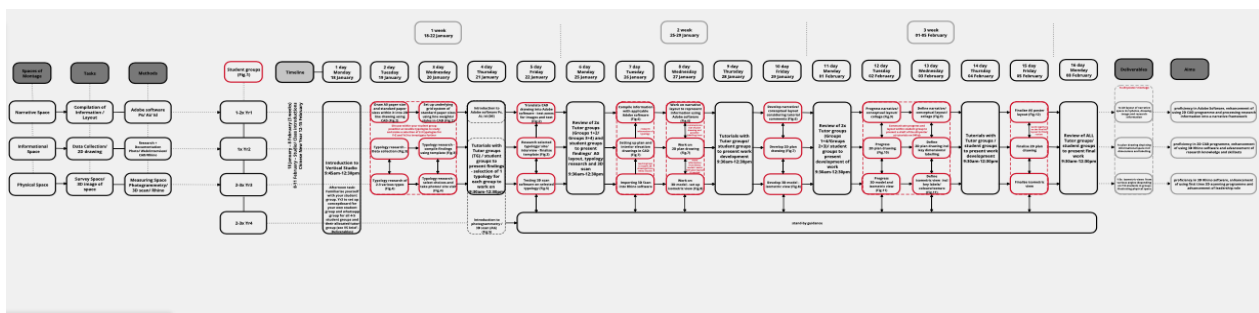


Figure 1. The V.S. Collective setting and workflow.

To establish cohesive collective learning outcomes and achievements, a ‘visual’ and ‘step-by-step’ workflow delineate the guiding steps, allocate assignments, and emphasise the interconnections among academic years, methodologies, outputs, and daily objectives within a timeframe for students and faculty to engage asynchronously. As shown in Figure 1, the horizontal axis shows concepts, tasks, methods, deliverables, and goals by study year. Vertical axis relates to exercise details. Each task and method per year and studio day was highlighted along with colour-coded explanations of ‘vertical’ collaboration between student years. In the original V.S. brief, lectures, images, surveying and tracing examples, layout samples, and typographies were used to visually reference tasks and outcomes.

Pedagogical wise, clusters of students are given the space and time to learn new analysis and representation techniques deemed critical by an institution that considers technical and data capabilities essential for design pedagogy. Unlike the normative compositional qualities of developing typologies and characteristics of space, the promotion of an ‘open’ and interchangeable technological structure articulates a viable model which relies equally on core faculty-driven capabilities and open and evolving professional requirements across a range of design professions.

2.3. Fostering Productive teacher- and student-led community

To cultivate a productive student-led community, the V.S. model employs a collective pedagogy that places participants in small groups with a shared understanding of their learning outcomes as well as individual roles. This aims at promoting collaboration between peers and between study years, with roles assigned to each study year to facilitate development before the transference of certain skills between peers. Taking the 2021 V.S. Montage as an example:

First-year students were responsible for the *narrative* component of the Montage. This covered digital literacy and visual communication using the Adobe Creative Suite (i.e., Photoshop, InDesign, and Illustrator). The inquiring activities of processing and visualizing data through photo retouching, vector graphic development, graphic layout, visual materials, and research outcomes were part of the challenges for navigating different narrative components individually and collaboratively.

Second-year students contributed to the informational aspect of the Montage. They were required to investigate kitchen typologies unique to Hong Kong. It was a crucial prerequisite prior to translating a kitchen type into a two-dimensional (2D) plan drawing, integrating historical, technical, material, and narrative dimensions with attributive data. The enhancement of digital literacy at this level was accomplished by deriving oblique projections from a three-dimensional (3D) Rhino model into two-dimensional drawings of a plan and elevation. The utilisation of AutoCAD for the creation of intricate, multilayered 2D drawings enhanced digital competencies and organised information protocols.

Third-year students concentrated on the physical elements of montage. This involved the surveying and documentation of a spatial arrangement utilising photogrammetry, the discipline of extracting three-dimensional information from photographs. This academic year focused on cultivating the digital expertise necessary for surveying and documentation processes utilising the photogrammetric 3D environment scanning software ReCap Pro/Photo. Students were required to convert the 3D-generated ReCap Pro data into Rhino layers and produce clear 2D drawings from it. On the communal side, they were considered as data managers, facilitating the knowledge transfer of Rhino software data to second-year students in their groups. Their contribution to enhancing interpersonal communication and group collaboration was essential to the success of skill and interpersonal development. Both online and offline, third-year group members, less shy than first-year students and more skilled than second-year students, had direct and easy contact with other members.

Finally, fourth-year students acted as peer tutors. When questions arose—for example, about MS Teams or access to the modelling software and storage and file management systems—they could be consulted and tasked with further guidance from the teaching staff. In this year students project managers assumed leadership roles within this mini student-led community, overseeing daily project development and subsequently serving as coordinators for academic advising to other student initiatives.

Along with such student-agency, V.S. also alternates feedback sessions with other tutors besides the regular fortnight tutorials. This allows a variety of feedback loops and valuable comments to students throughout the process. Seminars and lectures were interwoven to support upcoming tasks and to provide information and methodology. Such arrangements offer students and teachers a greater sense of collective and social cohesion, irrespective of the only online format, social as well as in a technological sense.

Overall, having grouped all study years together, the usefulness of this model to the school's spatial programme has presented a joint platform that integrates the application of a range of software and technological skills to improve students' digital proficiency. Multi-year collaboration provides members with peer-to-peer learning experiences, primarily focusing on group knowledge transfer. With the recognition that most students cannot acquire a comprehensive list of computer and analysis software competencies in the conventional time span of a semester's curriculum, the V.S. allows the simultaneous and mass transference of applicable skills.

2.4. Creating a share-knowledge space

To facilitate the effective, accessible, and timely representation of community knowledge as a resource for student inquiry (Slotta et al., 2018), a user-specific digital archive was created to assess student work for future V.S.s through a collective and comparative framework. The archive consisted of over 2000 digital artefacts, including images, surveying records, and drawings created by 120 students over a three-week period (see examples in figure 2). A design archive serves as a crucial repository for safeguarding the history and progression of V.S. methodologies. It functions as a repository of knowledge, exhibiting previous projects, methodologies, and innovations. This archive, by preserving a thorough compilation of design artefacts, sketches, and documents, offers designers, researchers, and students valuable insights into the creative process and historical context, as it enables individuals to examine effective strategies and evade previous errors.

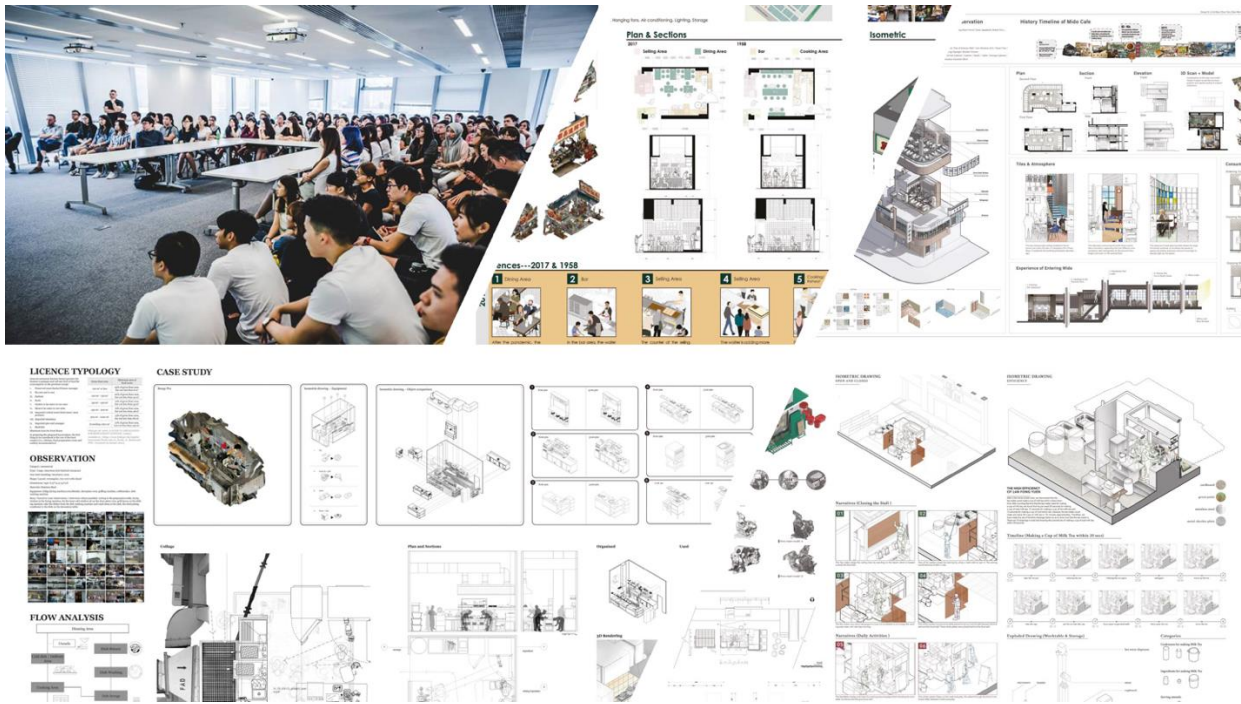


Figure 2. The V.S. outcomes driven through collective enquiry. Figures capture the group learning briefing sessions with the documented outcomes of spatial documentation of kitchens in Hong Kong.

3. Outcomes of collective inquiry

The end-of-term student evaluation survey indicated that, across all academic years, interaction with and learning from cohort groups were the most valued aspects of the course's learning and teaching outcomes. In terms of learning outcomes, first-year students reported gaining better visual and communicative knowledge related to presentation and composition competency, technical skills, and drawing techniques. Second-year students highlighted the value of research skills in design. Third-year students appreciated the considerable advancement in software proficiency.

On the critical side, some students perceived inadequacy in peer-to-peer interaction due to the module's online mode. The dominance of online studios lacked the full benefits of face-to-face collegial processes and feedback loops. A post-V.S. survey captured the impact of the V.S. through: "It was a great experience to learn "hard" and "soft" skills from senior years!". A second responded "At that time, I just year 1 student. But Vertical Studio let me know how the design process and proper research skill from year 2 and 3 students. And know more about the software information". Another detailed: "It is important to have the vertical studio to strengthen the connection between each year's student. And it is necessary to have the connection for a better understanding of the future learning path and being aware of what to face in the future".

Although COVID-19 has not removed the actual premises of education, it has, to a great extent, made them inaccessible as places for gathering, discussing, thinking, and producing design concepts. The inclusion of new virtual capabilities in the configurations of each setting—for example, the previously mentioned Conceptboard—has forever fused knowledge production platforms as productive settings. Collaboration and communication between students go hand-in-hand with digital media systems that link wider education communities into one comprehensive setting, which, we foresee, will in the long run change the nature of design materials.

4. Conclusions

While open-ended and interchangeable educational models may facilitate greater flexibility in study objectives and resources, evidence indicates that these approaches necessitate explicit workflow guidelines. The latest version, informed by preceding V.S. experiences, demonstrates the comprehensive scripting necessary to connect both stakeholders and participants to workflow processes. Collective actions as daily communication, reminders, and newsfeeds concerning technology focus mitigate uncertainties for both educators and students, delineating each step to follow and aligning them with curriculum objectives. The workflow and its steps are clearly presented and communicated from the outset; however, the efficacy of an open and adaptable curriculum relies on an understanding of broader objectives.

To this effect, collaborative learning models equally influence the expression of the educational environment across all settings, curricula, and pedagogical levels. We contend that the interchangeable and technology-centric V.S. model represents a prospective standard with the potential for significant influence across multi-discipline approaches. V.S. fosters closer alignment among educational environments, curricula, and teaching methodologies, facilitating potential intersections among various stakeholders and practitioners to establish a unique interdisciplinary framework for digital and design expertise.

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A Case Study on Students' Intercultural Sensitivity through Virtual Communication

Zhenhui FENG¹, Kangtuo LI²

¹The Education University of Hong Kong, Hong Kong SAR, China

²The Hong Kong Polytechnic University, Hong Kong SAR, China
fengz@eduhk.hk, cara.li@cpce-polyu.edu.hk

Abstract: *This current study investigated participants' intercultural sensitivity via virtual exchange. Twenty-six students from Hong Kong and forty-five from the United States participated in a semester-long virtual exchange program involving intercultural teamwork and global issue discussions. Students collaborated internationally on research projects addressing topics like education, philosophy, society, and religion across regions. Intercultural Sensitivity Scale (ISS) surveys were administered pre- and post-program to assess changes quantitatively. Students' reflective journals were also qualitatively analyzed. Findings from ISS scores and reflection analyses suggested that Hong Kong students demonstrated significant positive growth in intercultural sensitivity after the experience. This research provides novel insights into innovative virtual exchange methods for effectively developing intercultural competence among students separated by geography. As technology enables more global connections, these findings offer guidance for educators on leveraging technology to cultivate intercultural skills through engaging, collaborative international learning experiences.*

Keywords: Virtual exchange, Intercultural sensitivity, Intercultural communication competence, Online communication

1. Introduction

Distance collaboration involves learners from different cultural backgrounds working online under an educator's guidance (O'Dowd, 2021). Virtual exchange (VE) has gained popularity, especially post-COVID-19, for providing international experiences and fostering trust and understanding among culturally diverse students through collaborative learning and discussions. Various VE models, like telecollaboration and e-tandem learning, have emerged in second language education, positively impacting students' academic performance and retention rates (Lee et al., 2022).

Schools have adopted VE to enhance students' learning and intercultural communication competence (ICC), which involves avoiding stereotypes, viewing people with multiple identities, and seeking common ground for successful interactions (Byram et al., 2002). ICC consists of intercultural sensitivity, awareness, and proficiency, referring to communication's affective, cognitive, and behavioral aspects (Chen & Starosta, 2000). Intercultural sensitivity (IS) is the willingness to understand and appreciate cultural differences, promoting effective behaviors in communication.

VE helps students understand cultural differences through online collaboration, influencing their behavior in intercultural communication. This study explored how VE projects affect undergraduate students' intercultural sensitivity and their utility in intercultural communication across regions and cultures.

2. Literature Review

2.1. Virtual Exchange

"Virtual exchange" (VE), also known as "telecollaboration" or "collaborative online international learning," broadly describes programs that involve bringing together groups of learners from different cultural contexts for extended periods of online intercultural collaboration and interaction. VE is a pedagogical approach where groups of learners engage in online linguistic and cross-cultural interactions with partners from other cultural backgrounds or geographic locations as an integral part of coursework, guided by expert educators or facilitators. Educators provide learning support for students during the VE project. These modalities include synchronous communication, which occurs in real-time, either verbally or in writing, such as videoconferencing or instant messaging chat conversations, and asynchronous communication, which occurs in a delayed form, either verbally or in writing, such as discussion forums or email conversations. VE is an online intercultural education program engaging learners from different cultures and locations in interactive and collaborative activities. VE utilizes digital tools in a peer-to-peer format designed to engage learners in experiential, deep, and social learning (O'Dowd & O'Rourke, 2019).

VE has several vital features: (1) It is highly flexible and can be integrated into teaching and learning in various ways, including classroom or blended learning environments. (2) It provides an ideal opportunity for students to interact socially and collaborate with participants they are less likely to meet in traditional educational settings. (3) VE is an alternative to physical activities for students with disabilities or economic difficulties, promoting inclusion, language practice, and internationalization for all. (4) Some VE projects may incorporate self-directed online language learning platforms, such as Busuu and Italki, as part of a broader study program, often within a guided formal setting with a cooperating teacher.

VE emphasizes participants' learning and collaboration, supported by language connectivity and diverse geographical locations. It requires well-designed activities that multiple educators develop and implement collaboratively. O'Dowd (2021)

Cheng, M. H. M., Xu, G., Cheng, G., Kong, S. C., Song, Y., Erni, J. N., Chen, J., & Macfarlane, B., Yeung, S. S. (Eds.). (2025). *Proceedings of the International Conference on Learning and Teaching 2025 (ICLT 2025)*. Hong Kong SAR: The Education University of Hong Kong.

noted that VE varies by class and learner profile and by the sequence of tasks, the type of technology used, and the assessment of learning outcomes. VE has been integrated at different educational levels, from kindergarten to university, and is distinctive in its use of new media platforms to enable deep, interactive, and social learning.

Scholars have highlighted the key aspects of designing VE activities, which included explicitness, structure, and FIT. Explicitness ensures that students focus on how they learn the language, the competencies they are acquiring, and the linguistic and nonverbal communicative features they perform. Structure emphasizes the pedagogical design that fully supports the acquisition and use of language. FIT encompasses technology tools, language use, and instructional expectations appropriate to the learner's level (Beckett & Slater, 2018).

To develop the virtual communication course content, the VE project in this study followed several vital steps, including lesson planning, aligning with academic content, specifying communication content, and selecting technology platforms. Participants engaged in the VE project through various media, such as Zoom, video, and Padlet for presentations. Topics included COVID-19, global warming, media information usage, and the education industry.

VE can develop transversal or soft skills that are highly relevant to the modern workplace. These soft skills, repeatedly mentioned in the research, include teamwork, flexibility, intercultural cooperation, problem-solving, and aspects of digital competence related to online communication skills.

2.2. Intercultural Communication Competence and Intercultural Sensitivity

Drawing on the definition from Fantini and Tirmizi (2006), Intercultural Communication Competence (ICC) is a complex set of competencies needed to perform effectively and appropriately in interactions with people who are linguistically and culturally different from oneself. It emphasizes the concepts of effectiveness and appropriateness as two critical components of ICC. ICC is considered a person's ability to change or adapt their attitudes, behaviours, and knowledge to remain open and flexible to cultures different from their own (Byram et al., 2002). It involves effectively and appropriately performing communicative behaviours that negotiate cultural identities in a multicultural environment.

Kim's study (1991) identified several dimensions of ICC, including the affective, cognitive, and operational dimensions, all of which influence the effectiveness of one's intercultural communication. Scholars have stated that Intercultural Sensitivity (IS) represents an individual's desire to understand, appreciate, and accept cultural differences, which belongs to the affective dimension of ICC (Penbek et al., 2009). Chen (1997) emphasized the crucial role of IS in effectively managing a multicultural society and appreciating and enjoying its diversity. When living and working with people from different cultural backgrounds, IS is significant for ICC and intercultural adaptation (Landis & Bhagat, 1996). Studies have suggested a positive correlation between ICC and IS: the more interculturally sensitive a person is, the more interculturally competent they are (Bennett, 1993; Chen, 1997).

Chen and Starosta (2000) identified five essential components of IS: Interaction Engagement, Respect for Cultural Differences, Interaction Confidence, Interaction Enjoyment, and Interaction Attentiveness. They are prerequisites for an individual's IS. Interaction Engagement refers to participants' emotions about their participation in intercultural communication. Respect for Cultural Differences depicts individuals' tolerance of other cultures and perspectives. Interaction Confidence denotes how confident participants feel in an intercultural environment. Interaction Enjoyment identifies how participants react positively or negatively to interacting with people outside their culture. Interaction Attentiveness encompasses the effort participants put into understanding the elements of intercultural interaction.

This study aims to measure participants' intercultural sensitivity through virtual communication.

3. Methodology

A mixed methods approach was adopted in this study. Participants were administered a pre-and post-test using the Intercultural Sensitivity Scale (ISS) questionnaire to compare their IS before and after participating in the VE activities. Additionally, to gain a more comprehensive understanding of their IS, the content of their reflective journeys was analyzed to reveal insights beyond the questionnaire.

3.1. Participants

Twenty-six university students from Hong Kong participated in the study by engaging in a semester-long VE project with forty-five university students from the U.S. Students from both regions worked in small groups to complete VE tasks, which involved cross-cultural teamwork and discussions on global issues. They used Zoom as an online platform for cross-cultural communication and Padlet to post and share ideas, feedback, and mutual evaluations for group presentations.

3.2. ISS Survey

The ISS developed by Chen and Starosta (2000) was implemented to measure participants' attitudes towards other cultures. It includes five essential components of IS with a total of twenty-four questions.

Before the start of the VE project, twenty-six students from Hong Kong completed an ISS pre-test. This pre-test was designed to assess the students' existing experiences and characteristics related to intercultural communication sensitivity.

Upon completion of the VE project, an ISS post-test was administered to the twenty-six Hong Kong students. This post-test aimed to examine the differences in intercultural communication sensitivity among the students after participating in the VE activities.

Statistical analysis was conducted to analyze the data from the pre-and post-tests quantitatively. A T-test was adopted to compare and reveal the differences in IS among the students before and after participating in the VE activities.

3.3. Content Analysis

The reflective journals of twenty-six Hong Kong participants were qualitatively analyzed to explore their motivations and attitudes toward intercultural communication. Based on the ISS developed by Chen and Starosta (2000), four areas with open-ended questions were administered in the reflective journals.

4. Findings

4.1. ISS Survey

The results of the paired sample T-test show that Respect for Cultural Differences ($p = .040$) and Interaction Confidence ($p = .013$) both have significant p-values less than 0.05, indicating statistically significant differences in the pre-and post-test results for these two items. Additionally, the respondents demonstrated a significant positive improvement in overall intercultural sensitivity ($p = .004$). (See Table 1)

Table 1. Quantitate Approach: ISS Survey.

Factors	Pre-test		Post-test		P #
	Mean	Standard Deviation	Mean	Standard Deviation	
Interaction Engagement	4.03	0.42	4.10	0.40	.448
Respect for Cultural Differences	3.52	0.56	3.88	0.58	.040*
Interaction Confidence	3.80	0.53	4.20	0.46	.013*
Interaction Enjoyment	3.54	0.88	3.82	0.94	.074
Interaction Attentiveness	4.00	0.52	4.02	0.58	.923
Intercultural Sensitivity Scale	3.73	0.24	4.00	0.38	.004**

$p < 0.05$ was consistent with statistically significant differences in the pre-test and post-test results, while $p > 0.05$ was not, the same below.

The results of the paired sample T-test show that the significance p-values for the following four items are less than 0.05, indicating a noticeable positive change in respondents' attitudes. (See Figure 1) The four items are:

"I don't like to be with people from different cultures." ($p = .01$, Respect for Cultural Differences). The result shows a significant positive change in respondents' tolerance of other cultures and perspectives.

"I am pretty sure of myself in interacting with people from different cultures." ($p = .03$, Interaction Confidence), and "I find it very hard to talk in front of people from different cultures." ($p = .05$, Interaction Confidence). These results suggest that when respondents experienced cross-cultural environments, there was a significant positive change in their confidence level in interactions.

"I often get discouraged when I am with people from different cultures." ($p = .02$, Interaction Enjoyment). This result reveals that respondents' attitudes of discouragement when interacting with people from different cultural backgrounds had decreased, indicating a significant positive change in their interaction enjoyment.

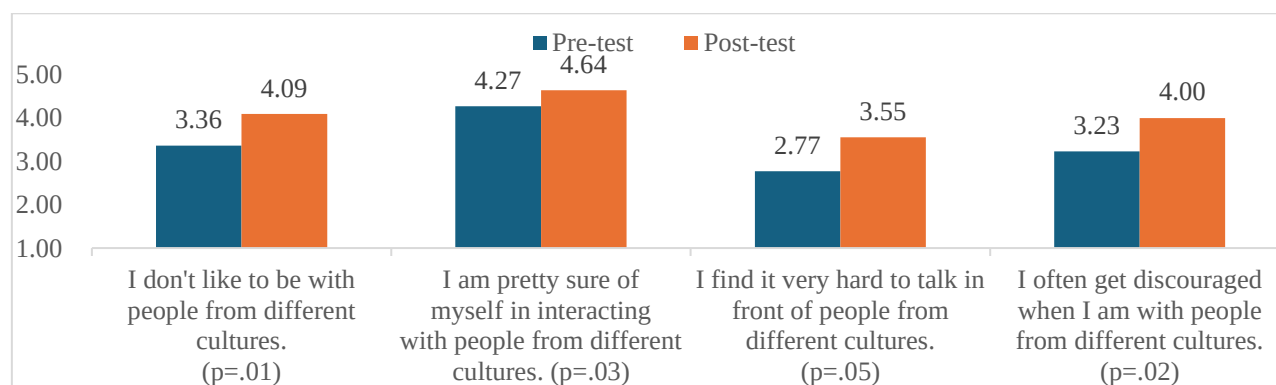


Figure 1. Quantitate Approach: ISS Survey-Paired Sample T-test Result.

4.2. Content analysis

Results from the reflective journals showed that participants developed positive emotions when working with an intercultural partner on a series of VE tasks. These tasks helped them deepen their understanding of other cultures, acquire valuable information, and appreciate and apply cultural differences in intercultural communication. (See Table 2)

Table 2. Qualitative Approach: Content Analysis.

Themes	Samples
1.Enhance understanding of different culture	-Have a deep understanding of COVID-19 and educational issues in the US, the data collection is sufficient.
2.Acquiring information in intercultural communication	-You guys provide fruitful evidence and victims examples as a living proof of racial discrimination happened in the U.S..
3.Appreciating and applying cultural differences	-As inspired by the U.S. students, they have many group projects (continuous assessment), no assessment carries too much weight.
4.Positive emotions	-It is good of us to discuss this topic because it seems the U.S.A and the Hong Kong students have the same loan problem we may face.

5. Discussion

Chen and Starosta (2000) stated that IS refers to an individual's ability to understand and appreciate different cultures, promoting adaptability and effectiveness in intercultural communication. Actively understanding, appreciating, and accepting different cultures is related to the individual's need to facilitate positive interactions in intercultural communication. Scholars identified other factors that affect IS, including gender differences (Segura-Robles and Parra-González, 2019), environmental variables and personal character variables (Zhang & Han, 2019), overseas experience (travelling, studying, exchange programs) (Yurur et al., 2021), and foreign language proficiency (Paige et al., 2003).

6. Limitation and Future work

In this study, only female students without overseas experience participated in the VE project. Future research should consider including male students, students with varying language skills, and those with different course content. Additionally, while questionnaires and self-reflections were analyzed, more analysis of unstructured content should be incorporated, such as observations of attitudes, communication skills, or facial expressions.

7. Conclusion

The participants demonstrated a significant positive improvement in intercultural sensitivity. The pre-and post-test results for Respect for Cultural Differences and Interaction Confidence showed significant differences. Participants experienced notable shifts in confidence, oral English proficiency, attitudes, and emotions when interacting with people from other cultures. They also showed initiative and actively sought to understand and appreciate different cultures during presentations. Positive emotions expressed in their reflective journals further highlighted the beneficial effects of virtual communication on intercultural sensitivity.

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Understanding Online Learning in Chinese Higher Education: Insights from the Literature on Empirical Studies

Baohua YU¹, Donghai YAN^{2*}

¹City University of Hong Kong, Hong Kong SAR, China

²Lingnan University, Hong Kong SAR, China

baohuayu@cityu.edu.hk, donghaiyan@ln.hk

Abstract: *This study investigates the existing evidence for online courses in China's higher education context. The two research questions are: What are the key features of online courses in Chinese universities or colleges? How do Chinese teachers and students perceive online courses? This study aims to gather and map practices related to online courses in China. A scoping review is used to ensure a systematic methodology and achieve the aim above. Open-access literature owning empirical evidence from quantitative, qualitative, or mixed methods is included in the review. Using thematic content analysis to explore the data extracted from included articles, this study presents the results of features and perception in the above research questions. Discussions are also conducted regarding the future development path of online courses based on the findings of the review.*

Keywords: Chinese higher education, features and perceptions, online learning

1. Introduction

The purpose of this review is to explore the practices of online courses within the context of Chinese higher education (CHE) and to identify any existing empirical evidence on features and perceptions of online courses for further investigation. This study is guided by two fundamental research questions: Firstly, what are the salient features of online courses offered in Chinese universities and colleges? Secondly, how do online courses get perceived by teachers and students within these Chinese educational institutions? The results and discussion of this scoping review provide valuable input for the next steps for faculty, university administrators, and technical staff in China to explore how to improve the quality of online courses by discussing the current situation. So far, no (if any) comprehensive maps have been drawn in this field.

A scoping review is often used to find key features of a concept and identify research gaps in a certain field (Munn et al., 2018). To ensure the systematicity of this study, The Joanna Briggs Institute Reviewers' Manual - Methodology for JBI Scoping Reviews has been selected to be applied in every step of the scoping review process (JBI, 2022). "Feature" refers to a typical quality or an important part of something, while "Perception" refers to a belief or opinion, often held by many people and based on how things seem (Matsumoto, 2009). Specific to this study, "Feature" mainly includes the inherent characteristics of the online course itself, such as the necessary technology; "Perception" mainly includes people's feelings and evaluations of the online course after experiencing it, such as inequality. The scope of this study is online courses in Chinese higher education, namely, higher education in mainland China.

2. Methods

2.1. Search Strategy

The protocol was developed to ensure reproducibility. The first step is to do database searches and import references into Zotero for review. The second step is to review the titles and abstracts of the references. The third step is to conduct full-text screening, data extraction, and quality assessment of the pieces of literature selected in the second step. The first search took place on September 30, 2023. The authors also set up a new literature alert so as not to miss the latest publications that meet the inclusion criteria.

2.2. Inclusion Criteria

The authors included peer-reviewed empirical publications from 2010-2023 with a focus on online courses in higher education in China in this review. Qualitative, quantitative, and mixed methods studies showing the features or perceptions of online courses in China higher education, including university, and three-year colleges, are considered.

2.3. Exclusion Criteria

The focus of this review was only on full-time academic online courses offered in higher education institutions. Thus, the authors excluded articles that focused on K-12 education, community education, professional/corporate online training

Cheng, M. H. M., Xu, G., Cheng, G., Kong, S. C., Song, Y., Erni, J. N., Chen, J., & Macfarlane, B., Yeung, S. S. (Eds.). (2025). *Proceedings of the International Conference on Learning and Teaching 2025 (ICLT 2025)*. Hong Kong SAR: The Education University of Hong Kong. courses, and National Open University/Radio and Television University. The authors excluded dissertations, conference proceedings, books, and reports from our criteria, to ensure that the sources were peer-reviewed articles published in academic journals. Finally, articles that only mention online courses but do not focus on them were also excluded.

Table 1. Search strategy.

Stage	Details
Database	ERIC, Web of Science
Search Terms	(university) OR (college) OR (higher education) AND (online courses) OR (online learning) OR (online education) OR (distance education)
Inclusion Criteria	Full Text: Yes Date: 2010 to 2023 Language: English-only Type: Peer-reviewed journal articles Education Level: Higher education, university, three-year colleges Location Identifiers: China Focus: The main object of discussion is online courses
Exclusion Criteria	Full Text: No Date: Before 2010 Language: Languages other than English Type: Dissertations, conference proceedings, books, reports Education Level: K-12, community or professional/corporate training online courses, National Open University/Radio and Television University Location Identifiers: Other countries or regions other than China Focus: The main object of discussion is not online courses, although online courses are mentioned

3. Data Sources

3.1. Source of Evidence Screening and Selection

The databases ERIC and Web of Science were selected for use, which cover education and other related areas and are available to the primary local target audience of this scoping review. The two researchers developed the scoping review protocol and conducted the database search between September 2023 and May 2024.

3.2. Search Results

The two researchers independently screened each title and abstract of 227 articles with eligibility to determine inclusion based on the inclusion and exclusion criteria. Then they had regular meetings to resolve conflicts and determine the final references to include for full-text review. After screening the title and abstracts, 140 articles were included for full-text review. Two researchers followed the same inclusion/exclusion criteria for the full-text review. Of these 140 articles, 66 articles were removed because the content of these articles did not match the inclusion criteria (Figure 1). Following a full-text review, 74 articles were included for data extraction.

Search Results

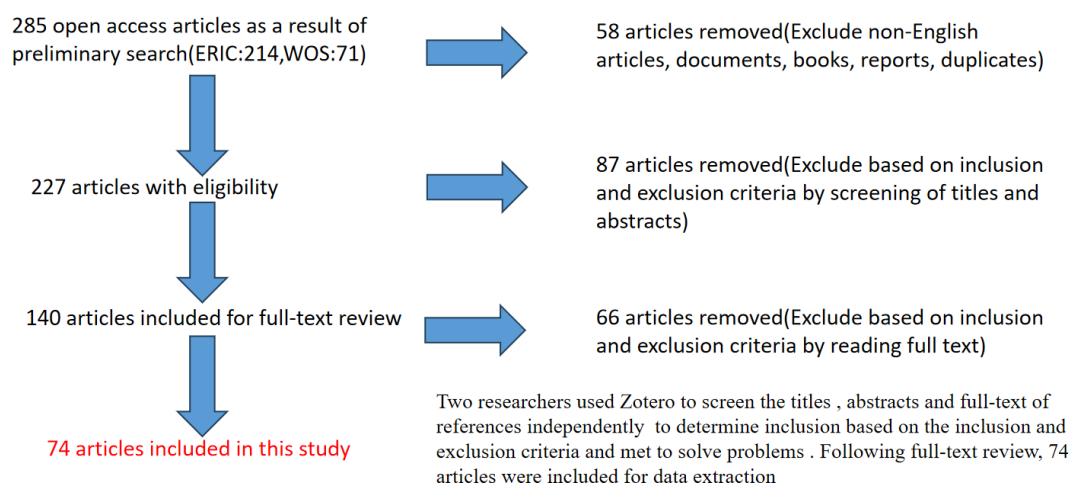


Figure 1. Search results.

3.3. Data Extraction

The two researchers used predefined chart forms to extract data from the 74 articles ultimately included in this study, including publication year, research design, research objective, participants, main findings, keywords, etc. After two independent reviewers reached a consensus on data extraction, they inferred the main points of each study. Finally, the research team conducted a thematic content analysis to identify themes among the main points.

3.4. Analysis and Synthesis

Thematic content analysis is an independent and reliable qualitative analysis method suitable for the introductory study of a phenomenon, the quality of which is inseparable from the researchers' energy investment in the data collection and analysis process. Researchers should use this approach at the beginning of their research careers (Vaismoradi et al., 2013). The authors used thematic content analysis to determine key themes within the included articles. Two authors reviewed the main findings from the included studies to identify needed features or perceptions and recurrences within the data. Through the data extraction process, we identified themes, and discussions were held based on them.

4. Results

4.1. Distribution of Included Evidence

A predominant portion of the research incorporated into this review, constituting 85.1%, was published in the timeframe from 2019 to 2023. The prevalent research methodology employed was quantitative, accounting for 60.8% of the studies, followed by mixed methods approaches, which comprised 24.3%. Qualitative research methodologies were utilized in 14.9% of the cases.

4.2. Features

Of the studies analyzed, 40, constituting 54.1%, furnished empirical evidence regarding the features of online courses. They encompass aspects such as the use of technology, flexibility, "just online", and health challenges.

Use of technology. Research noted that among electronic devices, tablets are preferred by college students for their facilitation of knowledge organization, note-taking, and access to original English online books, despite mobile phones and laptops being more frequently used (Zhang, 2022). Researchers (AlGerafi & Zhang, 2021) observed that students outside China face added challenges in attending online courses during the pandemic due to network instability and restrictions.

Flexibility. Scholars (Xu et al., 2020) identified several advantages of online classes over traditional face-to-face classrooms: (1) breaking the constraints of time and space; (2) increasing the capacity of course offerings; (3) facilitating the dissemination of high-quality educational resources; and (4) reducing repetitive work for teachers. Researchers noted that the flexibility of online courses is evident in the reuse of teaching materials and the timely sharing of resources (He & Xiao, 2020).

"Just online". An early cross-national study by researchers (Zhu et al., 2010) revealed that approximately half of Chinese teachers endorse the principle of social construction yet struggle to implement it due to subject constraints and the nature of the classroom. The remaining half showed little interest in these principles, preferring traditional lecture-based teaching methods, which they subsequently replicated in online courses. Further analysis by the authors of this study indicates that this trend of merely transferring lectures online persists in Chinese higher education, with lectures still dominating online course content. A study discovered notable differences between online courses in Chinese higher education and those in Western countries (McConnell, 2018).

Health challenges. A survey revealed that extended screen time leads to back pain and eye fatigue among students, marking it as a notable challenge (Li, 2022). Wang and his colleagues indicated that the prevalence of computer vision syndrome is higher in students engaged in online courses compared to those attending traditional classroom sessions (Wang et al., 2021). The health impacts of online courses extend beyond physical ailments to psychological issues.

4.3. Perceptions

Of the studies reviewed, 53 (71.6%) offered evidence concerning perceptions of online courses, encompassing issues such as inequality, low peer interaction, cultural traits, technical proficiency, and AI's role.

Inequality. Researchers noted that regional differences extend beyond educational approaches to more tangible aspects like hardware availability (Bai et al., 2023). A study reported that during the pandemic, students, especially girls from remote areas, faced difficulties in accessing laptops or tablets due to economic constraints within their families (He & Wei, 2021).

Low peer interaction. A survey indicated that classroom activities such as demonstrations, group discussions, role-playing, and language games are essential for enhancing students' interest in learning (Huang et al., 2022). These activities necessitate effective interaction between students and teachers, as well as among peers. Conversely, it was observed that both

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teacher-student and student-student interactions were minimal in online courses, a situation linked to the design of these courses (McConnell, 2018).

Cultural traits. Researchers observed that in cross-cultural online collaborations, Chinese students often refrained from asking questions and tended to concur with others' views (Yang et al., 2022). Interestingly, a study found that students from Peking University exhibited a strong competitive spirit and developed an autonomous learning style in online courses (Zhu & Qi, 2018).

Technical proficiency. High-quality online courses necessitate teachers possessing robust computer and network skills. This requirement is not only vital for the smooth conduct of online courses but also crucial in bolstering course interaction and fostering student engagement in collaborative learning activities (He & Wei, 2021). A deficiency in skills related to online teaching tools has even impeded the development of novel pedagogical approaches, such as case studies and group discussions (Li et al., 2021).

AI's role. Researchers noted that a newly developed intelligent homework platform has garnered unanimous approval from Chinese university students (Liu et al., 2022). This platform aids teachers in effective resource allocation, differentiated student development, and bolstering student initiative, leading to an increased willingness among students to ask questions. Research on chatbots indicates that these tools can assist students in goal-setting, a critical step towards achieving favorable outcomes in online learning environments (Hew et al., 2023).

5. Discussions

From the key themes above, we propose three significant discussion areas.

First, the technological inequality. Given China's forefront position in information and communication technology (ICT), the challenges faced by Chinese college students in terms of technology adoption are not predominantly significant, as evidenced by the literature reviewed. However, a notable concern is the limited penetration of Internet infrastructure in extensive rural areas, particularly in central and western regions. And given the greater challenges faced by girls, especially those in rural areas, in accessing electronic devices, scholarships specifically aimed at female students will help mitigate existing inequalities.

Second, cultural awareness. When conducting online courses, it is essential for educators to acknowledge and address cultural differences with sensitivity. Initiating change can begin with comparative studies grounded in Hofstede's cultural dimensions framework. Online course design using cultural dimensions can illuminate variations in communication styles, power distance, and individualism vs. collectivism, fostering inclusive learning environments.

Third, not "just online". While the most evident advantage of online courses is their flexibility, allowing students to learn anytime and anywhere, it is crucial to avoid merely replicating traditional classroom teaching on the Internet. This concept, which the present article terms "not 'just online'", advocates for fundamental reform. The authors propose that: (1) Chinese universities should adopt a new strategy to reposition online courses to orient first-year students about their majors, teachers, classmates, and campus facilities prior to enrollment. This approach will assist students in making informed decisions and potentially increase retention rates. (2) The integration of AI with online courses represents a significant opportunity for the widespread implementation of social constructivism in CHE, where student participation can be instrumental in generating new knowledge.

6. Concluding Remarks

A scoping review was used to gather and map practices in the area of online learning in CHE. Through data mining of the 74 included articles in this study, the authors found that online courses are based on technology but beyond technology. Some discussions can become valuable research topics in the future: reflections on the re-positioning of online courses have provided a promising topic for CHE research; reconsidering constructivism in the AI era has the potential to become a new direction for CHE online courses and is worthy of continued exploration. It matters for the sustainable development of China's online courses and the goal of internationalization of China's higher education.

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Enhancing Online Peer Learning in a Virtual Museum: Investigating the Impact of Three Peer-Questioning Scaffoldings

Liyin ZHANG^{1*}, Ning ZHANG², Jiajia HE³, Mingyue GUO⁴, Fan OUYANG^{5*}
^{1,2,3,4,5}Zhejiang University, Zhejiang, China

liyinzhang@zju.edu.cn, zhangning97@zju.edu.cn, hejiajia@zju.edu.cn, mingyueguo@zju.edu.cn, fanouyang@zju.edu.cn

Abstract: Peer learning, a widely recognized strategy in computer-supported collaborative learning (CSCL), has proven to enhance students' problem-solving skills as they work together on problems or projects. Despite its potential, peer learning in online environments, such as virtual museums, faces challenges in conducting high-quality collaborative knowledge construction activity. To address these issues, peer-questioning scaffolding has shown great potential to stimulate students' reflective thinking, deepen their understanding, and enhance higher-order cognitive skills in online peer learning contexts. This study investigates the impact of three types of peer-questioning scaffoldings—comprehension, deep-reasoning, and argumentation questions—on students' scientific performance within a virtual museum environment. Sixty undergraduate students from a leading university in China participated in a one-hour online peer-learning activity in the Beijing Museum of Natural History's virtual exhibition on ancient mammals. The students were randomly assigned to one of three scaffold conditions and engaged in synchronous peer questioning and knowledge construction activity. Primarily results revealed that the argumentation questions led to higher performance in higher-level cognitive outcomes, while the comprehension questions enhanced mid-level scientific outcomes. Based on our primarily results, the study suggests that comprehension and argumentation questions are particularly effective in promoting individual performance, with implications for tailoring peer-questioning strategies based on the learning phase.

Keywords: peer learning, virtual learning, peer questioning, higher education

1. Introduction

Peer learning, a widely recognized mode of computer-supported collaborative learning (CSCL), facilitates students' sharing of ideas, collaborative knowledge construction, and the development of complex problem-solving skills as they work together on problems or projects (Herder et al., 2020). Increasingly, online learning environments enhanced by digital tools—such as virtual museums, virtual laboratories, and digital books—are being used to extend peer learning beyond traditional classrooms, bridging the gap between in-class formal learning and real-world practices (Holland, 2019).

Despite its potential, peer learning in such environments often poses challenges, including students' struggles to critically analyze learning materials, engage in reasoned argumentation, and collaboratively construct knowledge. To address these challenges, researchers have explored various support strategies, such as peer feedback (Phielix et al., 2010), peer assessment (Prins et al., 2005), and peer-questioning scaffoldings (Lai & Law, 2013). Among these, peer-questioning scaffoldings have shown promise in promoting shared understanding, fostering diverse perspectives, and addressing misconceptions (Cho et al., 2011; Mohamad & Tasir, 2023). However, conflicting findings regarding the effectiveness of different types of peer-questioning scaffoldings call for further investigation (Choi et al., 2005; Xun & Land, 2004).

Moreover, previous research has rarely applied integrated methods to comprehensively assess the impact of these scaffoldings, especially within virtual learning contexts. To fill these gaps, this study investigates the effects of three types of peer-questioning scaffoldings—comprehension questions, deep-reasoning questions, and argumentation questions—within a virtual museum environment. Specifically, the research question was: To what extent did students differ in scientific performances under three types of peer questioning scaffolding conditions?

2. Methodology

The research recruited 60 undergraduate students (45 females, 15 males) from a leading research-intensive university in China. The participants included 19 freshmen, 16 sophomores, 13 juniors, and 12 seniors, all unfamiliar with the peer learning theme of ancient mammals. Participants were randomly paired into 30 groups, and consent was obtained for data collection. The experiment involved a one-hour online peer learning activity in the virtual exhibition hall of ancient mammals at the Beijing Museum of Natural History (<https://vr.nnhm.org.cn/index.html>) (Figure 1). In pairs, students explored the exhibition and engaged in synchronous discussions via DingTalk, focusing on peer questioning, answering, and collaborative knowledge construction.

The 30 pairs were randomly assigned to three questioning scaffolding types: comprehension, deep-reasoning, and argumentation. During the preparation phase, DingTalk chat groups were created for each pair, and participants set up screen recording software and familiarized themselves with the virtual exhibition hall. In the experiment phase, participants received instructions, task sheets with scaffolding questions, and study sheets. The 45-minute activity involved three rounds of

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questioning based on the scaffolding prompts (Figure 2), with participants alternating roles as questioners and responders. Pairs engaged in questioning, answering, and collaborative knowledge construction while exploring the virtual exhibition hall. Afterward, participants individually completed a 200-word study sheet summarizing their learning on ancient mammals in a study sheet.



Figure 1. A screenshot of the virtual exhibition hall of Beijing Museum of Natural History

Figure 2. Task sheet of the three types of questioning scaffoldings

Group 1	Group 2	Group 3
Comprehension questions	Deep-reasoning questions	Argumentation questions
1. What is the Mesozoic Era?	1. Why did the upper canine teeth of saber-toothed tigers evolve to be huge, while the lower canine teeth became relatively degenerated?	1. How do you think about the relationship between biological "evolution" and "progress"?
2. Can you give an example of a Mesozoic mammal?	2. What impact did the extinction of the dinosaurs have on the evolution of mammals?	2. Compared with ancient mammals, are modern humans an "evolution" or a "degeneration"?
3. What is the difference between the skulls of Hezheng sheep and saber-toothed tigers?	3. What characteristics of ancient mammals were adapted to the environmental conditions at that time?	3. Do you agree with the idea that the brain of human beings is the decisive factor in dominating the earth?
4. What is the most distinctive feature of the stenodont skull?	4. What was the evolutionary trend in body size of mammals from the Mesozoic to the Quaternary?	4. Do you agree with the statement "Mammals are the most advanced animals compared with other animals"?
5. At what stage in the development of mammals did their overall appearance become almost the same as that of modern mammals?	5. What were the natural conditions for radiation evolution in mammals?	5. How does the evolution of ancient mammals support the theory of evolution?
6. What is the difference between giant hyenas and canids in the current age?	6. Why did primates evolve into intelligent creatures rather than other mammals?	6. What do you think the exploration of the development and evolution of mammals means to modern society?

The research scored students’ study sheet content based on an adapted Bloom’s Taxonomy framework, which included six dimensions of Memorization, Understanding, Application, Analysis, Evaluation, and Creation (Anderson et al., 2001).

Table 1. The scoring standard of scientific performances

Category	Score	Description
Memorization	1 point	A participant mentioned a relevant scientific concept through memorization.
Understanding	1 point	A participant demonstrated an understanding of scientific concepts by explaining or paraphrasing knowledge.
Application	3 points	A participant demonstrated an understanding of scientific concepts by making connections to prior experiences, using examples, and solving real-world problems.
Analysis	3 points	A participant demonstrated an understanding of scientific concepts through classification, sequencing, analogies, and comparisons.

Evaluation	5 points	A participant evaluated, judged, or justified the perspectives or ideas, or predicted outcomes based on the values of perspectives.
Creation	5 points	A participant connected multiple scientific concepts, and generated an innovative perspective or idea

3. Primarily result and discussions

Kruskal-Wallis test was primarily adopted to analyze the difference in students' individual scientific performances among three groups. The results revealed no significant differences in scientific performance among the three groups ($p = 0.477$, $\eta^2 = 0.009$), indicating comparable knowledge levels across scaffolding types (Table 2). However, G3 ($M = 7.20$, $SD = 3.93$) had the highest mean score, followed by G1 ($M = 6.70$, $SD = 3.29$) and G2 ($M = 5.95$, $SD = 3.28$).

Table 2. The comparison of the study sheet performances of three groups

	G1	G2	G3	H	p	η^2
	Mean (SD)	Mean (SD)	Mean (SD)			
Scientific performances	6.70 (3.29)	5.95 (3.28)	7.20 (3.93)	1.480	0.477	0.009

Note. * $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$

The results showed that argumentation questions led to the highest performance in high-level scientific outcomes (Evaluation and Creation), deep-reasoning questions excelled in low-level outcomes (Memorization), and comprehension questions performed best in mid-level outcomes (Application and Analysis). Consistent with prior studies, argumentation questions enhanced critical thinking, problem-solving, and cognitive skills by encouraging detailed evidence generation, alternative solutions, and argument comparison (Barnett & Francis, 2012). This suggests their potential for fostering critical thinking and individual performance through active peer interactions and comprehensive knowledge application. Interestingly, comprehension questions demonstrated effectiveness in extending scientific understanding, contrasting with previous findings that they may limit deeper engagement (Cerdán, 2009). This could be due to the informal learning environment of the virtual museum, where comprehension questions helped students focus on diverse materials and expand their knowledge. Overall, the findings highlight the potential of argumentation and comprehension questions to enhance individual performance in informal learning settings.

4. Implications

This study offers three pedagogical implications for peer learning in informal contexts. First, instructors should align peer-questioning scaffoldings with the stages of peer learning (Song & Glazewski, 2023). Comprehension questions are suitable for initial exploration, guiding students to search and synthesize information. During discussions, combining deep-reasoning and argumentation questions fosters evidence-based articulation and shared knowledge construction. In later stages, argumentation questions can enhance critical thinking and comprehensive knowledge application (Mansour, 2024). Second, Dynamic peer-questioning scaffoldings, potentially driven by AI, can better adapt to students' needs during collaboration. Unlike static scaffolds, AI-driven systems could personalize support based on students' cognitive and behavioral states, improving self-regulated learning and interaction quality (Molenaar et al., 2012). Overall, instructors are encouraged to integrate scaffolds aligned with instructional goals, adjust task challenges, and adopt dynamic scaffolding strategies to optimize peer learning outcomes.

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Divergence and Convergence: A Case Study of Teacher Beliefs and Behaviors in Technology-Supported Alternative Assessment in a Hong Kong Flipped Classroom

Tracy CHANG¹ and Ricky LAM^{2*}

^{1,2}Hong Kong Baptist University, Hong Kong SAR, China
kayingtracy@hkbu.edu.hk, rickylam@hkbu.edu.hk

ABSTRACT

The case study examines the integration of technology-supported alternative assessments (AA) into Hong Kong flipped classrooms, focusing on the divergence and convergence of teacher beliefs and behaviours. Analysis of focus group interview data showed a gap between teachers' appreciation of alternative assessment methods and their practical implementation challenges. Teachers saw alternative assessments as beneficial for comprehensive education and student participation yet encountered substantial implementation barriers. The case study demonstrates how the teachers initially had limited understanding of formal "alternative assessment" terminology, although they had already implemented online platforms such as Google Forms and Classroom when schools closed owing to COVID-19. Such an inconsistency shows that the teachers share a belief in the essential role of AA during emergencies yet show differences in their readiness and appropriate use of available resources. The primary hurdles encountered included heavier workload demands and the requirement for both engaging digital content and tailored feedback for students. The lack of consistent family support further decreased student participation and exacerbated challenges for multiple students. Therefore, school-based professional development, curriculum alignment, and institutional support are urgently needed. These will enable teachers to effectively apply technology-enabled AA, leveraging their positive views to improve student learning in flipped classrooms. The case study provides valuable insights into the specific educator challenges in Hong Kong which will guide the formulation of effective support mechanisms and policy reforms.

KEYWORDS

Alternative assessment, Flipped classroom, Teacher behaviors, Technology integration, Teacher assessment practices

Unpacking collaborative writing with Gen-AI: a qualitative investigation of group and constituent implementation strategies

Anna KORCHAK^{1*}, Mik FANGUY²

¹Institute of Education, HSE University, Moscow, Russia

²Department of English Language Education, The Education University of Hong Kong, Hong Kong SAR, China
aekorchak@hse.ru, mfanguy@eduhk.hk

Abstract: *The integration of generative artificial intelligence (Gen-AI) in education has transformed collaborative writing practices. While individual Gen-AI use is well-documented, its role in group writing remains underexplored. This study examines how university students employ Gen-AI during collaborative writing assignments in an academic setting. Using semi-structured interviews with ten STEM-major postgraduate students, thematic analysis was conducted following Braun and Clarke's (2006) framework. Findings reveal three key themes: (1) group strategy—how students plan and execute Gen-AI-assisted collaboration, (2) strategy characteristics—specific AI functions used in writing tasks, and (3) strategy considerations—perceived benefits, limitations, and ethical concerns. Results indicate that while students integrate Gen-AI effectively in structuring content and refining language, challenges remain in balancing AI reliance with independent critical thinking. The study highlights the need for structured pedagogical approaches to guide Gen-AI integration in group-based writing assignments.*

Keywords: collaborative learning, collaborative writing, generative artificial intelligence, higher education, scientific writing

1. Introduction

The rapid advancement of generative AI tools, such as ChatGPT, has influenced how students approach writing tasks in higher education (Baidoo-Anu & Ansah, 2023). While previous research has explored individual applications of Gen-AI for academic writing (Chan & Hu, 2023; Mahapatra, 2024), its impact on collaborative group writing remains an open question. Given the benefits of collaborative learning (Johnson et al., 2014), this study investigates how students integrate Gen-AI into group writing assignments, considering both the benefits and challenges.

RQ: What are the features of students' group Gen-AI use during collaborative writing assignments?

2. Literature Review

2.1. Group Strategies in Collaborative Writing

Collaborative learning (CL) frameworks emphasize the importance of shared knowledge construction (Hung, 2013). Research identifies various collaborative writing approaches, including lead-writer structures and fully integrated co-authorship (Yim et al., 2017). However, the emergence of Gen-AI introduces new interaction dynamics that require further study.

2.2. Gen-AI in Individual and Group Writing

Gen-AI supports individual writers by generating ideas, paraphrasing content, and improving coherence (Chan & Hu, 2023; Delcker et al., 2024). In group contexts, Gen-AI has been shown to enhance brainstorming and streamline document integration (Tsufim & Pomerleau, 2024; Zhang, 2024). However, the extent to which Gen-AI modifies group workflows remains underexplored.

3. Methodology

This study employed a qualitative approach, conducting semi-structured interviews with 10 postgraduate students enrolled in a scientific writing course at a Korean university. Participants worked in fixed groups of 4–5 and were encouraged to use Gen-AI in their collaborative assignments. Interviews explored group strategies, individual AI interactions, and perceptions of effectiveness. Data was analyzed thematically using QDA Miner Lite.

4. Results

Analysis of student interviews revealed three overarching themes that characterize how Gen-AI is integrated into group writing assignments: group strategy, strategy characteristics, and strategy considerations.

4.1. Group Strategy

Students adopted two main approaches to structuring their collaborative work with Gen-AI. Some groups developed a pre-planned strategy, where they explicitly discussed how and when to use Gen-AI before beginning their assignments. These groups often assigned roles, such as one student generating an initial AI-produced draft, while others focused on refining and expanding it. For example, a participant noted: *"We first used ChatGPT to create a structured outline, then divided the sections among ourselves for further editing"*. (I2). This structured approach ensured a more balanced contribution from all members and improved coherence in the final product.

Conversely, other groups followed a spontaneous strategy, where individual members used Gen-AI independently without prior group discussions. In these cases, Gen-AI usage varied widely, and the final product often resulted from merging independently written sections. One participant described this dynamic: *"Everyone just used AI in their own way, and we combined our sections at the end. Sometimes it worked well, but sometimes the text felt disconnected"* (I3). This approach often led to challenges in integrating different writing styles and ensuring logical flow across sections.

4.2. Strategy Characteristics

Students employed Gen-AI in distinct ways, categorized into technical functions (e.g., grammar correction, sentence restructuring, translation) and conceptual functions (e.g., brainstorming, summarizing, argument development). Some students used Gen-AI to overcome language barriers, particularly non-native English speakers who relied on AI for grammar refinement: *"AI helped me fix sentence structures and made my writing sound more professional"* (I2). Others leveraged AI for content generation, using it to explore new ideas or clarify concepts. Additionally, students differed in their approach to drafting. Some adopted an AI-first strategy, where an initial draft was generated using Gen-AI before human revisions. Others preferred a human-first approach, drafting manually and then refining their text with AI assistance. These approaches influenced how deeply AI was integrated into the writing process and how much students relied on it for content creation versus enhancement.

4.3. Strategy Considerations

The benefits of Gen-AI use in group writing included increased efficiency, enhanced writing quality, and reduced cognitive load. Many students reported that AI allowed them to complete assignments faster and with less stress: *"It saved us a lot of time, especially in organizing our ideas and structuring the paper"* (I7). Others highlighted that Gen-AI improved the overall coherence of group work by standardizing language and style across sections. However, concerns emerged regarding over-reliance on AI, ethical considerations, and misinformation. Some students expressed hesitation about depending too much on Gen-AI, fearing it might weaken their critical thinking and academic writing skills over time: *"If we rely on it too much, we stop thinking for ourselves"* (I6). Additionally, concerns about the accuracy and originality of AI-generated content were raised, with some students emphasizing the need for fact-checking and ethical citation practices.

5. Discussion and Conclusion

Findings suggest that Gen-AI enhances collaborative learning by facilitating text production and refining writing quality. However, its application varies based on group strategies and individual preferences. While some students viewed Gen-AI as an effective co-writer, others expressed concerns about its influence on learning autonomy. Educators should integrate structured guidelines to balance AI use with student engagement. Future research should explore the long-term impact of AI-enhanced collaboration on student writing proficiency.

6. Practical Recommendations

Encourage explicit group strategies: Educators should guide students in establishing shared protocols for Gen-AI use to ensure coherence and accountability. Balance AI reliance with critical thinking: Assignments should incorporate reflective exercises to prevent over-dependence on AI-generated content. Promote ethical AI use: Universities should develop policies on Gen-AI transparency, citation, and originality in academic writing. Train students in AI literacy: Workshops on effective AI interaction can help students use Gen-AI critically rather than passively accepting its outputs.

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远程实习项目职前中文教师身份建构叙事研究

The identity Construction of Pre-service Chinese Language Teachers in an Online Teaching Practicum: A Narrative Inquiry

杜雨季

香港教育大学，香港，中国

华东师范大学，上海，中国

s1147983@s.eduhk.hk

【摘要】本叙事研究聚焦远程教学实习中职前中文教师身份建构，以两名职前中文教师为对象，探析三个学期的远程实践中教师身份建构的方式与影响因素。研究发现职前教师身份建构以问题为导向，如何应对问题成为教师身份建构的契机。远程实习模式助力线上教学与线下课程的双向学习，帮助职前教师实现教师与学生身份的灵活切换，并将远程教学经验反哺于线下课程学习。在影响因素层面，中文学习者与指导教师是影响职前教师身份建构的主要因素。学生语言水平的提高、对职前教师的认可、指导教师积极的在线反馈与团队协作模式利于职前教师身份的建构。

【关键词】教师身份；职前教师；远程实习；叙事研究；汉语作为外语教学

Abstract: This narrative study examines the identity construction of two pre-service Chinese language teachers during an online practicum over three semesters. The study reveals that the identity construction of pre-service teachers is problem-oriented, and how they respond to challenges presents opportunities for constructing teacher identity. The online practicum enhances teacher learning both in online language teaching and on-site courses. Furthermore, both students and mentors influence the identity construction of pre-service teachers. Factors such as improved language proficiency of students, student recognition of pre-service teachers, positive feedback from mentors, and collaborative online teamwork contribute to the construction of the pre-service teacher identity.

Keywords: teacher identity, pre-service teacher, online practicum, narrative, teaching Chinese as a foreign language

1. 引言

新教育技术的发展与新冠疫情的爆发改变中文教学生态，线上教学成为这场全球性危机的应对举措。吴勇毅（2020）指出，新冠疫情下教育生态的改变也将影响今后中文教师培养与培训方式，国际中文教育正在走向利用现代科技进行教师培训的道路。

就教师培养而言，职前中文教师是国际中文教育教师培训的主要对象之一。中文在线教学平台的开发与应用不断升级，基于网络的中文教师培训项目早在疫情之前便受到学者的关注。章欣、李晓琪（2017）结合面向韩国市场的网络教学项目，探讨网络教师培训的关键问题，并为职前中文教师培训研究提供路径。陈桦楠（2018）则介绍了一种依托于即时通讯技术的中文远程教学模式——Live & Fun Learning OET，该模式也是本研究参与者进行远程实习的渠道。Live & Fun Learning OET 模式（简称 LFL）将网络即时通讯平台作为一对一在线中文辅导的媒介，为国内高校中文国际教育专业的学生提供远程教学实习的机会。参与该中文实习项目的学生在线辅导来自美国密歇根大学、布兰戴斯大学、英国诺丁汉大学马来西亚分校以及纽约大学不同水平的中文学习者，获得教学培训、教师指导与实习证明。

随着教育技术的发展与在线教学的常态化，网络教学模式下国内外语教师的身份建构问题引起了学者的研究兴趣。张倩（2011）聚焦于在线英语教师的身份建构特征，张遐、朱志勇（2015）则对远程教育中教师角色认同理论与研究进行回顾，为相关研究提供理论视角和研究策略。新冠疫情期间，教师在最短的时间内将教学场所转移至线上，而这种特殊的教学实践方式下的外语教师身份建构，也引发学者的探讨。许悦婷、陶坚（2020）关注疫情爆发后高校外语教师在网络教学中的身份认同问题，指出教师身份动态化与教学改革效果的关联。戴楚洁

(2021) 则聚焦于熟手中文教师在远程一对一中文教学中的身份建构情况,发现该模式下学生社会身份影响师生关系和教师对权威性的感知。从已有研究来看,相关文献主要聚焦于在熟手教师的在线教学实践,对新手教师、职前教师的关注较少,尚无研究关注职前中文教师在线上教学实践中的身份建构情况。

职前二语教师的身份问题是近年来国外研究者关注的热点话题(滕延江,2018),而教师个体发展研究也受到国内中文教师教育领域前所未有的关注(黄启庆、刘薇,2017)。疫情期间特殊的教育生态下,远程实习项目及线上教学实践的特殊模式,更增加了探讨职前教师身份建构问题的必要性。Live & Fun Learning OET 模式或许能够作为远程教学模式中职前中文教师的身份建构研究的切入点,给予我们观察职前中文教师身份建构的方式与因素的可能性,以此评估远程教学实践对职前中文教师的意义。

2. 理论背景

第二语言习得研究于上世纪末开始向社会学转向(丁婷,2018),社会学中的身份建构问题引起教育研究者的关注。身份是通过感知、行动和理解的循环往复将自己与世界联系的方式(Lier,2007),而教师身份则指向教师个体在教学行动中对自我意义的追问,对为什么我是教师、我是怎样的教师、我要成为怎样的教师等本质问题的探索。

在身份研究中,二语教师的身份建构是教师教育领域的研究热点之一,而教师身份研究与职前二语教师教育存在密切关系(滕延江,2018)。职前教师身份建构研究领域中,教师身份建构的影响因素引起学者的关注。张倩(2012)回顾西方关于职前教师身份问题的实证研究,并梳理了职前教师身份建构影响因素方面的研究,主要包括情境因素、经历因素和自传因素(Beijaard et al.,2004)。其中,职前教师的经历因素指向其在教师教育过程中所获得的见习与实习情境中的经历(Lamote & Engels,2010),职前教师不断与周遭世界建立联系,并在联系的过程中对自我身份进行不断的建构与重构。因此,本文将聚焦于远程实习中职前教师身份建构过程。

3. 研究设计

3.1. 研究问题

本研究聚焦于以下两个问题:(1)远程教学实习中职前中文教师是如何进行身份建构的?(2)远程教学实习中影响职前中文教师身份建构的主要因素有什么?

3.2. 研究对象

本文采用目的抽样,选取两位汉语国际教育专业的职前中文教师刘老师与陈老师作为本研究的参与者。刘老师与陈老师就读于某大学的国际中文教育专业,成绩优异,热爱专业学习并积极参与专业实践。实习期间,两位参与者主要负责初级水平中文学习者的一对一在线辅导、学生联络、作业批阅与反馈等工作,同时参加集体备课环节和线上教学分享活动。两位研究参与者在实习前有一定的短期教学经历,并在教学实践的过程中享受教学、将教师视为职业理想。基于以上观察与考量,研究者选择两位职前中文教师作为研究对象。

3.3. 研究方法

在数据搜集方法上,本文主要使用半结构化访谈与实物资料法。具体过程如下:笔者与两位研究对象共同参加为期三个学期的远程实习,在实习活动中观察并记录研究参与者的表现,并及时做好相关文件资料的搜集,包括学生作业及教师批阅反馈、师生邮件、教学反馈报告,以及与研究参与者的线上交谈记录等。根据相关文件所涉及的实习环节,笔者事先拟好访谈提纲。第三学期正式结束后,笔者使用在线会议平台与两位职前中文教师分别进行了一次半结构化访谈,共计3.5小时。研究者在访谈结束后对录音进行转写,共计约40,000字。转写结束后,笔者对访谈内容进行初步整理,并根据前期的文件搜集工作,在线上交流平台上对部分问题进行追问,并得到研究参与者的补充回答。分析资料时,笔者将访谈内容中所提及的事件与实物资料再次进行核实,以确保被访谈者所描述内容的真实度与可靠性。

本文采用教育叙事研究视角呈现数据文本。1990年,Connelly与Clandinin将叙事研究方法引入教育领域,使该方法逐渐成为教师研究常见的质性方法之一(Connelly & Clandini, 1990)。叙事研究是“一种理解经验的方式,是研究者和参与者在某一段时间中,在一个或一系列的地点,与周围环境进行社会性互动的合作”(Connelly & Clandini, 2000:20)随着叙事研究方法在教师研究领域的应用,该方法在二语教师研究领域受到广泛支持(Golombek & Johnson, 2004; Johnson & Golombek, 2002; Johnson & Golombek, 2011),为二语教师提供机会来重新思考与理解自己作为教师的身份和所开展的教学活动。叙事研究方法与教师研究的适切性,体现在分析思路对于教师个体经历的关注(孙德坤, 2015)。其中,三维叙事探究空间分析路径,能够将教师故事按照时态维度、个人和社会维度、地点维度进行编码,以此建构完整、真实的叙事故事。其中,时态维度指在个体经历中过去、现在和将来已经发生或可能发生的故事;个人和社会维度则与教师个体的内在感觉有关,指向与其相关的、具体的社会实践;地点维度指个人所处的外在环境。本研究将以叙事研究中的三维叙事探究空间为主要路径,对文本数据进行整理、归纳与分析,给予参与者的真实叙事来展现职前教师在远程实习过程中的个体经验。

4. 研究发现

4.1. 远程实习中职前中文教师身份建构的方式

4.1.1. 线上的教与线下的学——“开机后是老师,关机后是学生”

在远程实习模式下,两位职前中文教师都认为,线上教学实践帮助其将大学内的学习生活与在线的实习工作进行分离。陈老师用“打开电脑”与“关闭电脑”作为自己在老师状态与学生状态的切换方式。“打开电脑和学生在摄像头前面对面的时候,就是个老师;关闭电脑的时候,回到了一个学生的状态。”时间与方式的不同都助于职前教师分开实习生活与学生生活。刘老师将工作日作为相对集中的线下学习时间,周五与周末专注于线上实习的任务。“线上教学确实是把我的实习和我的学生生活分开了。”但线上实习生活与线下学习生活的分离,并不意味着二者之间的互动也因此削弱。刘老师在本科三年级时,学校开设了一门案例分析课,而刘老师的教学经历便成为他在课上进行案例分析的灵感来源与有效素材。“教学案例分析课上会发现自己上过课后,我的分析会比别人更实际、务实一点。”

从没有教学经验的汉语国际教育学生,到线上教学经验的增加的实习教师,刘老师的在线教学经验反哺于自己的线下学习生活。同时,刘老师在远程实习中的作业批阅环节,对学生作业中出现的错误产生了浓厚的兴趣,并生出在实习结束后对所有作业资料进行整理,将其作为本科毕业论文的数据来源。可见,远程实习模式既实现了线上教学生活与线下学习生活的分隔,即教师状态与学生状态之间的分离;也给予二者彼此互动的机会,职前教师在二者之间实现教师与学生身份的切换,并将远程教学经验反哺于线下专业课程学习。

4.1.2. 发现问题与应对危机——“我没达到应有的样子”

实习过程中,问题无处不在。面对学生的失联和师生信息对接的不平衡问题,陈老师发现自己缺少有效解决问题的路径,问题解决的最终结果有时会以失败告终。“看不明白学生作业,无法判断到底对还是错,我不能和他当面说,后面学生也没有再返给我的信息,就这样中断了。”而问题的出现,也成为引起职前教师反思契机的关键性事件。在线上集体备课中,一向对职前教师给予积极反馈的指导教师审核集体备课成果时,直接在线上文档中标注出了备课中的错误出处。刘老师对这一段经历仍然记忆犹新并不断进行反思。“刚开始小组备课,老师直接发了邮件过来说问题特别大,我们小组没一个人发现。那一个瞬间就觉得我还是学生,专业知识没有很好地在备课里体现。”

发现问题后进行反思的模式也出现在陈老师的远程实习过程中。虽然在线教学过程中学生会出现各种各样的问题,但实习期间发生的问题似乎成为职前教师反思自身的契机。陈老师认为在面对学生不遵守远程课堂规则时,自己不具备教师所应有的品质。“学生迟到或想拖延半个小时,在他们不遵守时间的时候,我觉得没让学生觉得他们应该怎么样。”

4.2. 远程实习中影响职前中文教师身份建构的因素

4.2.1. 指导教师：同一“在线”阵营中的权力分享

远程工作的模式削弱了实习教师与指导教师之间的伙伴协作关系。因为时差的关系，指导教师独立完成中文课的教学工作，而处于另一时区的实习教师则需要选择合适的时间，在课后完成作业批阅、在线辅导、学生口语作业反馈等辅助工作。在这种相对特殊的实习情境下，指导教师对职前中文教师的身份建构产生影响。

面对指导教师在实习教师教学过程中的“缺位”，职前教师刘老师似乎并不确定自己是否具有足够的权力独自维持课程管理，而学生经常出现的旷课、迟到现象，也进一步加强了职前教师内心的自我质疑。“我们确定了时间之后，学生会有时候会迟到，我觉得这个就是比较困难的，有的学生他就是不太遵守时间。”当教师在处理学生课堂问题时，往往会在规则面前出现犹疑并最终选择相对柔性的处理方式。表面上是学生是否在线上课堂上准时出勤的问题，实际则为职前教师是否能在远程工作的环境下，以专业教师的课程管理原则去规范学生的问题行为。“有一次学生忘了要上课，下课后问能不能补课。我当时是第一次实习，想到学生平常表现很好，我就说可以给你补课，晚上11点给他补课。”

当学生屡次出现问题，未遵循职前教师的屡次提醒时，指导教师便成为了职前教师权力执行的“传话筒”，帮助陈老师督促学生完成相应的教学任务。“我学会怎么进行任务的对接或者反馈。如果有学生一直有什么问题，可以给老师发邮件，老师会和你解释他们为什么会犯这种错误，也会再告诉、提醒学生。”当面对学生未遵守远程作业收发规则时，职前教师在最终面临无法解决的问题时，向指导老师寻求帮助成为其最后的求援路径。“学生可能过了两天还没有交作业，我会先给学生发邮件，如果还没有解决的时候再去寻求帮助。”

刘老师通过邮件向指导教师求助之后，指导教师通过邮件对职前教师进行课堂规则的强调，向其赋予进行课程规则管理的权力。“学校要求超过三日后补作业不批改。以前学生超四五天才发来，我依然会改，现在超了三天没有发，我就是不改，会有原则性的执行。”

指导教师与实习教师通过邮件与在线信息的交流，向职前教师进一步规范了其作为教师的权力，而这种赋予权力的过程被刘老师比作得到了某种指令。“老师说如果说你的学生在课堂结束之后出现就不用补课，因为这样会增加你的负担。发现从这个时候开始，我好像是得到了某些指令一样，以后学生出现旷课情况也没给学生补课。”

在面对一些问题性事件的时候，职前教师与课程负责教师同属于一个“阵营”，共同成为了问题的解决者。在线上实习这一特殊情境下的共事形式给予职前教师一定的团队归属感：“本来感觉自己是被培训者，但有一瞬间让我改变了，就是老师在群里通知全员，告诉我们说学生有什么样的情况，我们怎么统一起来去回复应对，我像是团队中的一员。”

4.2.2. 学生：共渡难关后的成就感

尽管远程实习削弱了师生的互动，但学生在网络学习期间的进步与其对自己作为在线辅导教师的认可，仍被职前教师视为这段远程实习的最大意义。“我的成就感第一个就是学生的中文水平提高了。我会觉得是值得的，觉得自己是中文教师。”陈老师同样将学生的进步与个人教师成就感进行关联。“能感受到学生是有进步的，引导他说出目标的句子，在后面的课里他又自己用到了，会觉得很有成就感。”

在远程教学中，学生需要应对在线语言学习所面临的挑战，而帮助学生克服在线学习的困难甚至取得一定的进步，成为了职前教师刘老师自我身份认同的契机。“学生当时那天让我感触最深的，是他的反馈。他上课的时候他跟我说，以后会继续学习中文的下一个等级。”在“重重阻碍”下，刘老师发现初级水平学生在自己的教学与互动中并没有丧失学习中文的兴趣，反而加强了学生继续学习中文的想法与学习动机，这便成为职前教师产生感触、进行反思的节点。“学生说我这一年的对他帮助很多，自己原来很害怕中文，网络学习的过程中确实状态不好，但我依然很开心地准备各种话题，让他始终很快乐。”相反，一旦与学生直接相关的线上授课与辅导环节出现差错，便也成为形成职前教师挫败感的主要因素。“我觉得最大的挫败感是上完之后感觉

学生没有掌握很多东西，就会有很挫败感，感觉自己好像并没有准备好，可能不适合做这个工作。”可见，职前教师在线实习的过程之中，帮助学生渡过网络语言学习中的危机、克服了疫情期间在线语言学习的困难，引导学生突破远程中文学习所带来的挑战，能够增加职前教师对自我教师身份的认同感。

5. 结论

近年来，教师个体发展研究受到国内外语言教师教育领域的关注。近年的远程实习项目以及疫情期间的线上教学实践的特殊模式，也增加了我们探讨这一实习情境下职前教师身份建构问题的必要性。本文主要以质性研究方法，探究远程教学实习中职前中文教师身份建构的方式与影响因素。研究发现，在身份建构方式层面，职前中文教师身份建构以问题为导向，如何应对问题成为教师身份建构的契机。远程实习模式实现了线上教学场域与线下学习场域的分离与互动，助力职前教师线上教学与线下课程的双向学习。职前教师在二者之间实现教师与学生身份的切换，并将远程教学经验反哺于线下专业课程学习。

在影响因素方面，学生与指导教师是影响职前中文教师身份建构的主要因素。相较于实习教师之间的同侪互动，指导教师的线上反馈与远程团队协作意识利于职前中文教师身份建构。或许，针对职前国际中文教师的远程实习模式，并不是用来处理疫情期间学生没有实习渠道的临时性措施。在线上教育不断发展的今天，远程实习或许能够持续性地作为职前国际中文教师提升教学能力、积累教学经验、增加教师身份认同的有效实习模式。

基于互联网的远程教育实习模式下，职前中文教师的身份建构过程是复杂、动态的。本研究只选用两位职前中文教师作为研究样本，并只基于一个远程实习项目作为背景，研究结论的适用范围可能比较有限，无法做出普遍性推论；但仍希望能引起学界对职前中文教师身份建构的关注，以及对新教育技术背景下职前中文教师身份建构方式与影响因素的探讨。

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增強實境¹融入古詩教學的研究趨勢：2008~2024 年學術文獻綜述

Research Trends of Integrating Augmented Reality into Poetry Teaching: A

Review of Academic Literature from 2008 to 2024

范鈺君^{1*}，金夢瑤²

^{1,2} 香港教育大學中國語言學系，香港，中國
s1143933@s.edu.hk, mjin@eduhk.hk

【摘要】 本研究選定 2008 至 2024 年間發表的增強實境技術在中文教育領域的相關文獻進行分析，中英文文獻共計 2050 篇，使用量化軟件分析研究趨勢。然後選取其中 40 篇關於古詩教學和增強實境融合的強關聯文獻進行著重梳理。最終的研究結果表明：(1)「增強實境中文教學」領域的英文文獻起步比中文文獻早了七八年；(2) 2015-2024 是「增強實境中文教學」文獻發表的上升期；(3) 古詩教學和 AR 技術結合是新開闢領域；(4) 學者們從一開始「增強實境古詩教學」的理論設想到後期的實證研究，不斷對該課題進行深入探索，期待具體教學模型的出現，以更好激發增強實境在古詩教學中的潛能。

【關鍵字】 增強實境；中文電子化教育；古詩教學

Abstract: In this study, a total of 2,050 papers published between 2008 and 2024 in this field were selected for analysis, and quantitative software was used to analyze the research trend. Then, 40 of them are selected to review, which are strongly related. The final results show: (1) English papers started seven or eight years earlier than Chinese papers; (2) 2015-2024 is the rising period; (3) The combination of ancient poetry teaching and AR technology is a new field; (4) From the initial theoretical assumption to the later empirical research, scholars continue to conduct in-depth exploration of this topic, looking forward to the emergence of specific teaching models to better stimulate the potential of AR in the teaching of ancient poetry.

Keywords: Augmented reality, Chinese electronic education, Ancient poetry teaching

1. 研究目的

增強實境技術近年來被認為機具教學應用的潛力 (Baabdullah, A. M. et al., 2022)，其和教學的結合不僅提高了學生的學習成績，也幫助他們樹立積極的學習態度 (Murat Akçayır, 2016)，更建立了以師生交往為基礎的雙主型教育傳播模型 (Ateş, H., & Garzón, J. 2023)。在當下的教學中，運用增強實境技術已成趨勢 (Parmaxi, A. et al., 2020)。同時，香港特區政府教育局也呼籲中文教育界也應當積極使用科技資訊輔助中文課堂，使資訊科技在中國語文教育課程的角色逐漸得到重視和利用。

在中文教育中，古詩是重要的組成部分 (趙景欣, 2016)。它不僅可以提高學生聽說讀寫的能力，也具有品德教育的重要作用 (李獻芳, 2002)。讀者反覆吟誦優秀詩篇，詩中美德會內化為「道德行為」的習慣思維 (施仲謀、杜若鴻, 2022)。但古詩教學一直存在難度。古詩主旨由不同的意象共同構成，但這些意象往往都比較含蓄，難以具體掌握和傳授。現在已有專家指出，增強實境技術可以跨越時空限制，從多個感官通道複現意象場景 (徐翔, 2018)，從而解決古詩教學難題。換句話說，增強現實提供了一種全新的方式來復現和體驗古詩中的情景，使觀眾更全面地理解和感受其中的意象，從而提高古詩學習效能 (Iulian Radu, 2012)。

為瞭解增強實境在中文教育和古詩教學中的具體使用現況，本文旨在釐清：

- (1) 宏觀上，2008-2024 年間關於使用增強實境進行中文教學的文獻研究趨勢。
- (2) 微觀上，2008-2024 年間關於使用增強實境進行古詩教學的觀點成果梳理。
- (3) 基於文獻分析得出相關結論，並預測未來增強實境與古詩教學結合的走向。

2. 宏觀的文獻量化分析

本文選取中英文兩大數據庫 2008 至 2024 年間關於增強實境古詩教學的學術文獻。中文資料

¹ 增強實境的英文為「Augmented Reality」，下文因敘述方便簡稱為「AR」。

Cheng, M. H. M., Xu, G., Cheng, G., Kong, S. C., Song, Y., Erni, J. N., Chen, J., & Macfarlane, B., Yeung, S. S. (Eds.). (2025). *Proceedings of the International Conference on Learning and Teaching 2025 (ICLT 2025)*. Hong Kong SAR: The Education University of Hong Kong.

庫主要包括內地的知網、萬方，港澳臺的香港教育大學博士論文庫、華藝圖書館、臺灣人文及社會科學引文索引資料庫等。英文資料庫具體指Google Scholar和Web of Science。在中文數據庫中，我們搜索關鍵詞「AR+教學」，然後根據主題匹配度和文章權威性共鎖定624篇文獻。將這些文獻以Reworks檔導出後再導入可視化文獻計量工具Citespace進行分析，得出時間共線圖（圖1）。我們可以明顯觀察到相關文獻都集中在2015- 2024的時間區線內，而且多數涉及非文科領域。為探索語文學科在其中的表現，我們再次進行關鍵字共現，得出關鍵字共現信息圖（圖2）。該圖中，小學語文和古詩教學頻次位列第18、19位，都出現了4次。這就說明，AR和小學語文和古詩教學的結合在學界已經引起了研究者的注意。

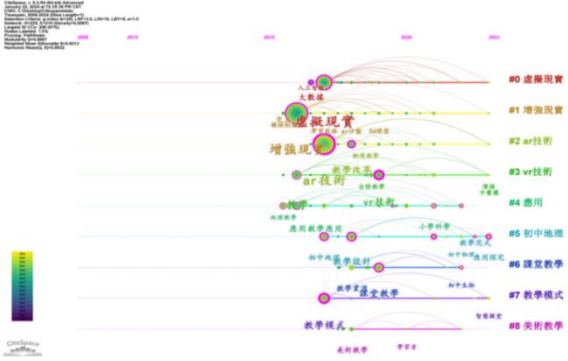


圖 1 「AR+教育」中文文獻時間共線圖

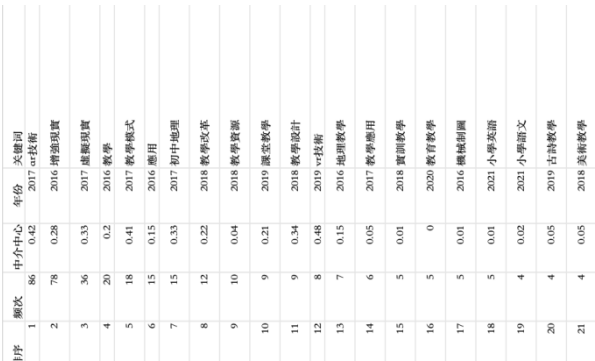


圖 2 「AR+教育」中文文獻關鍵字共現信息圖

在英文資料庫中，我們找到「AR+教育」的相關文獻共 814 篇，其中 Google Scholar364 篇，Web of Science450 篇。因 Google Scholar 無法導出 Reworks 格式或者 Plain Text 文檔，只有借助中介工具 Publish or Perish 轉換成 ISI 文檔，再和 Web of Science 導出的 Plain Text 文檔一起導入 Citespace 進行分析，最終得出「AR+教育」英文文獻時間共線圖（圖 3）。該圖表明在 2008-2024 這個時間區域內，關於「AR+教育」的英文文獻一直保持著穩定的發文量，比中文文獻的起步時間早了七八年。同時，通過產出的「AR+教育」英文文獻關鍵字聚類信息圖（圖 4），Language Learning（語言學習）、Second Language Learning（二語學習）和 Game-based Language Learning（基於遊戲的語言學習）的出現頻次是較高的。換句話說，AR 融入中文學科的研究已佔有一定比例，是一個值得深入探索的、並已受到學界關注的課題。

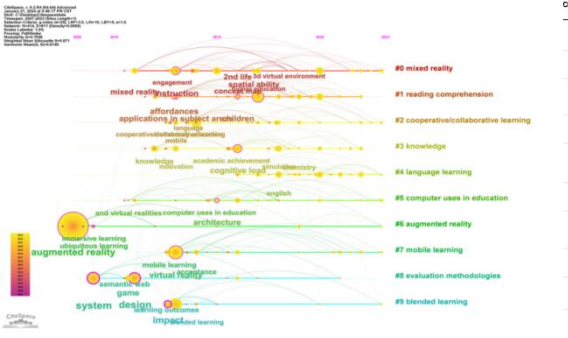


圖 3 「AR+教育」英文文獻時間共線圖



圖 4 「AR+教育」英文文獻關鍵字聚類信息圖

綜上所述，本章節得出以下觀點：(1)「增強實境中文教學」課題的英文文獻起步比中文文獻早了七八年；(2) 2015-2024 是「增強實境中文教學」文獻發表的上升期；(3)古詩教學和 AR 技術結合是新開闢領域；(4) 學者們對從一開始「增強實境古詩教學」的理論性設想到後期的實證研究，不斷對該課題進行深入探索，期待激發增強實境在古詩教學中的更多潛能。

3. 微觀的文獻綜述梳理

在上章節的基礎上，本章節將根據時間脈絡對這些文獻作出綜述性梳理，也對其最新的學術動態進行批判性點評。增強實境技術在教學領域的應用最早可以追溯到 20 世紀 90 年代，當時其作為航空公司和空軍飛行員的訓練工具被引入教學（Janin, A. L. et al., 1993）。隨著技術升級，

當下增強實境技術已經可以與電腦或行動手機裝置一起使用，因而得以在各個級別的教育中使用（Ferrer-Torregrosa, J., 2015）。隨著教學領域對 AR 技術的熱烈反響，學者們也在思考如何更好使用這項技術輔助課堂。在筆者目前搜尋到的資料庫中，最早研究增強實境輔助中文教學的文獻出現在 2003 年，具體用於國際漢語課中的漢字符號教學（Wagner, D., & Barakonyi, I., 2003）。學者指出，增強實境技術有趣、互動且適應性強（Marc Prensky, 2003）。

隨後，一些相關的研究文章相繼出版，它們都認為增強實境技術可以很大地調動學生的學習動機，進而幫助他們取得更好的學習成績（Sotiriou, S., & Bogner, F. X., 2008）。2009 年，權威頂刊《科學》（*Science*）發表了一篇文章，文中指出 AR 可以幫助學生在現實世界中進行真實的探索，以促進參與、學習以及從課堂到現實世界的轉移（Christopher Dede）。同年，Dede 又和其合作學者（2009）共同發文，指出增強實境可以促進學生的批判性思維和解決問題的能力。主攻增強實境教育領域的學者马克·比林赫斯特（Mark Billinghamurst）和安德烈亚斯·杜恩瑟（Andreas Duenser）也指出增強實境技術在教育領域的重要性，「（AR）克服基於文本的方法的一些局限性，讓學生根據他們喜歡的學習方式吸收材料」（2012）。這一時期也湧現出一批增強實境技術教學軟件。比如「文圖拉」、「AR Flashcards」等。這一時期增強實境教學的研究開始步入一個興盛期，同時相關產業也在飛速發展。

2015 年，著名刊物《地平線》（Horizon Project）首次提出「自帶設備」（BYOD）的創新理念，該理念認為個人移動設備上的擴增實境工具為教學與科技的結合帶來的現實性的可能，將帶動一種新的教學方式（Reyes, Y., & Martinez Pardo, D., 2019）。同時，增強實境技術可以跨越時空限制，從多個感官通道複現場景（徐翔, 2018）。學生可以通過互動裝置在真實的環境中進行觀看（García-Pereira, 2000），讓他們以自己喜歡的方式吸收學習材料（Billinghamurst, M., & Duenser, A., 2012），更全面地理解和感受學習內容，提高學習潛能（Iulian Radu, 2012）。2020 年，溫州大學孫敏敏在碩士論文中使用自製的增強實境寫作教學軟件進行數據的收集。在文末，孫提出：「AR 技術在小學寫作教學中的應用可以提高學生的學習投入，優化教學效果」（孫敏敏, 2020），肯定了增強實境技術在小學寫作教學中的積極作用。科技與教育結合的勢頭愈加強勢，增強實境教學時代即將來臨。

2020 年之後，中文學科的增強實境教學已經是一個不可忽視的研究方向。2021 年，華東理工大學的兩位學者發表了增強實境技術輔助小學生學習中國古典詩歌的論文。在文章，作者定制了一個增強實境系統，通過實驗指出「增強實境技術可以減少學生在傳統課堂上表現出的高認知負荷，給予古詩詞基礎薄弱或共感聯想能力較差的學生更多的學習空間」（Chen, Z., & Wang, Z., 2021）。Li, M.的團隊以 47 名內地小學生為實驗對象，驗證了 AR 寫作課堂能更大幅度提高學生在描述性寫作能力和創新性思維（2023）。在中文語言教學方面，利用 AR 技術教學國中學生進行識字也被證明是非常有效的（Li, J., 2023）。但也有研究者以中文 AR 書《未來機械世界》為例，指出 AR 書籍與學習者的交互程度還處在較低的水平（廖志, 2023）。總而言之，關於增強實境融入中文教學的研究遍地開花，並開始有相關實證數據的佐證。

在此階段，關於增強實境技術和古詩教學結合的研究成果也引人矚目。Lin, X. F.團隊推出一個名為「浪漫古詩」的學習軟件，招募五年級學生進行準實驗研究，並讓其完成學業成績測驗和課程體驗問卷。結果表明，使用增強實境進行古詩教學在提升學生學習效果和激發其學習動機方面表現優異。除此以外，Lin 還特別強調，增強實境技術可以減少學生在傳統課堂上表現出的高認知負荷，給予古詩詞基礎薄弱或共感聯想能力較差的學生更多的學習空間（2023）。香港學者 Tian, J.等人的文章則進一步比較 AR 視頻與傳統視頻在古詩教學中對學習者學習興趣的影響。實驗對 30 位遊客進行了受試者兼使用者研究，結果表明增強實境技術可以顯著激發學習者對古詩歌的學習興趣（Tian, J. et al., 2024）。同時，增強實境技術為消除學習者之間的經驗鴻溝提供了一種有效的解決方案，它讓經歷匱乏者短時間內獲得課程所需經驗知識（Khamitova, M. et al., 2023）。總之，AR 技術可以透過數位化的方式，讓學習者共用優質的教學資源（艾興和張玉, 2021），並減少師資差距帶來的不良影響。

增強實境古詩教學的科技產品也發展迅猛。學者基於 MergeCube 全息玩具設計兒童 AR 古詩 App，通過掃描 Merge Cube 全息玩具，能夠將原來的全息玩具變成不同詩詞對應的立體場景及動畫。使用者旋轉全息玩具即可旋轉全息場景，並實現與立場情境互動、拍照、語音召喚等功能（陳惘驚和高劉傑，2020）。涂鐵等人則具體針對 6-12 歲少年兒童設計了一個學習古詩詞的 AR 系統，通過精美詩詞圖形卡片提供 AR 古詩學習。2023 年，當當網向 C 端市場推出一款 AR 古詩地圖，使用者可以通過簡單的手機操作來激活高質的 AR 古詩學習體驗。總之，AR 已被實證證明可讓學生在學業表現上比傳統教學表現得更好（李若瑩等，2022）。

同時，也有一些學者開始思考增強實境技術在真實教學中的限制。他們認為教師如果沒有接受足夠的增強實境技術教學法指導，增強實境技術在教學中的使用會受阻（Squire & Jan, 2007），教育工作者沒有一個具體的教學框架可以用來評估課堂（Salmon, J., & Nyhan, J., 2013），真實和虛擬的結合也會讓學生們感到困惑（Wu, H. K., & Chang, H. Y. et al., 2013）。在這種反思下，學者們開始深入探索如何更好地結合增強實境技術和教學實踐（Iulian Radu, 2012），他們指出增強實境技術和課堂的不匹配不僅是因為增強實境程式的設計、技術問題或開發者的消極態度，也需要專業人員從教師和學習者角度進行研究（Akçayır, M., & Akçayır, G., 2017），否則真實的課堂適應這項技術依舊存在難度（Khan, T., Johnston, K., & Ophoff, J., 2019）。

因此，在最新的研究中已有部分學者開始嘗試建構增強實境教學模型，並對新模型進行實證驗證。Abas, H., & Zaman, H. B.是最早一批行動的學者，他們設計了增強實境教學三模型輔導學生進行閱讀，實驗的結果是比較正向的（2011）。相同的研究方向，Piriyasurawong, P.設計的增強實境閱讀模型（SC-AR 模型）也被證明能有效提高學習者的深度閱讀技能（2020）。開放式的模型則為更多的學科/專業的增強實境提供了教學支持，適合的教學模型能促進學生學習（Niu, B. et al., 2019）。Liu, C.等人開發了一種 AR 科學課程模型，在一所小學進行了兩次實驗。結果表明，使用模型可以有效幫助自我效能感低的學生減輕認知負荷（2020）。2023 年，Lin, X. F.等設計了一個基於情境化反思機制的 AR 學習模型來幫助學生完成學習探究任務，招募 81 名六年級學生進行準實驗和滯後序貫分析，結果表明該模型提高了學生的高階思維（Lin, X. F. 等，2023）。此類研究在 AR 教學的發展中是里程碑式的，它將教師的 AR 教學能力真正納入課堂能力培養中，AR 古詩教學的模型在不久的將來呼之欲出。

4. 結論

增強實境技術作為資訊與通訊科技（Information and Communications Technology，簡稱 ICT）的一個分支，被新媒體聯盟和教育學習倡議出版的《地平線報告》評為「（基於行動平臺的增強實境技術是）未來教育產業最有前途的技術之一」（Johnson, L., Becker, S. A., & Cummins, M., et al., 2016）。學者們從一開始的理論性設想到後期的實證研究，不斷對該課題進行更為深入的探索。在對該技術擁抱教學充滿希望的前提下，他們也迫切期待更多相關學科的具體教學模型出現，以更好地指導使用者探索並激發增強技術在教學中潛在的無限潛能，並防止出現較大的數位落差（Lin, X. F.等，2023）。其中古詩教學分支是片值得積極探索的處女之地。增強現實技術為古詩教學提供了一種全新的方式，透過佔用多感官通道充分發展學生的古詩學習興趣和潛能（Cai, Y., Pan, Z., & Liu, M., 2022）。未來的 AR 古詩研究的方向不僅是 AR 在古詩課堂的使用表現，或者其產品本身的設計修改，重點將逐漸偏移到 AR 教學模型的開發。有效的 AR 教學模型才可以輔助中文教師們培養合格的電子化教學能力，也將強力推進古詩科/中文科真正進入使用科技資訊輔助課堂教學的人工智能教學時代。

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数字徽章：在线学习激励、认证与评估的新风尚

Digital Badges: A New Trend in Online Learning Motivation, Certification, and Assessment

赵艺凡

上海第二工业大学，上海，中国

Yfzhao@sspu.edu.cn

【摘要】 数字徽章作为一种信息化的学习激励、认证与评估技术，随着在线学习平台的快速发展，成为提升学习效果的重要工具。数字徽章的核心优势在于其能激发学习者的学习动机，促进学习者持续参与学习过程，并通过可视化的徽章展示学习成果和成就，增强学习者的成就感和自信心。数字徽章能够精准认证学习者的知识、技能和经验，尤其是那些通过非正式途径获得的学习成果，弥补传统教育认证方式的不足。此外，数字徽章通过细化学习过程中的各项指标，为学习者提供了更加灵活和个性化的评估手段。

【关键字】 数字徽章；在线学习；学习激励；学习认证；学习评估

Abstract: Digital badges, as an information-based technology for learning motivation, certification, and assessment, have become an important tool for enhancing learning outcomes with the rapid development of online learning platforms. The core advantage of digital badges lies in their ability to stimulate learners' motivation, promote continuous participation in the learning process, and visually display learning achievements and accomplishments, thereby enhancing learners' sense of achievement and self-confidence. Digital badges can accurately certify learners' knowledge, skills, and experience, especially those learning outcomes obtained through informal channels, thus addressing the shortcomings of traditional education certification methods. In addition, digital badges refine various indicators in the learning process, providing learners with more flexible and personalized evaluation methods.

Keywords: Digital badges, online learning, learning motivation, learning certification, learning assessment

1. 前言

随着终身学习理念的日渐深入和信息技术的快速发展，“在线学习已成为学习的新常态”（吴峰&李杰，2015，p.112）。国内外出现了大量如 Coursera、edX、Udacity、可汗学院、代码学院等在线学习平台，学习者可以在网上注册账号，学习各类课程并取得各种数字徽章，分享和展示学习的过程、路径和成果。数字徽章是在数字化的背景下催生的一项新技术，2015 年，基础教育版《地平线报告》指出，“数字徽章在教育领域有巨大的发展潜力和应用空间”（龚志武&吴迪，2015，p.22）。数字徽章因其可视化的表达、游戏化的功能、详细的元数据，其在激发学习动机、记录学习过程和路径、认证和评估学习成果、规划学习路线方面的作用得到了认可（Clauussen & Glowatz, 2017, p.368）。由于许多学习者在学习过程中面临着“工-学矛盾”和“家-学矛盾”，学习投入和学习动机往往是影响学习效果的重要因素。学习者缺乏学习动机，难以持续投入到学习中，通过在线非正式学习获得的实践经验和软技能也得不到认可，导致学习的中断和放弃。如何最大程度的激发在线学习的动机，对其在线学习成果进行先进、便捷、科学的认证和评估是在线学习研究中的难点。数字徽章因其特有的功能和结构，为在线学习的激励、认证和评估带来了新的思路，国外多个高校、组织、机构已将数字徽章技术应用到在线学习中，并取得一定的成效。基于此，本文以理论为向导，对国外数字徽章的实践案例进行分析，对在线学习中数字徽章的应用价值和挑战进行讨论，为促进在线学习提供参考。

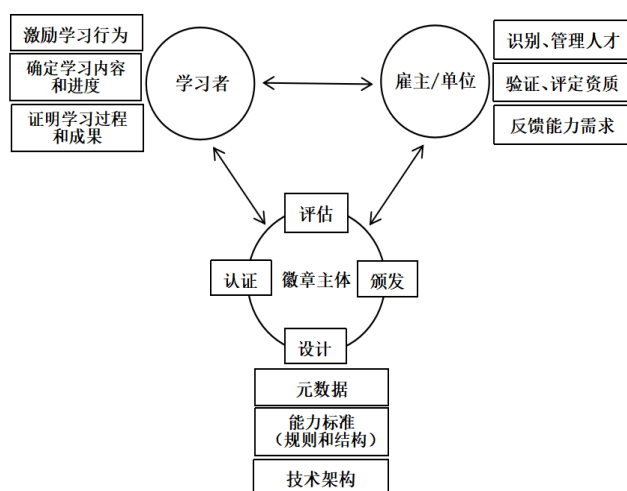
2. 数字徽章的特征与结构

2010 年，莫兹拉基金会（Mozilla Foundation）在一次会议上首次引入“数字徽章”的概念，认为数字徽章是一种“捕捉和交流个人所知和所能展示的东西的新方式”（Dowling-Hetherington & Glowatz, 2017, p.1）。麦克阿瑟基金会（MacArthur Foundation）将数字徽章描述为一种评估和认

证机制，“旨在使正式和非正式环境中的学习可见，且具有帮助改变学习价值的潜力”（Hurst, 2015, p.182）。在教育语境中，可将数字徽章的内涵概括为：一种“获取、记录、认证、评估和展示个人所学习的内容、过程和结果的数字凭证，既可以用来表征学习者所获得的知识、技能、认证、资格和成就，还能够作为一种数字化工具，通过网络随时向大众公开展示自己的兴趣和学习故事。

数字徽章有着明显的信息时代的教育特征：（1）可视化的图形。数字徽章由直观的图示、符号或文件来呈现，学习者和工作单位都可以在线查看徽章的类型、等级和信息。（2）携带元数据。数字徽章内部携带着徽章名称、类别、标准、颁发者信息、发行日期、等级、有效周期、成绩描述、学习记录、验证链接（链接到徽章的发放机构，证明学习成果的有效性）等数据。（3）弹性化的颗粒度。数字徽章的颗粒度可粗可细，可以对不同的学习层次、类型、专业的学习成果进行认证和评估。（4）集中化的成绩管理。徽章系统为学习者提供“徽章背包，类似于档案袋的作用”，（Santos & Charleer & Parra, 2013, p.324）用于记录和管理学习信息，进而了解学习进度和成效。（5）可展示与分享。在学习的过程中，学习者可以随时在社交网站或工作网站上分享携带有数据信息的数字徽章，展示他们所获得的技能和学习成就。

数字徽章的生态系统（如图1）由三个单元组成：徽章主体、学习者、雇主/工作单位。徽章主体是生产方，学习者、雇主/工作单位是消费和使用方。徽章主体由元数据、能力标准、技术架构组成，任何想授予徽章的个人或机构都可以成为徽章的设计者和颁发者，他们定义徽章的标准、内容和结构，通过技术和程序使徽章可以被使用，依据相应的标准对学习成果进行认证和评估，使学习成果能够以徽章的形式呈现。学习者通过徽章的奖励机制增强学习动力，完成规定的学习活动并获得徽章，使用可验证的数字徽章/证书展示自己的能力和学习证据，以申请获得工作资格或职业晋升。雇主和工作单位可以将徽章作为衡量技能水平或学习成果的一种方式，申请查看学习者的徽章信息，验证其资质，通过使用结构化数据算法寻找和识别完美匹配工作岗位的人才；根据行业、领域和各个岗位的技能要求反馈能力需求，帮助改进徽章标准。



3. 数字徽章在在线学习中的应用价值

3.1. 激励学习动机和行为

学习动机是预测学习效果的潜在指标之一。学习者在学习经常要兼顾家庭和生活的责任，学习时间和精力难以保障，加之在线学习缺乏对学习过程的严格监控和管理，久而久之，越来越

越多的学习者丧失学习动机甚至中途放弃，这是影响学习质量的主要因素（Dowling-Hetherington, 2017, p.14）。数字徽章以游戏化的方式不断刺激、激励学习者投入更多的时间、精力到学习活动中，接受更高水平的挑战，以外部动机的角色激励学习者持续学习。当学习者获得的徽章得到认可后，学习的动力和参与性进一步得到激发，进而促使其“设定更高层次的学习目标”（Shields & Chugh, 2017, p.1819）。

数字徽章对学习动机和行为的激励作用主要体现在四个方面（如图 2）：其一，数字徽章系统会针对不同的情况对学习行为作出积极的反馈，“这种正向激励能在很大程度上增强了学习活动的成就感和吸引力”（Ian & Schenke, p.452）。其二，学习目标的设定也会对学习行为产生积极影响，为了得到期望的徽章，学习者不断的完成学习任务，一系列的徽章就像一个又一个潜在的成就路标，为学习者提供下一步的学习引导，形成一种成就途径模型，每个徽章的数据都指向下一步的进展和成功的要求。其三，数字徽章通过提供一系列绩效标准来潜在地影响学习者能力的发展，这些标准帮助学习者设定适合自己的学习计划和路线，并能对自己的学习情况进行自我评估。“当有机会计划、监控和评估将要学习的任务时，学习者在任务上投入的时间和精力就会增加”（Gibson & Ostashevski & Flintoff, 2015, p.408）。其四，学习者可以便捷的展示自己的学习成果，“分享的成就感和自我展示的满足感对学习动机和行为的激发十分重要”（Lepper & Corpus & Iyengar, 2005, p.185）。例如，在工作单位中，为了提升员工的专业知识和能力，工作单位会开发相应的数字徽章系统，设定“荣誉奖”、“优秀员工”、“专业人员”、“团队领导”、“明星员工”等徽章，等级越高的徽章获取难度越大，需要员工掌握的知识 and 能力也越高，在员工获得徽章后，工作单位对其进行相应的奖励，以激发其进一步提升自己的能力。



图 2 数字徽章对学习动机和行为的激励过程

3.2. 认证学习经验和成果

在现有的文凭体制下，要证明一个人的学习经验和所获得的能力，传统的方式是在一所正规的学校里待上足够长的时间去学习，然后通过标准化的考试，最后拿到一张文凭，这种认证方式不够灵活、便捷，且认证颗粒度过粗，难以对实践技能、态度、价值观、沟通能力等进行认证，而在工作中，这些能力往往比一纸文凭更重要。同时，由于学习者有着丰富的非正式学习经历，这些学习成果大多是在工作场所或家庭生活中习得的，未被记录、识别和认证，学习者难以全面的展示自己的能力图谱。

与传统学习成果的认证方式相比，数字徽章系统更灵活、个性化，能够契合在线非正式学习成果的认证需求，学习者在可以随时展示其获得的知识和技能，无需依赖学历证书来证明自己，

这有助于打破高校对成果认证的垄断。数字徽章在进行学习成果进行认证时，以数字化的学习记录和证据链为基础，这些数据能够更加客观的反映出学习者的能力水平和成长过程；以特定知识和能力模块作为认证颗粒，依据不同的领域、专业、技能类型和层级开发多样化的认证模块，同一个学习者可以获得不同领域和专业的徽章，在应聘时能匹配到更多的岗位；认证范围无限扩大，包括传统认证方式难以认证的能力，如学习参与度、学习态度、实践经验、专业资质等；认证主体开放、多元，任何具有专业资质和公信力的部门、机构都可以成为认证主体；认证成本较低，主要是数字徽章系统运行管理维护成本；认证的安全性较高，易于持有、展示、存储及验证，可有效防止学习成果被恶意篡改和伪造。

3.3. 评估学习过程和效果

在线学习常常因为质量过低而被诟病，而学习评估直接影响着学习质量。传统的学习评估多以总结性评估为主，评估的结果通常是一个分数或等级，许多能力难以通过分数全面地展示出来，尤其是实践技能，学习者也无法从这个等级和分数中发现问题。同时，由于缺乏学习过程中的详细数据，在对学习者成绩之外的表现进行评估时，传统的评估方式大多依据老师的经验和感受来判断，影响评估结果的客观性、公正性。

相较而言，数字徽章更关注过程性评估，从学习者进入系统开始学习到获取徽章，所有的行为和表现如学习时长、尝试的次数、内容的掌握情况、互动情况等都能得到持续性的记录，学习者能力发展的整个过程能够可视化的呈现出来。从评估的标准上看，数字徽章的标准比较多元化、个性化（胡小勇 & 李馨 & 宋灵青，2013, p.3）。从评估的维度上看，登录时间、退出时间、学习频率、学习时长、阅读量、鼠标点击频率、眼睛移动的范围等数据可以分析出学习投入和学习态度；评论、发帖、回答问题、讨论、小组合作等数据可以分析出互动、交流情况；提问的内容、关注的主题等数据可以分析出学习兴趣；回答问题的质量、评论的质量、作业成绩、作业花费的时间、测试成绩、测试花费的时间等数据可以分析出学习的能力（任友群 & 冯仰存 & 徐峰, 2013, p.16）。从评估的方式上看，数字徽章使用时长、频次、作业、个人成绩、小组成绩、发帖、点评、同伴互评、自评相结合的方式，评估结果包含明细，根据所获的徽章，学习者能够清楚把握自己的知识、技能结构，了解已掌握的能力和欠缺的部分，以便规划下一步的学习路线。从评估的质量上看，第三方机构会定时对数字徽章的评估标准、评估过程、可信度进行监管，保证评估过程的科学、客观和公平。

4. 数字徽章在在线学习中的应用挑战

4.1. 对可信度和认可度的担忧

数字徽章在激励、认证和评估在线学习方面的探索还处于早期阶段，其有效性、可信度和认可度还有待提升。理论上，数字徽章体系能够与学位体系形成补充，在非正式、非正规学习成果的认证和评估中发挥优势，做到不同知识和技能的互认、转换与衔接。但是，在应用中，所有学习成果的可信度和有效性都需要得到政府、权威机构、用人单位的承认，如果数字徽章体系对学习成果和学习经验的核查不够严格，制定的认证和评估标准不够合理，就会导致数字徽章的滥发、滥用，质量大打折扣。在我国，还没有相应的政策和制度能为数字徽章的可信度和认可度保驾护航，数字徽章的认可度和影响力较小，学习成果得不到认可就会降低学习动机。同时，由于学习的内容、方式、成果过于多元化、碎片化、分散化，学习成果的认证和评估难度不断升级，“许多非正式的学习活动不能被观察到，一些软技能数据也不好搜集”（Gamrat & Bixler, 2019, p.16），这会影响学习数据的有效性。因此，需要解决数字徽章由谁来开发、怎么制定标准、谁有授予权、谁来监管、谁来保障这些问题，才能进一步推动数字徽章的有效应用。

4.2. 激励外部动机引发的负面效应

虽然数字徽章系统利用游戏化的任务设置，能在一定程度上激发学习者的学习动机和参与度，但是这种动机大多处于外部动机层面，对外部动机的过度刺激可能会导致学习者过度追逐学习

成就和奖励，忽视学习的过程和乐趣，进而降低学习者原有的学习兴趣和内部动机（Roy & Clark, 2019, p2635）。同时，由于学习者的学习需求、先前学习经验、心理特征、个性特征存在较大的个体差异，并非所有的数字徽章都能激发学习者的学习动机，一些不合理的目标设定、获取徽章的难度过高、不恰当的反馈甚至会降低学习动机（Jovanovic & Devedzic, 2015, p121）。同时，对外部动机和刺激的过度依赖也可能会降低学习的自主性和主动性（Grant, 2016, p7）。虽然数字徽章鼓励学习者选择个人的学习路径和内容，但为了更快地获得更多、更高等级的徽章，学习者会被动的被系统设计的学习路径所引导，完全被徽章系统操控，一旦脱离徽章系统或徽章不被认可，学习者便会逐渐丧失学习能力。因此，徽章的开发和设计要以过程性激励为主，不仅要考虑徽章对外部动机的激励作用，还要尽可能地促使学习者对学习产生浓厚的兴趣和内部动机。

4.3. 信息和隐私安全存在隐患

在信息化时代，数据和信息安全对每个人都至关重要。数字徽章对学习成果的认证和评估都依赖于详细的元数据，徽章系统通过数字化技术完整的记录学习者的学习轨迹和进度，当其在网络中采集、存储、传输、共享学习者的数据时，各环节都存在更改、泄露数据和信息的风险。在数据的采集阶段，一些平台可能会在未获得学习者知情同意的情况下便将与学习行为无关的信息进行采集，如学习者的性别、职业、收入、年龄等个人信息，这种行为违反法律和技术伦理；在数据的存储阶段，哪些信息是最主要的学习证据，哪些需要存储都有待商榷；在数据的传输阶段，系统或软硬件的漏洞都有可能导致数据和隐私的泄露；在数据的共享阶段，共享多少数据以及共享何种类型的隐私仍有待讨论。在国家隐私立法的背景下，数字徽章在在线学习中的应用需要保护好学习者的个人资料、学习痕迹和学习成果证明，一些涉及隐私的相关法律问题也要引起重视，如果这些学习信息和数据缺乏相关部门的强制性监管，就会使学习者处于巨大的信息安全风险中。

4.4. 能力本位回归的争论

数字徽章的实践探索对教育机构、学习者、教师、劳动力市场都产生了影响，公正透明的学习数据、个性化的学习认证和评估、客观的学习结果、颗粒化的技能发展都得益于能力本位教育理念的复兴诉求。能力本位教育理念反对知识中心、学位至上，倡导以职业需求为目标，以能力为教学基础，强调学习者的自我学习和自我评价。但是，过度强调能力会使学习的关注点过多的聚焦于行为层面，忽视专业知识、态度、价值观、品德的重要价值。许多学者对基于能力本位的数字徽章理念提出质疑和批判，认为数字徽章的应用需在一定程度上规避教育能力本位的功利化影响。在我国当前的教育体制内，素质教育仍是教育改革的推进方向，试图让数字徽章代替学历教育实现教育体制的全面改革并不现实，也不契合当前的发展实际。但是，引入数字徽章作为传统教育体系的一种补充，来促进个性化学习、终身学习，不失为一种创新之举。

4.5. 第三方认可的阻力

目前，在在线学习中引入数字徽章在技术上已经铺平道路，但是在第三方认可上仍存在阻力。许多国家在没有形成成熟的第三方认可制度前，主要由大学开发和颁发数字徽章，大学的排名、影响力、声誉与数字徽章的质量和认可度密切挂钩。但是大学所颁发的数字徽章的可信度和有效性由谁来保障？一般情况下，需要通过具有声望的公司和非营利性的社会组织或机构对数字徽章体系进行监督、认证和评估，以保证数字徽章的可信度和安全性。在同等条件下，标准越高、认证难度越大的徽章更容易得到行业、领域的认可和青睐。但是，对于第三方认证组织或机构而言，为数字徽章进行认可和评估存在一定的信任风险，在线学习过程中的许多不确定性将会对它的严苛度和可信度造成巨大的挑战。同时，由于不同认可者对相应技能如何测量有着不同理解，很多能力的认定也难以统一标准，第三方认证的复杂性和难度很大。对于数字徽章的发行机构而言，如果成果得不到第三方的认可，徽章就会陷入“自产自销”、“自娱自乐”的境地，其认可度和推广度会大打折扣。

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Strand

New Humanities Education

新人文教育

Challenges of Generative Artificial Intelligence in Humanities Education:

Preliminary Findings on the Use of Gen-AI in Text-Based Courses

Pamela Pui Wan LEUNG¹, Cheuk Wai YIP², Ka Ling LEUNG^{3*}
^{1,2,3}The Education University of Hong Kong, Hong Kong SAR, China
pleung@eduhk.hk, wklleung@eduhk.hk, chwaiyip@eduhk.hk

ABSTRACT

The rapid rise of generative artificial intelligence (Gen-AI) technologies has impacted teaching and learning strategies in higher education institutions. Limited findings focus on the learning effectiveness and challenges of using ChatGPT. In particular, the use of ChatGPT is relatively underexplored in text-based subjects in higher education. Based on a government-funded project which aims at modifying pedagogy with the application of ChatGPT in text-based courses, this paper will present findings from a pre-course survey of students. A total of 350 valid responses were collected from nine courses across seven subject domain areas participating in fall 2024. The pre-course survey was to investigate students' needs, preferences and the challenges they encountered in using ChatGPT. Questions covered students' literacy of AI applications, the frequency of using ChatGPT, and the purposes and roles of ChatGPT in their learning processes. In addition, the project team also collected views from the course teachers for a more comprehensive understanding of the relevant learning and teaching contexts. Findings from the surveys provided multifaceted insights for stakeholders to develop teaching strategies that can address the risks and challenges associated with Gen-AI applications in higher education. Post-course surveys are also planned to solicit evidence on the effectiveness of using ChatGPT in learning and teaching of the same courses in due course.

KEYWORDS

Gen-AI, ChatGPT, 6P Model, Text-Based Courses, Higher Education

An innovative attempt to implement Digital Humanities Education: The development of a virtual playhouse

Pamela Pui Wan LEUNG¹, Sunnie Yang HE², Sophia Sin Manw LAM³, Chaak Ming LAU⁴, Maggie Shen QIAO⁵, Mengyao JIN⁶, Anita Zhuoxuan LI⁷, Christie Hoi Kwan CHEUNG⁸, Dingding JIN⁹

^{1,2,3,4,5,6,7,8,9}The Education University of Hong Kong, Hong Kong SAR, China

pleung@eduhk.hk, heyang@eduhk.hk, ssmlam@eduhk.hk, lchaakming@eduhk.hk, sqiao@eduhk.hk, mjin@eduhk.hk, lzhuxuan@eduhk.hk, cheunghk@eduhk.hk, Jdingding@eduhk.hk

ABSTRACT

In today's technology-driven era, humanities are evolving with emerging technologies. To promote the humanities in an engaging way, a university in Hong Kong attempted to develop a digital playhouse (DP) using big data and generative AI. The DP project aims to create an interactive virtual learning platform with eight themes to promote sustainable teaching, research and knowledge transfer in the humanities. It targets the public and addresses personalised learning needs at varied ages and is divided into three main categories: game-based education, interactive art appreciation, and a database encompassing Chinese textbooks, local stories, and an AI-generated dictionary. Although the DP is still in construction, the project team intends to use big data technologies to capture and analyse learning behaviours, aiming to identify the evolution of learning pathways, characteristics of interaction patterns, variations in cognitive styles, and drivers of learning motivation. Using Theatre One as an example, where players can accumulate herbs and obtain access to prescriptions, this paper will illustrate characteristics of the DP and demonstrate how the backend system functions to assess the players' accomplishments, enabling the project team to determine necessary adjustments in difficulty, showcasing a data-driven design and its support for learner customisation and platform maintenance. Such design helps ensure optimal educational outcomes and system stability. In gist, the DP brings new perspectives to the development of disciplines and promotes interdisciplinary research through the integration of knowledge and innovation. It will inspire future advances in humanities education advancements and serve as a reference for similar projects.

KEYWORDS

Virtual playhouse, Digital Humanities, Big data, Interdisciplinary synergy, Creative design

Kunqu and GenAI: An Interdisciplinary Approach to Cultural Heritage and Creative Expression

Maciej KURZYNSKI¹, Enrico BERTELLI^{2*}

^{1,2}Lingnan University, Hong Kong SAR, China

maciej.kurzynski@ln.edu.hk, enricobertelli@ln.edu.hk

ABSTRACT

Our project invites non-music undergraduate majors from various disciplines to engage with the cultural heritage of Kunqu opera using multi-modal Generative Artificial Intelligence (GenAI). Acknowledging the complexity and expressive depth of Kunqu—its tonal patterns, intricate melodies, and poetic sophistication—we aim to enhance students' exposure to Chinese operatic masterpieces through innovative and interdisciplinary learning experiences. The course begins with a visit from a Kunqu master, who provides a live demonstration and explains the unique features of Kunqu, such as tonal patterns and the distinct characteristics of Northern and Southern melodies. Students are then guided in fine-tuning large language models (LLMs) using platforms like Perplexity, HuggingFace, and Google Colab and generate libretti that mimic Kunqu's linguistic style. Students learn prompt engineering techniques to refine the models' outputs, balancing structural integrity with creative expression. Suno, a GenAI audio platform, produces the blueprint for our music. Students are introduced to strategies for working with AI-generated music, combining audio samples with prompt-driven variations to approximate Kunqu's signature melodic characteristics. In the final stage, students create custom digital musical instruments, or samplers, to interactively remix and manipulate fragments of GenAI-produced tracks, culminating in their One-Minute Operas. This hands-on component fosters exploration beyond digital boundaries and integrates traditional arts, AI technology, and digital instrument design. Our project immerses students in Kunqu's artistic legacy while equipping them with transferable skills in AI, music technology, and design thinking. We demonstrate how digital tools can creatively reinterpret cultural heritage by sparking curiosity and fostering interdisciplinary learning.

KEYWORDS

Chinese opera, large language models, music technology, heritage interpretation

Enhancing Undergraduates' Service-Learning Motivation and Engagement

Ning REN^{1*}, Vivian Wing Yan LEE^{2*}

^{1,2}Centre for Learning Enhancement And Research, The Chinese University of Hong Kong, Hong Kong SAR, China
ningren@cuhk.edu.hk, vivianlee@cuhk.edu.hk

ABSTRACT

The Hong Kong Education Bureau and the Chinese University of Hong Kong (CUHK) highlight service-learning (SL) for students' holistic development. Starting in 2024/2025, SL will be compulsory for all incoming CUHK undergraduates. Nonetheless, previous SL studies reported low student motivation and engagement as a challenge. This prompts us to understand CUHK undergraduates' SL motivation and engagement, and how motivation and engagement can be improved, drawing on the Self-Determination Theory (SDT). SDT suggests that satisfaction of basic psychological needs (BPNs), autonomy, competence, and relatedness, contributes to human motivation and engagement. We obtained 354 valid survey responses from CUHK students during late 2024 using validated instruments: motivation (Guay et al., 2000), engagement (Reeve, 2013; Skinner et al., 2009; Wang et al., 2016), BPNs (Chen et al., 2014). Results showed high intrinsic motivation, identified regulation, and external regulation, with low amotivation. Engagement levels were consistently high across all types (behavioural, emotional, cognitive, agentic, social). Multiple regressions showed that among BPNs, autonomy was most strongly associated with intrinsic motivation, identified regulation, and emotional engagement; relatedness was most strongly related to behavioural, cognitive, agentic, and social engagement. None of the BPNs were significantly associated with external regulation and amotivation. Among the four types of motivation, amotivation had the strongest relationship with behavioural and cognitive engagement; intrinsic motivation was most strongly associated with emotional, agentic, and social engagement. Findings highlight the importance of fostering autonomy and relatedness to enhance SL motivation and engagement. Reducing amotivation and boosting intrinsic motivation are key strategies for improving engagement.

KEYWORDS

Service-Learning, Self-Determination Theory, Motivation, Engagement, Higher Education

Interdisciplinarity in the Literary and Arts Collective in Jakarta, Indonesia: Young

Artists' Experimentation in the New Humanities

Irsyad RIDHO¹, Hamidah BUSYRAH^{2*}

¹Jakarta State University, Indonesia

²Atelir Ceremai, Jakarta, Indonesia

irsyadridho@unj.ac.id, hamidahbusyrah@yahoo.co.id

ABSTRACT

Over the past two decades, Indonesia has experienced a profound democratization process following the fall of the New Order military regime. This shift has opened up space for previously banned or overlooked literary works, particularly those censored for political, racial, or gender reasons. Literary works and criticism that contribute to this democratization are essential for Indonesia's cultural development. In this context, the New Humanities framework has emerged as a key area of focus, emphasizing the need for literary studies to collaborate with other art forms to enhance the strategic role of the arts in societal change. However, while the integration of interdisciplinary approaches in literary studies has been slow within Indonesian universities, these practices are increasingly taking shape outside academic institutions. This research explores how younger generations are experimenting with interdisciplinarity in non-academic spaces, specifically within Jakarta's collective art scene. Using ethnographic methods, the study focuses on Atelir Ceremai, a collective arts venue in Jakarta, to examine the dynamics of this creative experimentation. The findings of the study reveal several important insights: (1) Atelir Ceremai provides an affordable and alternative space for young artists, offering a counterpoint to the rising costs of formal art venues in urban centers. This raises important questions about the role of art venues as public spaces. (2) Within this alternative space, cross-disciplinary collaboration plays a vital role in fostering artistic innovation and sustaining growth. (3) The collaboration at Atelir Ceremai also supports efforts toward collective independence through the development of business models, highlighting the growing intersection of cultural production and entrepreneurship.

KEYWORDS

new humanities, literary and arts collective, interdisciplinarity

Strand

Value Education, Teacher Conduct and Well-being

價值觀教育、教師操守與福祉

Exploring Family Functioning, Personal Growth Initiative and Future Orientation of GBA University Students

XinHua YANG¹, Michelle CHENG^{2*}

^{1,2}The Education University of Hong Kong, Hong Kong SAR, China
s1157393@s.eduhk.hk, chengwt@eduhk.hk

ABSTRACT

Family functioning plays a pivotal role in different aspects of student development. However, existing research has predominantly focused on the impact of family functioning on secondary school students. Prolonged family control has led many university students to rely on familial decisions and opinions, creating uncertainty or indifference about their own future and underscoring the need for further research on university students. This study intends to investigate the associations among family functioning, personal growth initiative, and future orientation among university students, as the interrelations among these variables have not been thoroughly examined in existing literature, indicating a need for additional research. A total of 700 university students studying in GBA participated in an online survey, which included the validated surveys Family Adaptability and Cohesion Evaluation Scale II, Personal Growth Initiative Scale II, and Adolescent Future Orientation Scale. Quantitative analysis examined the moderating role of personal growth initiative in the relationship between family functioning and future orientation. This study proposes that family functioning plays a crucial role in influencing college students' personal growth initiative, which subsequently impacts their future orientation and shapes their career and educational decisions. Based on the findings of this study, recommendations will be provided, offering university educators valuable insights to assist in making informed decisions regarding the implementation of home-school collaborative education customized to individual student requirements. Additionally, strategies will be suggested to aid educators in supporting students to cultivate a positive outlook on family relationships, nurture a robust personal growth initiative, and establish optimistic future aspirations.

KEYWORDS

University Student Development, Family Functioning, Personal Growth Initiative, Future Orientation

Preservice Teachers' Career Decisions: Mediating Effects of Utility Values and Self-Efficacy on Person-Environment Fit

Wening CAHYAWULAN^{1*}, Hui WANG²

^{1,2}Department of Special Education and Counselling, The Education University of Hong Kong, Hong Kong SAR, China
s1147991@s.eduhk.hk, hwang@eduhk.hk

ABSTRACT

Becoming a teacher offers individuals opportunities to shape the future of society through education. This potential impact makes the teaching profession regarded as a satisfying and interesting job in comparison with other career paths. Consequently, many individuals are drawn to pursue teacher education in higher education institutions with the aspiration to become teachers in the future. However, their initial career decision to choose teaching as their first career choice may change throughout their training as they may plan to be a teacher or may not plan to become a teacher after graduation. This study investigates the influences of using teaching as a first career choice and their current career plans on their teaching values and self-efficacy, which in turn, influences their perception of person-environment fit within the teaching profession. The study involved 1,143 final-year preservice teachers from Indonesia. Structural equation modeling with latent interaction analysis indicated that preservice teachers' current career plan to become teachers and the person-environment fit was mediated by social utility values and teacher self-efficacy. Moreover, choosing teaching as a first career choice was positively associated with personal utility values, social utility values, and person-environment fit when preservice teachers also have career plans to become teachers after graduation. However, teacher self-efficacy was only predicted by preservice teachers' career plans after graduation. This study highlights the possible interaction between choosing teaching as a first career choice and the current career plan to understand preservice teachers' utility values, teacher self-efficacy, and person-environment fit.

KEYWORDS

career decision, utility values, teacher self-efficacy, person-environment fit

Teaching As a Career Choice: Preservice Teachers' Perception of The Teaching Profession Upon Graduation

Wening CAHYAWULAN^{1*}, Hui WANG²

^{1,2}Department of Special Education and Counselling, The Education University of Hong Kong, Hong Kong SAR, China
s1147991@s.eduhk.hk, hwang@eduhk.hk

ABSTRACT

People choose the teaching profession for various reasons, and their experiences in teacher education can significantly influence their career plans after graduation. This study proposed to explore the academic and professional experiences of four types of preservice teachers, upon the time they graduate from teacher education: preservice teachers who (1) chose teaching as their first career choice and planned to continue as teachers after graduation, (2) chose teaching as the first career but changed mind and decided not to teach after graduation, (3) originally chose teaching as a fallback option but now change mind and decide to pursue teaching, and (4) originally chose teaching as a fallback option and still did not want to teach upon graduation. This qualitative research involved 14 final-year preservice teachers from a teacher education institution in Indonesia. Results suggested that the first group chose teaching because they were intrinsically motivated to teach. The second group initially chose teaching mostly because they had prior teaching experiences, but then they changed their mind and did not plan to become teachers after realizing that teachers had heavy workloads and low salaries. The third group chose teaching primarily because they failed to get into their first career preferences, however, they developed an interest in teaching during teacher education, or they found it was similarly hard to get another job if they do not teach. The last group chose teaching as a fallback originally and still did not plan to become teachers due to a lack of self-efficacy in teaching.

KEYWORDS

teaching as a first career choice, career plan, teaching profession

How Social-Emotional Competence Protects Students' Well-Being from the Effects of Bullying

Eka WAHYUNI^{1*}, Wening CAHYAWULAN², Hui WANG³

^{1,2}Universitas Negeri Jakarta, Jakarta, Indonesia

³The Education University of Hong Kong, Hong Kong SAR, China
ewahyuni@unj.ac.id, wening@unj.ac.id, hwang@eduhk.hk

ABSTRACT

Bullying is known as a prevalent issue in peer relationships within the school environment. When students become victims of bullying, it can severely impact their well-being. Therefore, to reduce the risk of becoming victims of bullying, students must develop strong social-emotional competence that will help them manage their emotions and social interaction, which can foster healthy relationships with their peers ultimately enhancing their overall well-being. This study investigates how different types of bullying students experience (i.e., exclusion, hitting, taking belongings, and cyberbullying) influence their well-being (i.e., emotional well-being, social well-being, and psychological well-being), considering the mediating roles of students' social-emotional competence (i.e., self-awareness, self-management, social awareness, and responsible decision-making). This study includes 3,306 students ($M=13.69$; $SD=1.53$) from public schools in Indonesia. Structural equation modeling with latent interaction analysis indicated that the relationship partially mediates the social-emotional competencies between bullying experience types, such as exclusion and taking belongings. Moreover, students who experienced exclusion and taking belongings of bullying were more likely to have lower emotional well-being and psychological well-being. Additionally, students with high self-awareness and self-management were more likely to have better emotional well-being. In comparison, those who have high social awareness were more likely to have lower emotional well-being and psychological well-being. This study highlights the importance of developing students' social-emotional competence as a protective factor against bullying, enhancing students' well-being.

KEYWORDS

social-emotional competence, bullying, well-being

Transnational Migration and Changing Demographics in Australian Schools:

Implications for Future Education

Jiao TUXWORTH

University of the Sunshine Coast, Australia

Mengjiao.wang@research.usc.edu.au

ABSTRACT

Australia's increasing cultural and linguistic diversity offers valuable opportunities for developing a more inclusive and globally relevant education system. Yet, despite curriculum goals aimed at embracing diversity to match the changing demographics, Australian schools remain predominantly monocultural and monolingual, with a teaching workforce that is largely Anglo-dominated. This disconnect between student demographics and teacher representation limits the potential for a truly inclusive, culturally responsive educational environment. Similar trends are evident in other high-immigration countries like Canada, the United States, and New Zealand, where institutional and systemic barriers, rooted in colonial histories, continue to marginalise Culturally and Linguistically Diverse (CALD) teachers. Within Australian schools, CALD educators, particularly those trained overseas, face challenges including covert racism, cultural and linguistic discrimination and bias. These barriers restrict their employment opportunities, impede career growth, and often cause psychological and physical distress, ultimately preventing these teachers from contributing their unique skills and perspectives. The absence of targeted recruitment and employment strategies for CALD teachers risks excluding skilled educators who could enrich the learning environment and expand students' global awareness. This underrepresentation also affects Australia's educational competitiveness on the world stage, as it limits students' access to diverse perspectives and intercultural skills essential in a globalized society. This study applies the current issues in Australian schools as a case study to explore the challenges and possibilities for implementing decolonial approaches in education, highlighting the need for reforms that prioritise diversity, equity, and inclusion in future educational practices.

KEYWORDS

teacher employment, teacher education, teacher well-being, transnational migration

When Teaching and Management are Inseparably Interconnected: Unveiling a

Class Teacher's Emotions and Identity

Yuanhao XU

The Education University of Hong Kong, Hong Kong SAR, China
s1125836@s.eduhk.hk

ABSTRACT

Class teachers' identities and emotions have been omitted within the milieu of the quality-oriented education, which intends to enhance students' holistic development and apply student-centered teaching approach. To fill this gap, the current study adopts a case study design to explore class teachers' emotions and their identities in the context of the quality-oriented education system. Data were collected by narrative frames and a series of interviews with six participants. In addition, field notes and other documents were used as additional data. A thematic analysis was adopted to analyze the data. Three themes are identified: (1) caring class teachers with high career motivations, (2) moderate class teachers aiming to solely perform their professional duties, (3) indifferent class teachers with eroding passions in education. The findings also reveal that class teachers encountered negative emotions during their work, originating from the school rules, educational climate, misbehaved students and unreasonable parents. However, they experienced positive feelings derived from colleagues' support, his students' progress and parents' recognition, which enriched their teacher identities. In addition to that, this paper shows that teacher emotions are an indispensable part of class teachers' training programs. This study thus yields the importance of class teachers' emotion in constructing their identities.

KEYWORDS

Class teachers, teacher identity, teacher emotion, quality-oriented education

Critical Affective Literacy for Values Education

Andrew J. PEREIRA

Education Research Scientist, Centre for Research in Pedagogy and Practice, National Institute of Education

Andrew.pereira@nie.edu.sg

ABSTRACT

Social and Emotional Learning (SEL) in citizenship and character education is essential for cultivating students' self-awareness, emotional regulation, responsibility, and empathy. The COVID-19 pandemic, alongside rising stress and anxiety levels in schools, underscores the need to address the affective dimensions of learning more deeply. However, current approaches to civic education often overlook the role of emotions in shaping citizenship and character. Anwaruddin's Critical Affective Literacy (CAL) offers a framework for engaging with emotions critically. CAL encourages students to 1) examine their own emotional responses, 2) empathize by considering others' perspectives, 3) interrogate how emotions are constructed in social and political contexts, and 4) pursue emotional transformation to support social justice. Studies indicate that CAL fosters empathy across divides and promotes critical engagement with diverse viewpoints. This presentation advocates expanding SEL to incorporate CAL principles not only within Citizenship and Character Education (CCE) but also in language, humanities, and social studies, enhancing students' critical engagement with societal issues and emotional literacy. It details an intervention in Singapore schools, highlighting a collaborative effort between educators and a school to address complex educational challenges using CAL-based pedagogies. The findings and implications will be discussed from the empirical evidence of the intervention. This collaboration supports educators in addressing complex emotional and ethical issues, offering students meaningful engagement with the affective dimensions of social and civic life.

KEYWORDS

affect; emotion; critical literacy; critical affective literacy, civic education

Power, Bias, and Sensitivity: An Autoethnographic Reflection on Counseling Ethics in Indonesia's LGBTQ+ Context

Rika KARTIKAWATI
SMKN 7 Kota Tangerang, Indonesia/Banten
rika.sacapermata@gmail.com

Abstract: *This autoethnographic article reflects on the power dynamics and personal biases of a guidance and counseling teacher, drawing upon my encounter with Davi (a pseudonym), a homosexual individual who had been mistreated by his previous guidance and counseling teacher when he was in senior high school due to his sexual orientation. My first encounter with Davi coincided with my first experience of taking a multicultural counseling class. The narrative highlights my complexities experience and dilemma of addressing sensitive topics such as sexual orientation within the context of Indonesian society, where these issues remain particularly taboo. Through reflection on Davi's experience and my own awareness of the potential harm, the article emphasizes the importance of self-awareness for guidance and counseling teacher. It argues that counselors must recognize their own biases, values, and beliefs to provide respectful, unbiased, and effective support to students. Therefore, being aware of and acknowledging their own values, morals, and beliefs is a vital skills for professional counselors. The article advocates for the need for professional counselors to engage in continuous self-reflection to ensure that their personal views do not interfere with the provision of ethical and inclusive counseling services. Because every individual has the right to be respected, treated with respect and to have the opportunity to obtain quality professional guidance and counseling services.*

Keywords: Guidance and counseling, Biases, Ethic code, School counselor, autoethnography

1. Introduction

Counseling practices in Indonesia face multifaceted challenges, particularly regarding LGBTQ+ individuals. As guidance and counseling teacher, I am keenly aware of the impact societal norms can have on counseling process. This paper uses autoethnography to explore my journey and biases through my experience encounter with Davi, a pseudonym homosexual who had a marred counseling experience by discrimination. By integrating personal narrative with ethical framework, I am to highlight the importance of self-awareness in counseling practice.

Professional counseling codes of ethics are strongly based on the moral principles of autonomy, beneficence, non-maleficence, justice, fidelity, and veracity. Sperry (2007) described non-maleficence as “the most fundamental ethical value across all helping professions”. It means that as a counselor we don't harm our clients, both intentionally and unintentionally. Incompetence in working with a particular client or population may be a form of causing harm to clients (Meara et al., 1996). The way therapists deal with clients' values can raise ethical issues. Richards, Rector, and Tjeltveit (1999) do not think therapists should attempt to teach clients specific moral rules and values because doing so violates clients' autonomy and prevents them from making their own choices.

Counseling is a profession involving intimate relationship between counselor and their clients. So as we begin working with our clients, we will gain detail information of their behavior and the way they view life. Some clients may have very similar beliefs to mine, and others may have beliefs that polar opposites. Knowing my values, my unresolved issues is very critical to develop my self awareness as an ethical professional. Because counselor must be self-aware and fully understand their own moral, values, and beliefs before they are able to avoid imposing their values onto clients. Practitioners who counsel person in diverse groups without an awareness of their own stereotypical, biases and faulty assumptions can cause harm to their clients (Corey, Corey & Callahan, 2011).

2. Context and Background

The issue of sexual orientation in Indonesia is contentious. The stigma attached to LGBTQ+ identities often leads to discrimination and emotional distress for individuals navigating their identities. I draw upon my memories of my encounter with Davi (Creswell & Creswell, 2018), to “explores multiple layers of consciousness, connecting the personal story to a wider lens of cultural understanding” (Barley & Southcott, 2019, p.2609). As an educator, it is essential to understand the cultural landscape while also upholding ethical standards that promote respect and inclusion. Autoethnography recognizes self-experience as a valuable and worthy of examination social phenomenon (Edwards, 2020). The autoethnography organically allows me to denote some personal and emotional truth from my lived experience (Bochner & Ellis, 2016), and this truth emerges as the “epiphany or epiphanous moment” (Barley, 2020a, 2020b; Barley & Southcott, 2019, p. 2610). I use autoethnography with narrative reflective to raise my awareness regarding LGBTQ+ issues as “autoethnography also yields greater awareness of the fundamental relationship between “self” and “other/s”, including how that relationship is constructed

and mediated in the context of formal, non-formal and informal learning, and how that relationship can help to facilitate, and/or to impede, educationally oriented goals such as the formation of informed citizens and the growth of peaceful communities” (Anteliz, E.A., Mulligan D.L., & Danaher, P. A., 2023). Within autoethnography, I found my epiphanic moments (Barley, 2020a) when I come “to understand the world and to know myself within the world” (p.494).

3. Encounter with Davi

My initial meeting with Davi occurred during my multicultural class, a pivotal moment that prompted me to reflect on boarder issues. It was facilitating by a non-governmental organization that works on health issues focusing on men with risky sexual behavior. I had an assignment for my multicultural class to interview a different cultural background with me in order to raise my multicultural awareness, in this case I had to interview a homosexual individual. Davi shared his experiences as a homosexual, including his experience of mistreatment from his guidance and counseling teacher when he was in high school. His story resonated with my own concern about the lack of ethical guidance in addressing LGBTQ+ issues within the school system.

Raised and born in a place with limited access to the information about homosexuality made Davi feel lonely. Davi tried hard to suppress his sexual attraction to men. He went to an Islamic boarding school pushed by his parents in order to isolate him from homosexual world, although it only lasted for three months. Instead of getting a support system to avoid homosexuality, Davi found homosexual behavior there and decide to leave the boarding school. Davi was fifteen years old when he found and join a homosexual community in Bandung.

At the age of sixteen, Davi began to coming out about his sexual orientation, restricted to his closest friends at senior high school. Davi's experience joining a homosexual community increasing his awareness of his sexual orientation. Unfortunately, his openness to his friends turned out to have long consequences. One of her friends complained about Davi's sexual orientation to his guidance and counseling teacher. His guidance and counseling teacher invited Davi to his workspace. Davi got molested, the teacher asked Davi to take off all his clothes. Davi, who had no bargaining position at all, could only obey being treated like that. Years later, Davi realized that what the teacher did to Davi was a form of sexual harassment.

4. Self Reflection and Awareness

Corey, Corey & Callahan (2011) stated that “Practitioners who counsel persons in diverse groups without an awareness of their own stereotypical beliefs, cultural biases, and faulty assumptions can cause harm to their clients” As a counselor, I may think I am not culturally biased, yet may continue to hold stereotypical beliefs and cultural biases that could affect my practice. I wasn't aware of my biases until I took a multicultural counseling class and faces of my subtle and judgmental beliefs about LGBTQ. I was born and raised as a moslem, and I was taught that gay isn't something we can accept in our religious way. So, when Davi tell his story about homosexual community he found when he was in the Islamic boarding school, I tremblingly respond it with subtle judgmental way.

Davi: My parents sent me to the Islamic boarding school in order to isolate me from my homosexual world, they want me to be cured.

Me: As if you have disease to be cured.

Davi: oh ya. They pretend they know nothing about my sexual orientation but sending me to Islamic boarding school is the answer of their beliefs that I'm a sinner. You know what? Despite being “normal”, I found a homosexual community hidden in that boarding school.

Me: Seriously?

Davi: I know, bitter truth right?

I may offended him unintentionally with my respond: seriously? When he explained about his experience. As if I didn't believe what he said. In fact, it hit me hard when I face the truth that my religion institution has unrevealed story about homosexual activity. There's also a bitter false assumption when I asked him what is his future plan for his life. He repeatedly said “I want to be a good guy”. I confronted that many times what he means by being good, as if I need the concrete definition of being good. I didn't realized that simple word isn't simple at all for him. Being good without any judgmental opinion from others is hard. He may not be good enough for others because of his sexual orientation, he may have a stigma from society because of his sexual orientation. I often hear people commenting about homosexual by saying: He is good, but he is homosexual.

When Davi shared his experience molested by his guidance and counseling teacher, I feel a shame. This was my epiphany moment. I come to the point where I realized that as a guidance and counseling teacher, I have a great power to oppress my students (intentionally or unintentionally). I may suggest them to do something they don't want to, even if it's not something dangerous for them. For example, if I ask my student to help me bring my bag in my classroom they probably will obey me without hesitation. My beliefs change as this experience triggered the epiphanic change (Barley & Southcott, 2019; Yacek & Gary, 2020). I have to carefully deliver my words whenever doing counseling session since it may have a subtle message that may harm my students unintentionally.

As I navigated Davi's situation, I was reminded of ASCA (American School Counselor Association) code of ethics and ABKIN (Indonesia Guidance and Counseling Association) code of ethics, which emphasized the needs for counselor to provide a safe and respectful environment for all students. A professional school counselor is the primary mental health supporter of all students on his/her campus. Additionally, professional school counselors have an ethical responsibility to abide by the following five tenets as listed in the preamble of the ASCA Code of Ethics (2010):

Each person has the right to be respected, be treated with dignity and have access to a comprehensive school counselor program that advocates for and affirms all students from diverse populations including: ethnic and racial identity, age, economic status, abilities or disabilities, language, immigration status, sexual orientation, gender, gender identity or expression, family type, religious or spiritual identity and appearance.

Working with lesbian, gay, and bisexual individuals presents a challenge to counselors who hold strong personal values regarding sexual orientation (Corey, Corey, & Callahan, 2011). Negative personal reactions, limited empathy, and lack of understanding are common characteristics in therapists who work with LGB clients (Schreier et al., 2005). As I reflective to my conversation with Davi, I know my value as a moslem and heterosexual may appear in counseling room with homosexual clients, so I will carefully pay attention to the clients' problems that need to addresses. Only if they problem are having ambivalence about their sexual orientation, then their sexual orientation will be discuss in the counseling room.

5. Ethical Consideration in Counseling

As guidance and counseling teacher in Indonesia, I obey the ethics code of ABKIN, and it is stated in the preamble of ethics code of ABKIN that:

the core values of guidance and counseling are 1) enhancing the achievement of human development tasks throughout the life span; 2) respecting diversity and using a multicultural approach to support the value, dignity, potential, and uniqueness of each individual in their social and cultural context; 3) promoting social justice through advocacy services; 4) maintaining personal integrity in the counselor-client relationship; and 5) practicing guidance and counseling services in a competent manner and based on ethical behavior (ABKIN, 2010).

The introduction also states that "one of the basic principles of professionalism is that every individual has the right to be valued, treated with respect and have the opportunity to obtain quality guidance and counseling services in a professional manner" (ABKIN, 2010), and also "counselors are aware of and respect their clients as individuals with their personal rights and multicultural conditions".

Counselors may not agree with the values of their clients, but they must respect the right of their clients to hold a different set of values. Counselors must aware of their power, and imposing their value to clients is also apart of power abused. Understanding myself or becoming clear about self-awareness is critical in developing myself as a competent and ethical counselor. In order to raise my awareness or challenge my biases, I use self-inventory from Corey, corey & Callahan (2011) to clarifying my values and how it may influence my practice. This help me understand what I feel prior and after I encounter with Davi regarding homosexual issues.

Directions: For each statement, indicate the response that most closely identifies your beliefs and attitudes. Use the following code:

5 = I *strongly agree* with this statement.

4 = I *agree* with this statement.

3 = I am *undecided* about this statement.

2 = I *disagree* with this statement.

1 = I *strongly disagree* with this statement.

Tabel 1. Self-Inventory

No	Statements	Respons
1	Well-trained, sensitive, and self-aware therapists who do not impose their own values on clients are better qualified to be multicultural counselors.	
2	To counsel effectively, I must be of the same ethnic background as my client.	
3	Basically, all counseling interventions are multicultural	
4	I must challenge cultural stereotypes when they become obvious in counseling situations	
5	Contemporary counseling theories can be applied to people from all cultures	
6	With the current emphasis on multiculturalism, counselors are vulnerable to overcorrecting for a perceived imbalance when addressing cultural differences.	
7	I will be able to examine my behavior and attitudes to determine the degree to which cultural bias influences the interventions I make with clients.	
8	Special guidelines are needed for counseling members of ethnic or racial minority groups.	
9	The codes of ethics of most professional organizations contain culturally biased assumptions	
10	The primary function of majority-group counselors is to alert their clients to the choices available to them	
11	An effective mental health practitioner facilitates assimilation of the minority client into society	
12	Ethical practice requires that counselors become familiar with the value systems of diverse cultural	

	groups	
13	I would have no trouble working with someone from a culture very different from mine because we would be more alike than different.	
14	If I just listen to my clients, I will know all I need to know about their cultural background	
15	Client resistance is typically encountered in multicultural counseling and must be resolved before changes can take place.	
16	The ability to observe and understand nonverbal communication is an important component of multicultural counseling.	
17	Establishing a trusting relationship is more difficult when the counselor and the client come from different cultures.	
18	Unless practitioners have been educated about cultural differences, they cannot determine their competency to work with diverse populations.	
19	As a condition for licensure, all counselors should have specialized training and supervised experience in multicultural counseling.	
20	At this point in my educational career, I feel well prepared to counsel culturally diverse client populations.	
21	To be considered competent, I think all mental health professionals need to appreciate the ways that diversity influences the client–counselor relationship and the counseling process itself	
22	A Christian counselor should refer gay, lesbian, and bisexual clients to another professional	
23	Gay and lesbian clients are best served by gay and lesbian counselors	
24	I would have difficulty counseling either a lesbian or gay couple who wanted support in adopting a child	
25	As a mental health practitioner, it is my ethical responsibility to learn about referral resources for gay, lesbian, and bisexual clients and to make appropriate referrals if clients request them.	

6. Conclusion

Our cultural experiences, values, and assumptions are the basis of our worldview and possible biases, so it is important to be aware of how they may influence our practices. I believe that self reflection and self evaluation are critical component of developing into a counselor with self-awareness. Awareness require reflection and understanding. Once counselors are self-aware, they are able to take action. This autoethnography exploration has underscored the complexities of counseling within Indonesia's LGBTQ+ context. The awareness of our values an biases will keep us on the track, treating our clients with respect regardless their cultural background. Every students deserve our respect and the same opportunity to receive quality guidance and counseling. By continuously engaging with ABKIN code of ethics, ASCA code of ethics, and reflecting on my practice, I can actively work toward dismantling biases and creating a supportive atmosphere for all of my students.

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Explore the Relationship between River Density and Language Diversity in Twenty-Three Provinces in Mainland China

Ziru WANG¹, Bojun WANG^{2*}, Yilin HUANG³, Yuhang Liu⁴
^{1,2,3,4}The Education University of Hong Kong, Hong Kong SAR, China
s1137309@s.edu.hk, wwbbjj2018@gmail.com, hyilin111@gmail.com

Abstract: Numerous studies have explored the complex relationship between climatic factors and language diversity. Axelsen and Manrubia (2014) identified a positive correlation between global language diversity and variables such as river density, rainfall, and terrain roughness, supporting the theory that geographical structures influence language patterns. However, Hua et al. (2019) found that when controlling for geographic and phylogenetic non-independence, the relationship between river density and language diversity decreased, though some correlations with river density, elevation range, and landscape roughness persisted. This study examines the relationship between river density and language diversity across 23 provinces in mainland China, excluding autonomous regions, municipalities, and special administrative regions. Data were collected from 92 locations, with four cities randomly selected from each province. Language diversity was measured using the number of dialects documented in the Language Atlas of China, while river density was calculated using GIS software. The results indicate a weak negative correlation between river density and language diversity, with a correlation coefficient of -0.3135. This suggests that river systems may not play a significant role in shaping language diversity within these regions. Instead, historical, cultural, political, and social factors appear to have a more substantial influence. These findings provide essential implications for policy development aimed at preserving language diversity, highlighting the need to focus on socio-political and cultural dimensions rather than purely environmental factors.

Keywords: River density, Language diversity, Relationship, Well-being

1. Introduction

Numerous studies focus on the complex relationship between regional climatic factors and language diversity. Axelsen and Manrubia (2014) demonstrated a positive correlation between global language diversity and river density, average rainfall, and terrain roughness, implying a crucial relationship between dense river systems and great language diversity. This result supports the theory that geographical structures affect social and language patterns. However, succeeding research by Hua et al. (2019) introduced subtleties to these findings. While initially duplicating the results of Axelsen and Manrubia, Hua et al. (2019) discovered that when geographical and phylogenetic non-independence across grid cells are considered, significant connections between river density, landscape roughness, and language diversity disappear. However, they ultimately concluded that there were correlations between language diversity and river density, elevation range, and landscape roughness, although these landscape factors had a far lesser impact on language diversity than climate variables.

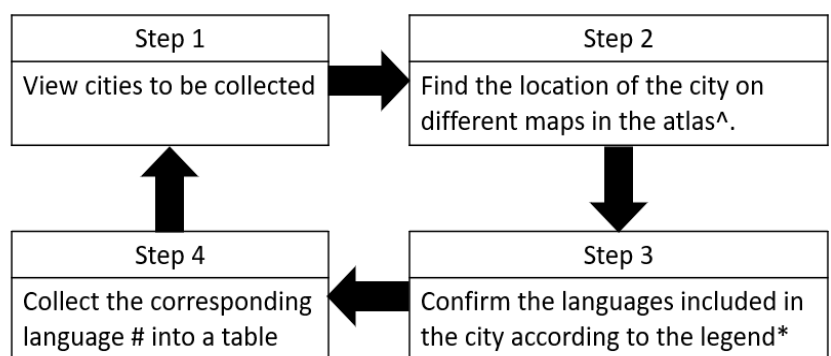
In the context of mainland China, research explicitly resolving the connection between river density and language variety throughout the twenty-three provinces needs to be improved. The difference is significant considering the wide geographic range and rich language diversity of China. Filling this gap may assist scholars in getting a better knowledge of the environment's impact on language diversity, as well as providing information on how river systems influence regional cultural and language development. The research concentrates on whether there is a connection between river density and language diversity in mainland China, the degree of this relationship and the factors influencing it. This research aims to bridge a critical knowledge gap by laying the groundwork for policies that promote language diversity preservation and sustainable development in the face of geographical and environmental challenges. In the following, the report will introduce the research methodology, research results and analyse the factors behind the study results.

2. Research Methodology and Result

The main methodology used in this study was quantitative research. A total of 92 data points were gathered from 23 provinces in China, excluding autonomous regions, municipalities, and special administrative regions (Appendix 1). From each province, 4 cities were randomly chosen. The formula for calculating the correlation between the number of languages and the density of rivers is as follows:

Correlation Coefficient = The Number of Languages / River Density

The River Density was calculated directly from the data of previous researchers (Peng et al., 2022). The statistical method for counting the number of languages (Figure 1) and the data graph (Figure 2) are presented as follows.

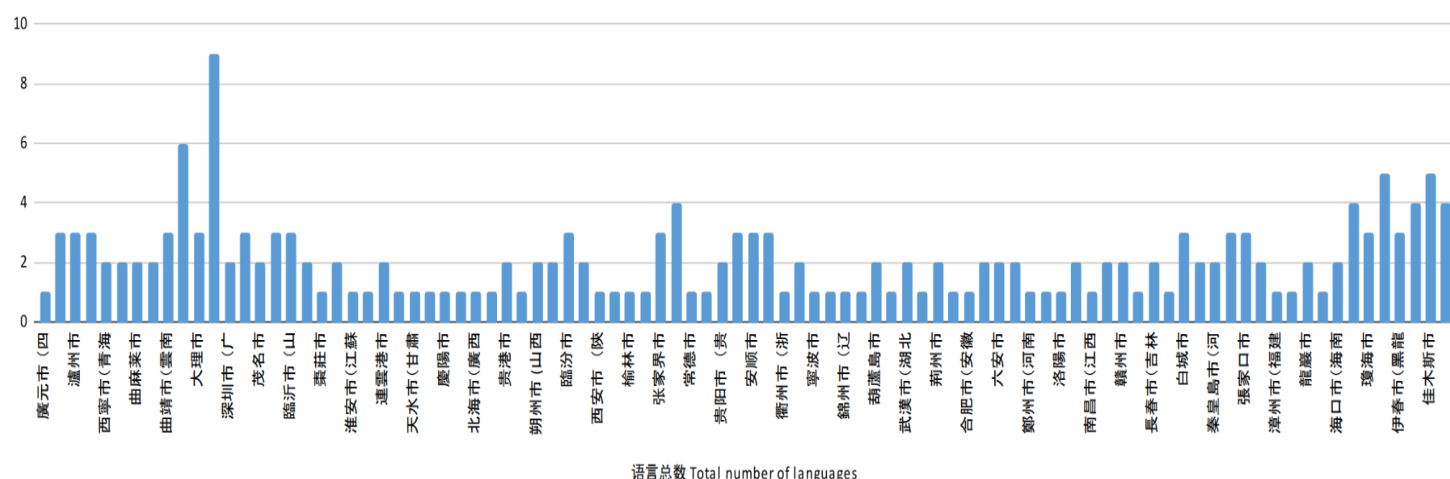


^ 《Language Atlas of China (Han Languages Volume), 2nd Edition》 & 《Language Atlas of China (Minority Languages Volume), 2nd Edition》
 * This legend refers to the color coding of languages in the atlas.
 # Including Chinese and minority languages.

Figure 1. Steps Chart for Counting The Number of Language.

Figure 2. Histogram of The Number of Language.

语言总数 Total number of languages的直方图



The findings of this research are significant due to the presence of a reported negative correlation (-0.3135). This can be observed from the decreasing trend in the scatter plot (Figure 3) below. This diverges significantly from the prior research and discourse.

Figure 3. Scatter Plot of The Number of Language

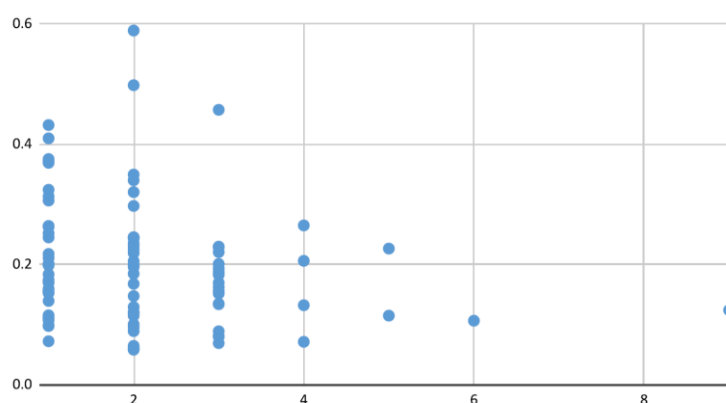


Table 1. Correlation Coefficient Correspondence Table. (Asuero et al., 2006)

Numerical Value	Result
1	Positive Correlation
0	None Correlation
-1	Negative Correlation

While the calculation itself is not challenging, we encountered multiple erroneous experiences in earlier times. Initially, we could not locate specific data regarding river density (river density = the length of river flowing through the city / the area of the city). We intended to calculate river density by dividing the number of rivers by the total river length. Therefore, significant efforts were dedicated to collecting data on river basin areas exceeding 1 km² (as illustrated in Table 2) to quantify the number of rivers in the sample cities. During this process, we explored the utilization of relevant river websites and local chronicles to gather river data for the sample cities, but this approach was ultimately abandoned due to concerns regarding the reliability of the data sources. We then opted to employ the credible 《Encyclopedia River And Lakes in China (10 volumes)》 as the primary data source for our collection efforts.

Additionally, we compiled the total river length of the identified rivers. However, we overlooked a critical factor - the total river length did not necessarily correspond to the length flowing through the sample cities. Consequently, the correlation we had calculated initially proved to be irrelevant due to the flawed data. Yet, we continued exploring alternative methods, such as grid-based analyses of river distribution maps, without a direct data source until the current dataset was obtained.

Table 2. River Integration Icon.

Region (City) 市區（中國省份）	River name 河流名称
廣元市（四川省）	清江河（2.846）
攀枝花市	新莊河（1.24）、雅礱江（128.444）
瀘州市	永寧河（3.21）、沱江（27.86）
宜賓市	岷江（140）、越溪河（2.63）
西寧市（青海省）	湟水（32.863）、米兰河（5.791）、沙塘川河（3.371）、大夏河（7.152）
格爾木市	格爾木河（7.527）、那棱格勒河（26）、沱沱河（17）、楚玛尔河（20.8）、當曲河（4.123）
曲麻萊市	卡日曲（3.126）、邹玛曲（2.186）、楚玛尔河（20.8）
玛多市	多曲（6.085） 邹玛曲（2.186） 勒那曲（2.218） 多钦安科朗河（2.236） 热曲（5.450） 黑河（14） 东曲（30.219） 优尔曲（4.123）
曲靖市（雲南省）	甸溪河、珠江、西江、黃泥河、九龍河、北盤江、亦那河、拖長江、可渡河
文山市	郁江、西洋江、那馬河、穀拉河、北門河、大樑子河、八布河、南利河、扒河、南溪河、盤龍江、小河底河
大理市	黑惠江、西洱河、元江、李仙江、直立河、永平河、順鼻河
普洱市	威遠江、普文河、李仙江、猛野江、洒南江、南廠河、阿墨江、普洱大河、南班河
深圳市（广东省）	淡水河、石馬河、珠江三角洲
韶關市	南水、滄江、新豐江、墨江、錦江、武水、長樂水
茂名市	羅定江、九州江、梅江、袂花江、羅江、鑒江
清遠市	鳳崗河、濱江、滘江、長樂水、煙嶺河、連江、青蓮水
臨沂市（山東省）	邳蒼分洪道、沂河、東汶河、沭河、新沭河、沭河、濰河、渠河
泰安市	泗河、洸府河、大汶河、瀛汶河、柴汶河、匯河
棗莊市	中運河、韓莊運河
日照市	濰河、博瞳河

3. Reasons for Irrelevance of Conclusions

The significance of investigating the reason for the lack of correlation between river density and language will then be demonstrated, and the variables that impacted the outcomes of our experiment will be discussed.

Firstly, the data sites surveyed in this group are mainly located in the official language area, which covers a wide area (Table 3). This lack of linguistic diversity also contributes to its low correlation with river density. In the history of the development of the Chinese language and population diffusion, the formation and diffusion of the dominant language is closely related to geographical, cultural, political, and social factors. For example, LI Nan (2015) mentioned that the number of immigrants increases due to reduced cultural differences. This result remains robust even when controlling for the effects of other factors such as economics and geography.

Table 3. River Integration Icon.

Region (City) 市區（中國省份）	Language 語言
臨沂市（山東省）	冀魯官話、中原官話、膠遼官話
泰安市	冀魯官話、中原官話
棗莊市	中原官話
日照市	冀魯官話、膠遼官話
淮安市（江蘇省）	江淮官話
徐州市	中原官話
連雲港市	江淮官話、中原官話
揚州市	江淮官話
天水市（甘肅省）	中原官話
隴南市	中原官話
慶陽市	中原官話
張掖市	蘭銀官話
北海市（廣西壯族自治區）	粵語
防城港市	粵語
貴港市	粵語、客家話
来宾市	西南官話
朔州市（山西省）	晉語（大包片、五台片）、漢語官話
長治市	晉語（上党片）、漢語官話
臨汾市	晉語（興隰小片）、中原官話（平陽小片、絳州小片、解州小片、平陽小片）、漢語官話
太原市	晉語（并州片）、漢語官話

Secondly, by analysing the survey data from the official language areas, the group found that the correlation between the proliferation of official languages and river density is insignificant. The pattern of historical language diffusion can illustrate this phenomenon. In ancient times, rivers, as essential corridors for transport and economy, played an important role in forming and preserving local dialects, such as the Wu Taihu Piece and other dialects spoken in the Taihu Lake basin of Zhejiang Province (Ramsey, 1987). However, in the case of the official language, its dissemination was more dependent on political impetus or population movement in different historical periods. In ancient China, rivers connected different regions when transportation was inconvenient (Ramsey, 1987). However, the spread of the official language depended more on the intervention of language policies of the ruling class or the promotion of administrative organisations.

This is reflected in the use of a uniform language in the bureaucracy, which further strengthens the status of the official language as a lingua franca rather than relying on the natural diffusion of natural geographic paths (Bryan, 1929). Therefore, rivers may only be complementary in the less linguistically diverse official language areas.

However, the river was not a hindrance but a facilitator in spreading the official language. Researchers have found that rivers are significant providers of water and food, and they also provide safety and transit, which can help mitigate the isolation caused by challenging terrains (Axelsen & Manrubia, 2014). River banks generally have flat land in valleys that are good for farming (Bryan, 1929). Therefore, within each of these river basins, it was unavoidable that one or two central cities would develop, forming most ancient counties along the river valleys. For instance, the accompanying diagram depicts the correlation between the river and the urban growth zone (Figure 4).

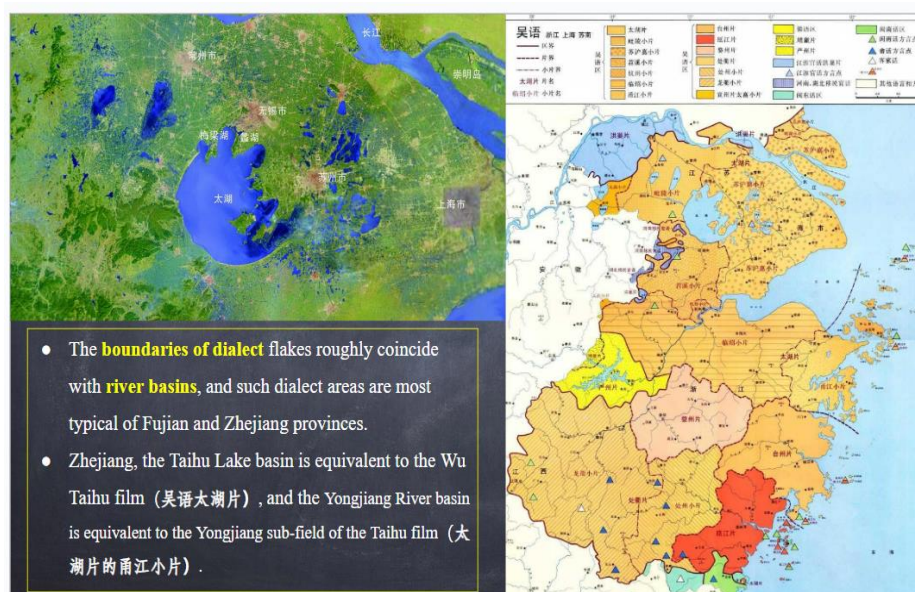


Figure 4. Relationship between rivers and urban areas

4. Conclusion

This study provides a comprehensive evaluation of the correlation between river density and language diversity in 23 provinces in mainland China, challenging previously established associations. The results indicate a weak relationship between river density and language diversity, suggesting that river density may not significantly impact language diversity in the examined regions. The results suggest that the transmission of official languages is mainly shaped by historical, cultural, political, and social factors rather than physical topographical characteristics like river systems. Consequently, these insights offer significant perspectives for policies safeguarding language diversity and promoting sustainable development.

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Appendix 1

Statistical tables of data:

<https://docs.google.com/spreadsheets/d/1YC3WgQRjpfwhXKsZQ-nRu3VFX-YxGq8V/edit?usp=sharing&ouid=105966346233320758398&rtpof=true&sd=true>

Appendix 2

Histogram of The Number of Language:

<https://drive.google.com/file/d/11AEA-1NxAluV5CUhh4aCNvS7mubwm99L/view?usp=sharing>

Appendix 3

Scatter Plot of The Number of Language:

<https://drive.google.com/file/d/11KqK1XZSXhv6O0IsI4kJGpLKbU71qLzR/view?usp=sharing>

Empirical Evidence on a Proposed Ethics Education Framework: A Pilot Run of Specifically Designed Ethical Seminars

Alvin Y.T. WONG^{1*}; Ken C.K. TSANG²; Kent K.K. CHAN³; Michael C.W. WONG⁴; Angelique T.C. CHAU⁵

^{1,2,3,4}College of Professional and Continuing Education, The Hong Kong Polytechnic University, Hong Kong SAR, China
alvin.wong@cpce-polyu.edu.hk, ken.tsang@cpce-polyu.edu.hk, kent.chan@cpce-polyu.edu.hk, m.wong@cpce-polyu.edu.hk, Angelique@hotmail.com.hk

ABSTRACT

An existing literature discussed a preliminary ethics education framework comprising four key dimensions: (i). attitudes, (ii). interpersonal communication, (iii). responsibilities to stakeholders and (iv). Industry codes of ethics and regulations. This study aims to provide empirical evidence on students' perceptions on a pilot run consisting of ethical seminars specifically designed with reference to the proposed framework. Two ethical seminars (part I and II) were conducted at a tertiary education institution in 2021. Ethical seminar (part I) focused topics on (i) individual attributes and (ii) interpersonal relationship, whereas ethical seminar (part II) addressed (iii) responsibilities to stakeholders, and (iv) relevant codes of ethics and regulations, using examples in accounting and finance areas. Participants were invited to complete a questionnaire on voluntary basis, and to indicate their perceptions on the ethical seminar with 5-point Likert scale. In total, 20 and 30 set of questionnaire responses were received in the ethical seminar (part I) and (part II) respectively. Despite the limited sample size, preliminary results showed that the scores for each of the four dimensions of the proposed framework exceeded 4 point (on 5-point Likert scale, with point 5 as the highest level of respondents' rating). Participants indicated that the seminars increased their awareness on the four aspects covered by the framework mentioned above. The pilot results suggest further research on this area.

KEYWORDS

ethics, education, framework

Exploring Effective Content Vehicles for Ethics Education: Dances with Artificial Intelligence and Characters in Classical Literature

Alvin Y.T. WONG^{1*}; Ken C.K. TSANG²; Shun-man LAW³

^{1,2,3}College of Professional and Continuing Education, The Hong Kong Polytechnic University, Hong Kong SAR, China
alvin.wong@cpce-polyu.edu.hk, ken.tsang@cpce-polyu.edu.hk, shunman.law@cpce-polyu.edu.hk

ABSTRACT

This pilot study aims to explore effective content vehicles for ethics education, with focus on two main elements: (i) use of Artificial Intelligence (AI) and (ii) use of characters in classical literature. In this era of AI, students may be keen on content with AI. Besides, participants are familiar with characters in classical literature that may increase participants' interest and level of involvement in the seminar. In 2024, an ethical seminar, with the theme of good teamwork, was conducted in a tertiary education institution in Hong Kong. In this seminar, the teamwork among the characters of a famous classical Chinese literature, "The Journey to the West" was discussed. In addition, participants were invited to share their views anonymously on some questions posted by speakers through a student response system. Then, responses from a ChatGPT-based AI tool to selected questions were obtained for comparison and discussion. A total of 16 participants completed voluntarily a questionnaire about their perception on the use of classical literature and the use of AI in the ethics seminar based on 5-point Likert scale and open-ended questions. In this pilot study, preliminary results show that participants felt positive on the use of AI and classical literature in the seminar. A few participants thought that AI may not be able to fully replace human discussion in ethics education at this stage.

KEYWORDS

ethics, education, AI, literature

Tracing the Pathways to PhD Student Well-being in Hong Kong

Wendan XU^{1*}, Junjun CHEN²

^{1,2}The Education University of Hong Kong, Hong Kong SAR, China
s1130087@s.eduhk.hk, jjchen@eduhk.hk

ABSTRACT

PhD students are essential for the sustainability of the higher education system and make substantial social and economic contributions to the academic community after graduation. A ‘mental health crisis’ for doctoral students appears as they have reported a prevalence of well-being problems six times higher than those of the general population. These trends align with previous studies from various contexts, highlighting this concern's universal nature. Although well-being problems have generally been well-documented, most studies related to PhD students’ well-being have been conducted in Western. Moreover, previous studies are more likely to use a quantitative approach focusing on the linear relations between well-being and the key factors that influence it. This study aimed to explore whether and how various factors influence PhD students’ well-being in Hong Kong using a mixed-method approach. Initially, PhD students (n = 2,220) from eight Hong Kong government-funded universities were recruited. Results revealed various dimensions of the research experience (e.g., resources, school culture, and skills development) had distinctive connections with students’ well-being. Subsequently, 30 doctoral students were divided into ten focus groups to participate in the study's second phase. The research further elucidated how these factors impact PhD student well-being in Hong Kong. This study provides implications for increasing awareness of the factors and mechanisms that support or undermine PhD students’ well-being. It also has functional suggestions for educators and administrators interested in enhancing PhD student well-being.

KEYWORDS

PhD student, well-being, research experience, Hong Kong

The Worked-Related Flow Experience of School Principals in Hong Kong: A Qualitative Approach

Junjun CHEN

The Education University of Hong Kong, Hong Kong SAR, China
jjchen@eduhk.hk

ABSTRACT

Principal work-related flow is an underdeveloped topic in the scientific field. This optimal experience is most likely to occur when skills equal challenges and often coincides with episodic creativity and excellent performance. This study aimed to understand how school principals perceived their flow experience in their professional lives using a sample of 24 school principals from Hong Kong. This study used the Self-determination model of flow as the theoretical framework, which is based on the core concept that human beings are inherently proactive and tend to respond actively and master internal and external forces rather than being passively controlled by them. Moreover, thematic analysis was employed to handle the interview data. Thematic analysis is a theoretically flexible method focusing on patterned meaning identified across a qualitative dataset. Participants' experiences of flow experience were coded according to the three dimensions - absorption, work enjoyment, and intrinsic work motivation. A rich data with daily scenario has been found with the interview data. The project will provide empirical insights to advance the knowledge construction of principal flow in the professional lives. Moreover, this project will respond to recent international and local policy initiatives regarding promoting the well-being of the school principal at work.

KEYWORDS

School principal, work-related flow, qualitative method

Undergraduate students' mathematical well-being in China: A pilot study

Qiaoping ZHANG¹, Haomin FANG^{2*}

^{1,2}Department of Mathematics and Information Technology, The Education University of Hong Kong, Hong Kong SAR, China

zqiaoping@eduhk.hk., hfang@eduhk.hk

ABSTRACT

Undergraduate students often struggle with high failure rates and the complexity of learning content in mathematics courses, which makes students fear. Fear of mathematics may lead students to avoid elective courses that involve substantial mathematical content, limiting their academic growth and preventing them from pursuing STEM-related careers. This study investigates Chinese undergraduates' mathematical well-being (MWB) using a validated student well-being scale and examines how students' MWB predicts their interest in pursuing STEM careers. A total of 506 undergraduate students from diverse majors in Mainland China participated in a questionnaire survey conducted through convenience sampling. The findings revealed undergraduate students' MWB is reflected in five factors, namely: having, being, relating, feeling and striving. These factors encompass external mathematical learning assets that students can acquire and utilize, as well as their perceptions and pursuits of these assets. Linear regression analysis indicates that mathematical well-being, both at the individual factor level and collectively, exert a positive influence on fostering interest in STEM careers, particularly in undergraduates' feeling and striving. The overall linear regression model further suggests that while MWB has a moderate impact on undergraduates' STEM career interests, it is not the sole determinant. The results offer theoretical insights for enhancing college mathematics education.

KEYWORDS

Mathematical well-being, STEM, STEM career interests, undergraduate students

Enhancing Digital Citizenship with Scenario-Based Learning

Pakho HUANG^{1*}, Theresa KWONG^{2*}, Grace NG³, Crusher WONG⁴

^{1,2,3,4}Centre for Holistic Teaching and Learning, Hong Kong Baptist University, Hong Kong SAR, China
pakhowong@hkbu.edu.hk, theresa@hkbu.edu.hk, msgng@hkbu.edu.hk, crusherwong@hkbu.edu.hk

ABSTRACT

Challenges related to academic integrity and responsible online behaviour become more prevalent with the advent of generative AI. This initiative aims to foster digital citizenship among students by using augmented reality (AR) to create engaging learning experiences that address challenges related to academic integrity and responsible online behaviour. This scenario-based learning approach aligns with the Digital Citizenship Framework, helping students understand the responsibilities of their digital actions. Quantitative and qualitative data on student engagement and improvements in decision-making skills will be shared. The implications of integrating technology in higher education and the importance of promoting a culture of digital citizenship in academic settings will be discussed. Educators and stakeholders are invited to explore the adoption of similar approaches for digital citizenship education.

KEYWORDS

Academic Integrity, Generative AI, Digital Citizenship, Augmented Reality (AR), Scenario-based Learning

The Impact of Asian Cultural Norms on Asian Female Teachers' Emotional Wellbeing and Resilience

Soojeong LEE¹, Ji HONG^{2*}, Yijia CHEN³, Jing ZHAO⁴, & Dionne CROSS FRANCIS⁵
^{1,2,3,4}University of Arizona, U.S.

⁵University of North Carolina – Chapel Hill, U.S.

sjlee23@arizona.edu, jihong@arizona.edu, yijiachen@arizona.edu, jingzhao1@arizona.edu, dicross@unc.edu

Abstract: *The lack of teacher diversity in U.S. K-12 schools emphasizes a critical need to explore the experience of teachers from underrepresented groups. This research focuses on Asian female teachers, who are often underrepresented and misunderstood because of their cultural backgrounds. These teachers experience unique challenges due to their racial, gender, and cultural identities, which significantly influence their emotional wellbeing and resilience as a teacher within U.S. K-12 school contexts. Therefore, the research examines how familial and Asian cultural norms influence the emotional wellbeing and resilience of Asian female teachers. Using a qualitative research design, semi-structured interviews were conducted with 3 Asian female teachers, each lasting between approximately 45 to 90 minutes. Data analysis focused on themes related to Asian cultural norms, emotional wellbeing, and resilience. Findings reveal that they face high expectations and pressures from their families and Asian cultural norms. These experiences affect their anxiety and perfectionism but foster resilience and motivation as a teacher. This study underscores the importance of understanding the cultural experiences of Asian female teachers to develop more inclusive and supportive school environments. These findings contribute to improving teacher diversity and promoting equity in education.*

Keywords: Asian Female Teachers, Asian Cultural Norms, Emotional Wellbeing, Resilience

1. Introduction

1.1. Background of Study

According to data from the National Center for Education Statistics (NCES) (2024), students of color are anticipated to make up 56% of the total K-12 public-school population in the U.S. by 2031. However, during the 2020-2021 school year, 80% of K-12 public-school teachers in the U.S. were White (NCES, 2023). Increasing racial and ethnic diversity among teachers offers many benefits, such as providing role models for students of color, promoting cultural awareness in schools, and ensuring that students of color benefit from well-qualified teachers (Ingersoll et al., 2022). In this context, White teachers may find it difficult to understand the experiences of students of color. Moreover, the lack of diversity within the teaching profession often results in limited awareness of the challenges faced by teachers of color. The experiences of teachers of color are frequently marginalized and often not fully understood. Therefore, it is a clear necessity to enhance the representation of teachers of color to foster a more inclusive educational environment. Understanding the impact of their backgrounds on their emotional wellbeing and resilience contributes to a more equitable and culturally responsive educational landscape. These insights serve as a foundation for creating supportive school environments that value diversity, equity, and inclusion. Especially, this study focuses on Asian female teachers. In the school year 2020-2021, Asian teachers were 2.4% of all K-12 public school teachers (NCES, 2023). While Asians are classified as part of minority groups in the U.S., they remain underrepresented within these categories. The experiences of Asian individuals are often overlooked, and they may struggle to engage fully due to pervasive stereotypes that associate Asian people with exceptional academic performance. Furthermore, even though the education sector is predominantly composed of women, they continue to face instances of sexism.

Asian female teachers often face self-pressure, high expectations, and a pursuit of perfection from their families and Asian cultural norms within U.S. culture (Gordon, 2000). These pressures arise from both their race and gender identities and their unique cultural backgrounds, which shape their emotional wellbeing and resilience in their role as a teacher in the U.S. Subjective wellbeing, as defined by the OECD (2013), refers to “Good mental states, including all of the various evaluations, positive and negative, that people make of their lives, and the affective reactions of people to their experiences.” This concept consists of three key components: Life evaluation, Affect, and Eudaimonia (psychological “flourishing”). Among these, ‘Affect’ refers to feelings of person or emotional states, capturing how people experience life. ‘Affect’ encompasses both positive affect that related to the positive emotions such as happiness, joy, and contentment) and negative affect that includes negative emotions such as sadness, anger, fear and anxiety. It is noteworthy that teacher emotions are shaped by the surrounding environment, which is linked to a variety of social and cultural norms (Author et al., 2012; Badia et al., 2017). In this context, Emotional wellbeing of teachers plays an important role in supporting teachers’ psychological well-being, professional development, cognition, motivation, and their ability of educational change (Author et al., 2012; Badia et al., 2014; Trigwell, 2012). They also significantly influence the quality and effectiveness of classroom instruction, work performance, and relationships with students (Author et al., 2012; Badia et al., 2014; Trigwell, 2012). It is noteworthy that teacher emotions are

shaped by the surrounding environment, which is linked to a variety of social and cultural norms (Author et al., 2012; Badia et al., 2017). Resilience is defined as the capacity to recover from difficulties and adapt to change, which is essential for teachers to maintain their personal well-being, teaching effectiveness, job satisfaction, and retention in the profession (Gu & Day, 2013; Mansfield et al., 2016). Resilience is considered a complex and multi-dimensional concept that encompasses capacity, process, adaptation, and outcome, with these dimensions deeply intertwined (Fraser et al., 1999; Mansfield, 2020). Research has shown that teachers with strong resilience are better equipped to manage stress, sustain their motivation, and maintain a positive outlook in the face of adversity (Bobek, 2002; Castro et al., 2010). For instance, resilient teachers are more likely to employ creative problem-solving strategies to overcome difficulties or engage in effective classroom management techniques that foster a productive learning environment (Le Cornu, 2009). As a result, they can build stronger relationships with students, which enhances student engagement and academic achievement (Mansfield et al., 2016). Therefore, given the significance of emotional wellbeing and resilience, this study aims to explore how Asian female teachers' families and Asian cultural norms impact their emotional wellbeing and resilience in the classroom.

1.2. Research Purpose

This study addresses a critical gap in educational research, highlighting a group often overlooked among marginalized teachers. By focusing on their unique experiences, this study examines how their families and Asian cultural norms influence the emotional wellbeing and resilience of Asian female teachers. This research fosters a deeper understanding of Asian female teachers' experiences from their racial and cultural backgrounds. The findings offer valuable insights into Asian female teachers in the U.S. K-12 schools. This research aims to make a significant contribution to the field of education by addressing the underrepresentation of Asian female teachers, advocating for equity, and driving meaningful changes in school policies and environments.

1.3. Research Question

In what ways do familial and cultural norms of Asian female teachers impact their emotional wellbeing and resilience?

2. Methodology

2.1. Research Design & Data Source

This study used a basic qualitative design, specifically an interview design, to gain an in-depth understanding of the experiences of Asian female teachers in school (Creswell & Poth, 2017). Data was collected through semi-structured online interviews lasting approximately 85 minutes for Clara, 45 minutes for Kaya, 88 minutes for Lia. The interview questions focused on four main categories: individual backgrounds and school contexts, cultural contexts, emotional wellbeing, and resilience. Sample questions include "How you think your racial background impacts your emotions as a teacher?", "How do you think the idea of your future ideal self as a teacher is impacted by your racial background?", and "How do you think your resilience as a teacher is impacted by your racial background?".

2.2. Participants

Participants were recruited using snowball and criterion sampling. Snowball sampling is a method that involves asking well-connected individuals for referrals, which can be especially effective since Asian female teachers are likely to have professional connections. In addition, criterion sampling focuses on selecting cases that meet specific criteria. Since Asian female teachers meet specific criteria such as race (Asian) and gender (female), they represent an ideal group for this approach (Creswell & Poth, 2017). Recruitment involved distributing flyers to teacher organizations, schools, publicly accessible locations, and social media groups where Asian female K-12 teachers in the U.S. are active. We also sent targeted recruitment emails and encouraged referrals from participants.

This study includes 3 Asian female teachers: Clara, Kaya, and Lia. Clara identified herself as a Korean-American and female. She teaches fourth grade at a suburban school where middle to higher income families are predominant. The school primarily consists of White teachers and White students. Kaya identified herself as a Korean-American and female. She works at an elementary school in a middle to lower income community. The school primarily consists of White teachers and White students. Lia identified herself as a Hawaiian, Chinese, German, Irish, Norwegian, and Austria and female. She works at an elementary school in a lower income community. The school consists of primarily White teachers, and students of color.

2.3. Data Analysis

After interviews were recorded via Zoom and a recorder, the interviews were transcribed verbatim. The transcripts were segmented and coded according to key concepts related to the interview questions. These codes were grouped to identify primary themes, which were interpreted to understand the influence of contextual factors on their emotional wellbeing and resilience. For data analysis tools, the researcher used qualitative data analysis software, MAXQDA. To ensure the

trustworthiness of the findings, peer debriefing and member checks were employed. Peer debriefing involved sharing data and analysis with colleagues for feedback, while member checks involved returning to participants to verify that the interpretations reflect their experiences.

3. Findings

3.1. Influence of Cultural Norms

The participants experienced high expectations and pressures related to their achievement broadly, with success in schools being central. These expectations can from their families and what they regarded as Asian culture norms. For example, Clara said,

I think that when it came to my schooling, my parents always wanted me, you know, not just to go to school, to go to school, you know, of course, they wanted me to make good grades and do what I was supposed.

Lia also echoed the high academic standards her family holds.

I'm one of my cousins, who is the same age as me is fluent in Spanish, Hindi, Mandarin. And like, he was an EMT in college, and just like, he plays the cello, like, he plays the cello. Like, he does everything. And so like, and my brothers like, they always joke that like, Oh, I'm Lia's the dunce of the family, because I only speak three languages when they speak four to six each. So it's kind of, I don't know that, like our family has specifically placed to on us those expectations and said, like, you're going to do this, we expect this. But I think just that's the culture. And there are very, very high expectations and like being a teacher is not the most. It's not the biggest achievement. And so if I'm going to do it, I want to do it incredibly well. Um, so that's something that I placed on myself too, I think.

Clara and Lia described the exceedingly high expectations that were communicated explicitly within their families that they inferred were endemic of their ethnic group, which they tended to generalize as Asian culture. While achieving high grades and top scores was a priority, it was only one aspect of the overall exceptionality families expected of children. As Clara and Lia communicated, success was also measured through multilingualism and musical prowess. These high expectations which were multifaceted pushed them to excel and motivated them to produce high-quality work, but they also created significant pressure. For example, despite already being a teacher, Lia continually pursued even greater achievements. Similarly, Clara said,

because the expectation growing up is always the highest. And I learned very early on, you know, my mom was a, she, she had a difficult life. I mean, she came here to the United States, she didn't speak any English, she did not have any family. So she always just taught me, you know, keep working hard, you just got to keep working, keep going until you get to whatever that goal is, I definitely learned that from her. And, you know, I think that as a teacher, you have to you have, I mean, you have to have that kind of ideal, because there's never, you're never going to get to the point where you know, everything, and everything's perfect.

In addition to striving to achieve challenging goals, their families also instilled a strong work ethic that motivated them to strive for perfectionism as a teacher. This illustrates how families and their ethnic cultural norms often set high expectations, placing individuals under intense pressure to meet these standards while striving for outstanding achievements.

3.2. The Impact of Cultural Norms on Emotional Wellbeing

The cultural norms the participants described also influenced their emotional wellbeing. Clara said,

Um, I do think I probably have more anxiety because I have that kind of background of having the idea that I have to be perfect and you know, do it all right. And that definitely comes from my cultural background at home. You know, where I grew up in a family that, you know, a B wasn't an A, so, you know, for most families, a B is fine, but my family oh, no, it's all A's or it's, it's not good enough. And so I do think that that plays a part in that. So I probably have anxiety because of that, you know, and that kind of high expectation and pressure that I put on myself.

High expectations and pressure from her cultural background elicited feelings of anxiety. However, Clara also mentioned her family's backgrounds, and some of the positive aspects, specifically their religious traditions that helped her stay positive.

But I think on the flip side, you know, in the way that I grew up, because my parents were very religious, I also kind of have this weird side by side aspect of grace and just you know, you can only do the best that you can do and you know, as long as you're trying that's all you can ask for. So it's kind of this battle between the two. And so I try to always stay positive and you know, know that there are going to be some hard days but you know, not look at one day as dictating everything. Or one moment.

Clara described how her experiences supported a mix of emotions that created somewhat of a balance. Although there were these exceptionally high expectations that created anxiety, she was able to draw on her religious beliefs and give herself grace, which also provided calm.

Kaya noted that her schooling experience as an Asian person influenced how she experiences emotions (e.g., pride, empathy) as an Asian female teacher. Her own racial identity and related experiences, being Asian and not White, she was able to understand what it meant to be "othered" having your own cultural background overlooked. Having not had experience in her own schooling that elicited feelings of pride motivated her to create those experiences for her own students.

I feel like when they connect with something they're more engaged. They want to. They want to learn it. They want to talk about it. Umm, so I definitely think that when we can connect with our students of color and from different cultures that's really important, otherwise they come to school, and.. you know, like me growing up when I went to school, my school was white. My teachers were white, you know. I was one of the only kids of color, and every day was like, Oh, we're learning about white people. Oh, we're learning about white inventors. Oh, we're learning about white composers, and it was always kind of like. What about the rest of the world? So I was always questioning, and I was always kind of annoyed. So I try to remember that and go. Okay. I'm gonna teach about you know an African dance, you know. I try to just keep them engaged...

I like to think so. I like to think that like talking about different cultures and countries. And if kids connect with it. I like to think that they're like, oh, you know, in music class, we might talk about something that I'm familiar with, and I hope that they would feel proud to be, you know, from a different country, or, to speak a different language, versus just trying to simulate into White American culture. I want kids to feel confident in who they are. And if their parents are, you know, immigrants and their 1st generation. That's awesome, like, I don't want kids to feel like they're not American enough. It's like, that's the point of America. We're a melting pot, you know. It comes from all over.

Kaya understood the challenges faced by people of color in U.S. society due to her race and cultural background. This awareness allowed her to empathize with students of color and encouraged them to feel racial pride as they were learning. This demonstrated that even if their families and their ethnic cultural norms created some pressure which elicited negative emotion, their own educational experiences helped shape their understanding of the experiences of other marginalized students. Thus, they were able to facilitate more culturally rich learning experiences engendering positive emotions that enhance their emotional wellbeing as a teacher.

3.3. The Impact of Cultural Norms on Resilience

Their families and cultural backgrounds also impacted their sense of resilience. Clara said,

I do. And, again, I think because in my culture, you know, family is kind of, you know, the center of how I grew up and the importance of family not just being your nuclear family, but kind of the community around you. And everyone kind of looking out and taking care for one another plays a part in that. You know, and I think that when it came to my schooling, my parents always wanted me, you know, not just to go to school, to go to school, you know, of course, they wanted me to make good grades and do what I was supposed to, but to always kind of think about what is it that I want to do you know, what is that end goal, you know To have those goals for myself and understand what you know, that I can achieve those things if I keep working and persevere and, you know, stay determined to get there.

She illustrated the significant ways in which the culture of her family and community influences her approach to work and her ability to persevere in the face of challenges. Her background instills in her a strong work ethic and resilience.

4. Implications

This study highlights the significant impact of familial and cultural norms on the emotional wellbeing and resilience of Asian female teachers in the U.S. K-12 schools. While the teachers broadly referred to this as Asian culture, we hold that Asian communities are not a monolith and consist of multiple ethnic groups whose cultures are multifaceted and complex. To reflect this, we contextualize these findings with respect to the participants' ethnic communities. These teachers experience a complex interplay of cultural expectations and norms, which significantly influence their personal and professional experiences. To improve their personal and professional experiences, there is a combination of individual and systemic efforts. From an individual level, it is essential for teachers to cultivate self-awareness regarding the cultural, social, and professional dynamics within school contexts. By fostering this awareness, teachers can maintain a strong sense of professional identity and exhibit a positive outlook on their roles. At the systemic level, school contexts play a significant role in fostering supportive environments that reduce negative emotions and strengthen resilience by recognizing and valuing cultural differences. Moreover, it is important to create an inclusive environment by improving cultural awareness through teacher training and developing diverse curricula that promote diversity, equity, and inclusion in school context. By integrating these individual and systemic approaches, schools can create an inclusive environment where all teachers feel valued and empowered to embrace their cultural identities, ultimately benefiting the school community.

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Holistic Individualized Coaching: Personalized Learning to Support Mathematics

Teacher Learning and Wellbeing

Dionne CROSS FRANCIS¹, Pavneet KAUR BHARAJ², Boran YU³, Ji HONG⁴, Anna GUSTAVESON⁵

^{1,3,5}University of North Carolina at Chapel Hill, U.S.

²California State University Long Beach, U.S.

⁴University of Arizona, USA

dicross@unc.edu, pavneetkaur.bharaj@csulb.edu, boranyu@unc.edu, jihong@arizona.edu, annagus@unc.edu

ABSTRACT

Personalized learning has become increasingly widespread as an effective approach for advancing learners' cognition, affect, and motivation-related attributes. However, much of the research about the application and effectiveness of personalized learning has been focused on K-16 students and less on teachers. K-16 students typically receive support within digital, adaptive learning environments. However, this format does not effectively facilitate the kind of support teachers typically need. Drawing on the key features of personalized learning designs articulated by Plass and Pawar (2020), we describe a personalized learning approach to teacher learning, called Holistic Individualized Coaching (HIC). HIC is grounded in a theoretical view of identity development as learning, which supports advancing teachers' identifying as mathematics teachers; the calibration of their sense of competence as a teacher and their actual content knowledge and pedagogical skills; and, the development of productive emotions and beliefs related to mathematics teaching. We discuss how seven elementary mathematics teachers' participation in HIC over the course of an academic year influenced positive shifts in the quality of their mathematics instruction, how strongly they identified as mathematics teachers, and their accompanying emotions. The findings highlight the unique identity profiles and identity development trajectories of teachers, highlighting the importance of personalized support for teachers as they learn in the context of professional development. We discuss the suitability of personalized learning models for designing learning environments for teachers that support learning and wellbeing, and describe opportunities for advancing teacher-specific models, in particular HIC, using current technological innovations.

KEYWORDS

Personalized Learning, Instructional Coaching, Professional Development, Holistic Individualized Coaching

中國大學生網路消費信貸逾期調查：以廣東省廣州市為例

A Survey of Online Consumer Credit Overdue among Chinese College Students:

The Case of Guangzhou City, Guangdong Province

李翼飛^{1*}，姚偉梅²

^{1,2} 香港教育大學，香港，中國

s1143419@s.edu.hk, cyu@eduhk.hk

摘要

隨著互聯網資訊技術和金融科技的迅速發展，越來越多的年輕消費者更傾向於選擇便捷的互聯網金融消費信貸產品。由於年輕人錯誤的消費和借貸觀念，導致了逾期還款問題的出現。本研究調查了廣東省廣州市 737 名大學生的網路消費信貸逾期情況和影響因素，結果顯示 43.28% 的大學生有過逾期還款行為，其中有 47.34% 人因無法按時還款造成最終違約。通過卡方檢驗發現性別對逾期還款產生了顯著性差異，且對網路消費信貸產品的選擇偏好存在顯著差異。通過相關性分析發現風險行為控制感知、未來時間視角、感知金融素養、採用負責任的信用行為意願對生活滿意度呈正向相關。通過二元 logistics 回歸分析發現，採用負責任的信用行為意願顯著降低大學生逾期還款情況的發生。

關鍵字

大學生；網路消費信貸；逾期；生活滿意度；採用負責任的信用行為意願

Strand

Education Leadership and Curriculum Development for the Future

未來的教育領導與課程開發

Assessing the Impact of Tutorial Discussions and Textbook Use on Learning Effectiveness in Finance Education

Anson WONG

The Hong Kong Polytechnic University, Hong Kong SAR, China

Anson.wong@polyu.edu.hk

Abstract: *This study investigates the critical relationship between textbook access, student preparation, and academic performance within the context of business finance education. The findings reveal that access to textbooks plays a pivotal role in enhancing learning outcomes. Students who have access to these essential resources engage more deeply with course content, leading to a better understanding of complex financial concepts. Moreover, the research indicates that consistent preparation is closely linked to improved academic results. This suggests a synergistic effect, where the combined influence of textbook availability and student effort leads to greater academic achievement. Effective study practices, such as thorough pre-class preparation and diligent post-class revision, are identified as key components in fostering academic success. The study underscores the importance of ensuring that textbooks are accessible to all students, as well as the need to promote effective study strategies. By addressing barriers to textbook access and encouraging robust preparation habits, educational institutions can significantly enhance the overall learning experience and academic outcomes for their students. Ultimately, this research emphasizes that a holistic approach, combining resource availability with strategic study practices, can empower students to excel in their academic pursuits, particularly in challenging subjects like business finance. This approach not only benefits individual learners but also contributes to a more knowledgeable and skilled workforce.*

Keywords: Business Finance Education, Tutorial Discussion, Textbook Access, Learning Outcomes

1. Introduction

In contemporary education, particularly in specialized fields such as business finance, the interplay between instructional materials and student effort plays a crucial role in shaping academic outcomes. Textbooks have long been recognized as foundational resources in educational settings, providing structured content that aligns with course objectives and enhancing the learning experience. In the context of business finance, where concepts can be complex and multifaceted, the accessibility and utilization of textbooks can significantly influence students' understanding and mastery of the subject matter.

Moreover, the effort students invest in preparing for lectures—through reviewing assigned readings, engaging with supplementary materials, and applying learned concepts—has been shown to correlate positively with academic success. This preparation not only aids in reinforcing understanding but also cultivates critical thinking and analytical skills essential for navigating real-world financial scenarios.

This study aims to investigate the impacts of both textbook use and students' preparatory efforts on their learning achievements in a business finance course. Specifically, it aims to explore whether students who have access to their textbooks and are willing to dedicate time and effort to prepare for class are more likely to influence their academic performance. By examining these factors, the study will contribute to a deeper understanding of how resource accessibility and personal commitment to learning can enhance academic performance, thereby offering valuable insights for educators and curriculum developers in the field of business education.

Textbooks play a crucial role in education by providing a structured framework for the curriculum, guiding students through essential concepts and topics in a logical sequence. This organization helps learners build upon their knowledge progressively, ensuring a comprehensive understanding of the material. By compiling relevant information, theories, and examples, textbooks serve as centralized resources that facilitate deeper engagement with the subject matter. Additionally, they support diverse learning styles through various teaching methods, including visuals and practice questions, which cater to individual student needs. This adaptability promotes equity in education, as all students have access to the same foundational knowledge.

Furthermore, textbooks are invaluable as reference tools, allowing students to review and clarify complex concepts, particularly in intricate subjects like business finance. They encourage independent study habits, enabling students to take responsibility for their learning and reinforcing their understanding beyond the classroom. Many textbooks also align with standardized assessments, improving students' preparedness for exams. By incorporating case studies and problem-solving exercises, textbooks foster critical thinking and analytical skills essential for academic and professional success. Overall, the importance of textbooks in education cannot be overstated, as they significantly enhance the learning experience and contribute to students' academic achievements.

Student preparation plays a pivotal role in academic success by equipping learners with the necessary tools to engage meaningfully with course material. When students invest time and effort in preparing for lectures—such as reviewing previous lessons, completing assigned readings, and organizing their notes—they develop a foundational understanding that enhances

their ability to absorb new information. This proactive engagement not only boosts their confidence in the classroom but also facilitates active participation in discussions and activities, which are critical for deepening comprehension. Moreover, students who regularly prepare for classes are better positioned to connect theoretical concepts to practical applications, reinforcing their learning and retention.

Additionally, effective preparation fosters a sense of responsibility and self-discipline, qualities that are essential for long-term academic achievement. Students who establish consistent study habits and set aside dedicated time for review are more likely to perform well on assessments and achieve higher grades. This preparation also enables them to identify areas where they may need additional help, allowing for timely intervention and support. Ultimately, the effort students put into preparing for their classes not only influences their immediate performance but also cultivates lifelong learning skills, setting the foundation for future educational and professional success.

2. Literature Review and Research Questions

The literature review begins with a discussion on the effectiveness of tutorial discussions in finance education, followed by an examination of the impact of textbook access on learning performance. This structure highlights the interplay between interactive learning methods and resource availability in enhancing student outcomes.

Assessment in finance courses typically includes individual written assignments, exams with multiple-choice questions, calculations, and tutorial discussions (Bhati, 2012). Interactive teaching methods, particularly tutorial discussions, significantly enhance students' understanding of personal finance concepts (Tennyson & Nguyen, 2001) and foster critical thinking skills (Salas-Velasco et al., 2021). Research has shown that tutorial discussions serve as effective assessment tools for interactive learning. Balan's review of the tutorial system at Oxford University highlights its academic rigor compared to traditional lectures, as students prepare written work and engage in discussions with tutors, promoting critical thinking (Balan, 2018). This format encourages students to articulate their opinions rather than merely memorizing information. However, Balan notes that the effectiveness of these discussions can depend on tutors' moderation and peer contributions. Additionally, Serra's introduction of student-led tutorials in engineering classes resulted in significantly higher passing rates, demonstrating the benefits of peer-led discussions where students present solutions to the class (Serra et al., 2023). Such models emphasize active participation and collaborative learning, further enhancing educational outcomes.

In tandem with these interactive methods, textbooks play a crucial role in curriculum reform as primary teaching materials supporting both educators and students in achieving educational objectives. However, their impact on classroom learning depends on effective utilization (Fullan, 2000). Research on textbook use has been ongoing since 1955, with Rezat (2009) noting their importance in educational research. Findings indicate that German secondary school students primarily use textbooks for solving tasks, consolidating knowledge, and exploring interests. Similarly, Weinberg et al. (2012) found that students mainly rely on textbooks for homework and test preparation, yet Sikorski et al. (2002) reported that students often spend less time reading than recommended, averaging only 2.6 hours per week for chemistry when 4.1 hours were suggested.

Further insights reveal that many students read textbooks primarily before tests (70%), but only 27% do so before class discussions (Clump et al., 2004). Sinapuelas (2011) categorized student engagement levels, finding most students fall into the "memorizer" and "programmer" categories, focusing on fragmented knowledge. Zeng (2016) proposed a framework showing that limited in-depth reading and low engagement hinder full textbook utilization. Overall, textbooks significantly influence learning outcomes, consolidating knowledge and affecting students' interests and academic achievements (Son & Diletti, 2017; Wakefield, 2007). Thus, combining effective tutorial discussions with optimal textbook use can create a more enriching educational experience.

Based on the literature reviewed, this study will address the following research questions:

1. How does access to textbooks impact students' learning achievement in business finance?
2. How do students perceive the effectiveness of tutorial discussion in their learning experience?
3. In what ways does the effort students invest in preparing for lectures affect their academic performance?

3. Research Method

The research will adopt a quantitative design utilizing a self-administered questionnaire to collect data from university students enrolled in a business finance course. This survey will feature sections assessing students' perceptions of tutorial and textbook effectiveness and its impact on learning outcomes, alongside evaluations of various assessment methods—such as tutorial-based assessments, midterm tests, individual assignments, and final exams—using a Likert scale. To ensure a comprehensive understanding of their educational experiences, open-ended questions will allow participants to provide qualitative feedback. Data will be gathered through an online survey platform, maintaining anonymity and confidentiality.

4. Results Analysis

The survey results presented in Figure 1 indicate a strong preference for tutorial sessions as the most effective assessment method among students, with 62% selecting it. Individual assignments followed at 17%, while midterms and final exams were

the least favored, receiving 8% and 13%, respectively. This highlights the students' inclination towards interactive and engaging learning experiences that tutorials provide, suggesting that they may enhance understanding and retention of course material more effectively than traditional assessments.

The results presented in Figure 2 indicate that a significant majority of respondents prioritize shorter preparation times, with 52% spending less than one hour and 37% allocating one to two hours for class preparation. Only 12% invest more time, with just 7% spending three to four hours and 5% dedicating over four hours. In terms of post-class revision, Figure 3 shows that 62% spend one to two hours reviewing materials, reflecting a preference for moderate revision periods. Meanwhile, 17% spend less than one hour, while 12% and 10% allocate three to four hours and more than four hours, respectively. Additionally, the perceived helpfulness of these study practices is evident in Figure 4, as 52% find pre-class preparation somewhat helpful and 38% consider it very helpful. Only 10% felt these efforts were ineffective, suggesting that most students recognize the value of preparation and revision in enhancing their understanding of course content.

The survey results presented in Figure 5 reveal a concerning trend regarding access to required textbooks, with 72% of respondents lacking their own copy. Among those with access, only 17% have either a hardcopy or an online version, while 10% rely on borrowing from the library or friends, and just 2% own the textbook. This lack of personal access hinders students' engagement with course content. In terms of usage, Figure 6 shows that only 15% of students use the textbook very frequently, while 23% never use it, 30% use it rarely, and 32% use it occasionally. This indicates that many students either underutilize or avoid the textbook, potentially affecting their understanding. Despite these challenges, Figure 7 indicates a generally positive perception of the textbook, with 58% finding it somewhat helpful and 17% rating it very helpful, though 25% still consider it not very helpful or not helpful at all.

The survey results in Figure 8 highlight students' reliance on alternative learning materials in the absence of required textbooks, with 70% identifying course materials on Blackboard, such as lecture notes, as their most important resource. Recorded lecture videos were favored by 20%, while 10% valued supplementary materials from social media or online platforms like YouTube. This underscores the importance of accessible educational resources in supporting student learning. Figure 9 reveals a mixed self-assessment of academic performance, with 51% of respondents rating their performance as average or poor, indicating uncertainty about their academic standing; however, 18% felt confident enough to rate their performance as excellent. In Figure 10, a substantial 63% of students believe that pre-class preparation and post-class revision somewhat contribute to their performance, while 28% feel these practices greatly enhance their outcomes. Additionally, Figure 11 shows that 65% consider lecture notes the most crucial learning material for assessments.

Based on the results of the analysis, we obtain the following key findings of the study:

1. Impact of tutorial discussion and Textbook Access on Learning Achievement

The results indicate that students perceive tutorial discussions as the most effective assessment method for their learning, with a significant 62% preference. This suggests that the interactive nature of tutorials enhances their understanding and engagement with the material. These findings highlight the importance of incorporating more interactive learning methods, such as tutorials, into the curriculum. The findings also clearly indicate that a significant portion of students (72%) lack personal copies of required textbooks. This lack of access correlates with low usage rates; only 15% of students use textbooks very frequently. Such limited engagement likely hampers their understanding of key concepts, suggesting that access to textbooks directly impacts learning achievement in business finance.

2. Efforts in Lecture Preparation and Academic Performance

The survey results show that most students prioritize shorter preparation times, with 52% spending less than one hour preparing for class. However, a substantial number (62%) do engage in post-class revision, which they generally find helpful. This indicates that while short preparation times may not be ideal, the effort put into revision does play a role in enhancing understanding and academic performance. The majority of students believe their preparation practices positively influence their performance, reinforcing the importance of effort in achieving academic success.

3. Interaction Between Textbook Use and Preparation Efforts

The findings suggest a significant interaction between textbook use and preparation efforts. The limited access to textbooks may lead to underutilization, which in turn affects the effectiveness of students' preparation habits. Although students recognize the value of preparation, the interplay between insufficient textbook access and short preparation times can undermine their overall learning outcomes. This highlights the need for both adequate resources and effective study practices to foster better academic performance.

5. Conclusion

In conclusion, this investigation provides crucial insights into the connections between tutorial discussion, textbook access, student preparation, and academic performance in business finance education. The findings indicate that tutorial discussion and access to textbooks significantly enhances learning outcomes, as students with necessary resources engage more effectively with course content. Additionally, consistent preparation correlates positively with improved academic results. The synergy between tutorial discussion, textbook use and student preparation further amplifies these positive effects.

Cheng, M. H. M., Xu, G., Cheng, G., Kong, S. C., Song, Y., Erni, J. N., Chen, J., & Macfarlane, B., Yeung, S. S. (Eds.). (2025). *Proceedings of the International Conference on Learning and Teaching 2025 (ICLT 2025)*. Hong Kong SAR: The Education University of Hong Kong.

The study emphasizes the importance of tutorial discussion, accessible textbooks and effective study practices, such as pre-class preparation and post-class revision, in boosting academic performance. The reliance on tutorials highlights the need for interactive learning environments and quality digital resources. By addressing barriers to textbook access and promoting effective preparation strategies, educational institutions can cultivate a supportive learning environment, ultimately helping students reach their full potential.

However, the study has limitations, including reliance on self-reported data, a potentially unrepresentative sample, and a focus on quantitative measures that may overlook qualitative aspects. Future research should target diverse student populations, employ longitudinal studies, and explore external factors like socioeconomic status. Qualitative methods could reveal deeper insights into student attitudes, while examining various instructional methods could identify strategies to enhance engagement and learning outcomes.

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Appendix: Figures

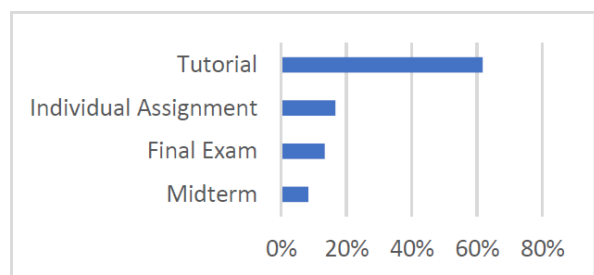


Figure 1: Preferred Assessment Methods for Enhanced Learning

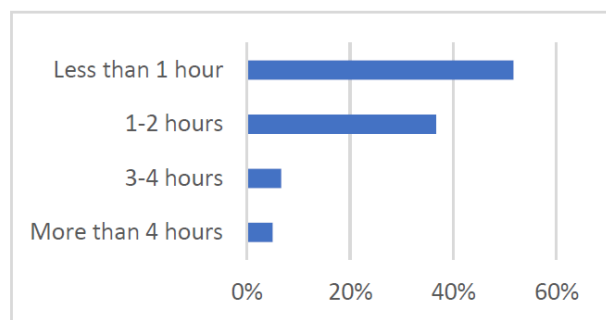


Figure 2: Time Spent on Class Preparation

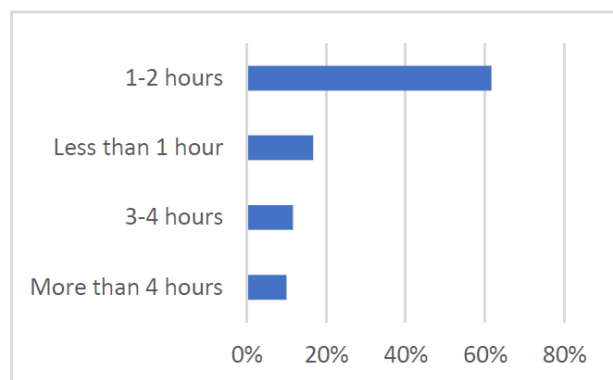


Figure 3: Time Spent Revising Class Materials

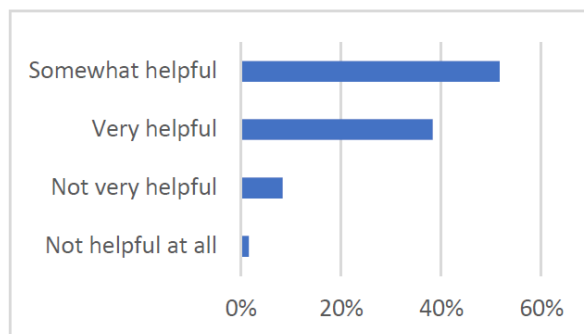


Figure 4: Perceived Helpfulness of Class Preparation and Revision

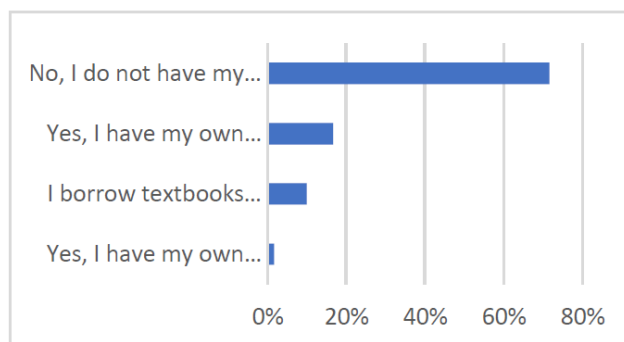


Figure 5: Access to Required Textbook for Course

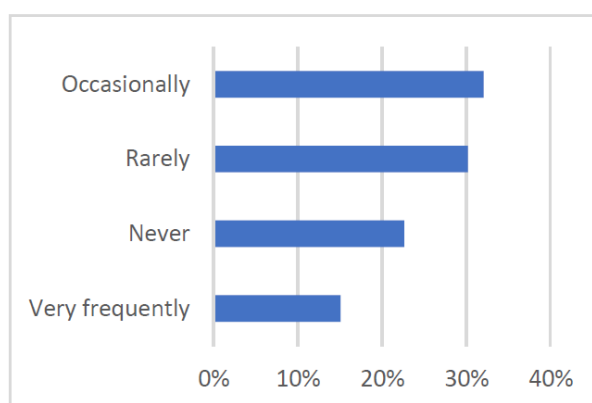


Figure 6: Frequency of Textbook Use in Studies

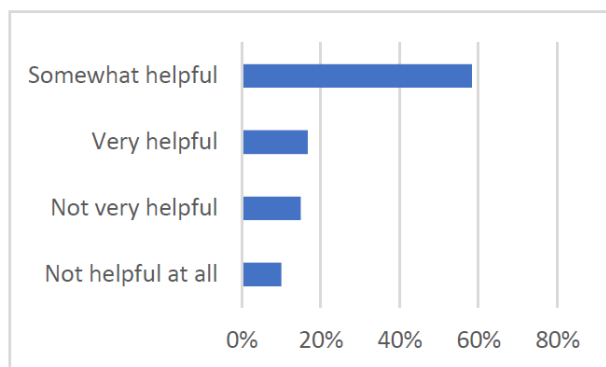


Figure 7: Textbook Effectiveness in Enhancing Course Understanding

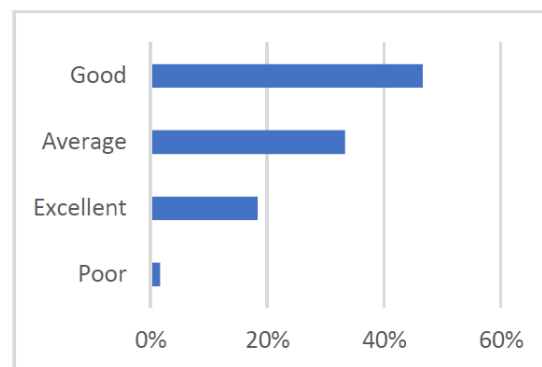


Figure 9: Student Self-Assessment of Performance in Course

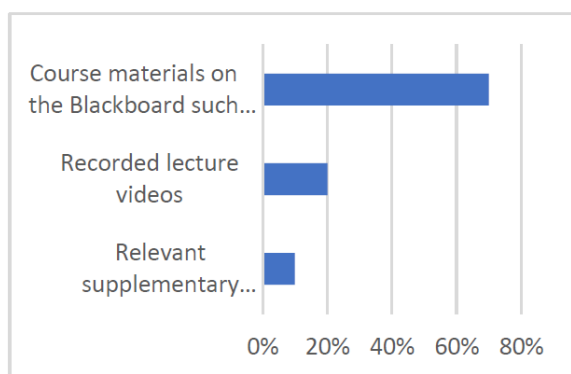


Figure 8: Alternative Learning Materials for Course Study

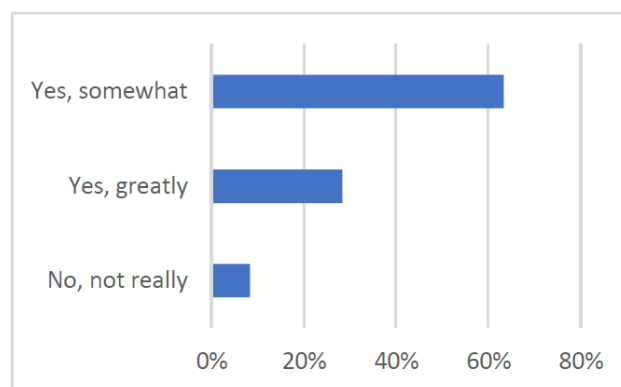


Figure 10: Impact of Preparation and Revision on Assessment Performance

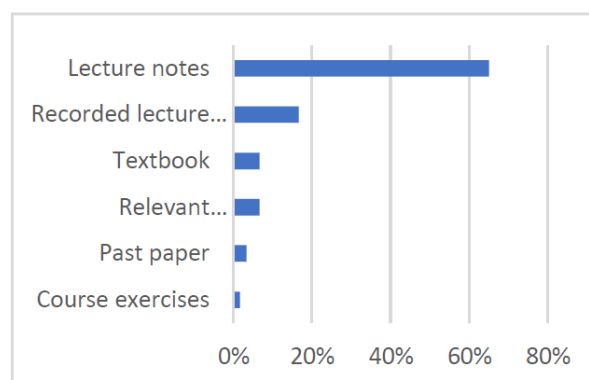


Figure 11: Key Learning Materials for Assessment Performance

A Comparative Study of Integrating SDGs into University Policies and Practices in Hong Kong and Finland

Weiyan XIONG^{1*}, Anatoly OLEKSIYENKO², Yuzhuo CAI³

^{1,2,3}Global Research Institute for Finnish Education, Education University of Hong Kong, Hong Kong SAR, China

^{1,2}Department of International Education, Education University of Hong Kong, Hong Kong SAR, China

³Faculty of Management and Business, Tampere University, Finland

wxiong@eduhk.hk, anatoly@eduhk.hk, cyuzhuo@eduhk.hk

ABSTRACT

A growing global focus on Sustainable Development Goals (SDGs) highlights the critical role of higher education in promoting sustainable practices through research, teaching, and service. The varying degrees of integration of the SDGs into university policies and practices across different regions underscore the importance of conducting comparative analyses. Therefore, this study aims to analyze universities' pursuits of SDGs and reorientations of institutional policies and practices of research, teaching, and learning in Hong Kong and Finland. Through a comparative review of university policies and practices at both institutional and jurisdictional levels in two regions, this research seeks to demonstrate the good strategies and practices for promoting SDGs into university policies and practices. Specifically, this study identifies innovative methodologies for assessing the capacities related to research and pedagogy that can effectively promote and implement the SDGs within higher education institutions. Ultimately, this study aims to develop targeted recommendations for universities in Hong Kong and Finland striving to enhance their effectiveness in integrating SDGs into their policies and practices. In addition, the research outcomes are intended to inform and enrich students' learning experiences and faculty professional development with SDGs and to provide critical insights into policy and innovation that focus on enhancing the social roles and responsibilities of universities at both local and global scales.

KEYWORDS

Sustainable Development Goals, SDGs, higher education for SDGs, Hong Kong, Finland

Joint educational leadership and curriculum development: A multiple-case study of students' investment in EAP and imagined identities

Yue ZHANG^{1*}, Binyu YANG²

¹The Education University of Hong Kong, Hong Kong SAR, China

²Renmin University, Beijing, China

yuezhang@link.cuhk.edu.hk, binyuyang@ruc.edu.cn

ABSTRACT

As the outcome of a Beijing-Hong Kong joint curriculum development project, this action research adopts the model of L2 investment to understand how elite English learners in a key public university in Beijing (985, 211, Double First-Class initiatives) are empowered to invest in their identities. A critical pedagogy accentuates learners' needs and experiences with an understanding of what these practices signify and how such practices enable them to construct their imagined identities. Acknowledging that English learners need to negotiate EAP identities to claim legitimacy, in an undergraduate EAP course, we engaged students in three tasks, where students imagine their places in their communities, critically examine a key issue in the community, and challenge and problematize the issue through creating proposals and present a poster in English. Focusing on two cases, this study triangulates in-depth interviews and their learner artifacts (proposal, poster, recording of presentation) as data. Findings reveal how a male Economics major and a female French major, both born and raised in Beijing, aiming to be members of the National Development and Reform Commission and the Ministry of Foreign Affairs, proposed two agendas: primary education in Africa and female education equity in China to perform their imagined identities as future government officials, translanguaged as multilinguals, and engage with English language and literacy practices as EAP practitioners. Pedagogical implications and directions for future studies will be provided.

KEYWORDS

artificial intelligence (AI), ESP teachers, AI acceptance, TPB, aviation English

Reveal of Curriculum Development: Bibliometric Analysis and Literature Review

Tika FEBRIYANI^{1*}, Iqbal², Ali MURTADHO³, Rika DAMAYANTI⁴

^{1,2,3,4}Universitas Islam Negeri Raden Intan, Lampung, Indonesia

tikafebriyani@radenintan.ac.id, iqbal@radenintan.ac.id, alimurtado@radenintan.ac.id, rikadamayanti@radenintan.ac.id

Abstract: The importance of curriculum development is underscored by the need to adapt to social and technological changes, globalization, and evolving labor market demands (Suwarni, 2023). A well-structured curriculum functions as a framework for educators, guiding the delivery of learning materials and ensuring alignment with educational goals (Siregar & Bahrissalim, 2022). This adaptability is critical to cultivating a relevant and effective educational experience. This research uses bibliometric analysis to provide graphic information about the statistical overview of literature from 1063 articles, 60 books, and 193 book chapters published in reputable international journals that correlate with curriculum development from 2014 to 2024. An in-depth study was carried out on 1316 documents to reveal this research. Types of documents from the Scopus database for curriculum development in articles, books, reference books, and conference papers. Visualization with R Software Bliibliometrix with three visuals: Annual scientific production, most cited articles, country scientific production, and word cloud and Co-occurrence network. The analysis findings show that curriculum development is the dominant topic. Research popular topics for 2014-2024 are curriculum, human, humans, curriculum development, female, male, article, medical education, medical school, and education. Less researched topics are need-assessment, educational measurement, program development, and leadership. This study can provide a global roadmap for researchers regarding curriculum development.

Keywords: curriculum development, bibliometric analysis, literature review

1. Introduction

The importance of curriculum development is underscored by the need to adapt to social and technological changes, globalization, and evolving labor market demands (Suwarni, 2023). A well-structured curriculum functions as a framework for educators, guiding the delivery of learning materials and ensuring alignment with educational goals (Siregar & Bahrissalim, 2022). This adaptability is critical to cultivating a relevant and effective educational experience. While a focus on curriculum development is essential, some argue that an overemphasis on standardization can stifle creativity and adaptability in teaching, potentially limiting educational responsiveness to local contexts and the needs of individual learners.

The negative impact of curriculum development that is not carried out properly or is delayed is incompatibility with developments in science and technology (Lee, 2008), decreased quality of education (Ornstein & Hunkins, 2017), gaps between student needs and the learning provided (Tyler, 2013), Unresponsive to Social Issues and Local Needs (Kelly, 2009), Inhibits the Development of 21st Century Skills (Trilling & Fadel, 2009). Meanwhile, curriculum development that is carried out well can provide various significant positive impacts, namely Relevance to the Development of Science and Technology (Lee, 2008), Improving the Quality of Learning (Ornstein & Hunkins, 2017), 21st Century Skills Development (Trilling & Fadel, 2009), Responsive to Social Needs and Issues (Kelly, 2009).

Previous research on curriculum development, namely Prestigiacomo (2024) researched biomedical engineering curriculum development: A qualitative study involving four stakeholders, Jatuporn (2023) focused on Local Curriculum as Cultural Practices for Lanna-ness Identity under Place-based Education Reform Policy in Chiang Mai, Thailand, Researcher Lutfauziah (2023) Curriculum development for environmental education at an Islamic boarding school, Nuryana (2023) researched Student stress and mental health during online learning: Potential for post-COVID-19 school curriculum development, research conducted by Amalu (2023) Determinants of Social Studies Curriculum Implementation by Teachers with Intellectual Disabilities in Selected Schools of Calabar South Local Government Area of Cross River State, Nigeria: Implications for Psychology. From previous research, it is still rare to use bibliometric analysis in curriculum development and to determine trends in curriculum development topics.

2. Method

Scopus is one of the world's largest providers of bibliometric databases for preparing curriculum development data. R Software visualizes the bibliometric network using data imported from the Scopus data source. This research uses bibliometric analysis to provide graphic information about the statistical picture of literature from 1063 articles, 60 books, and 193 book chapters published from 2014 to 2024. An in-depth study was carried out on 1316 documents to reveal this research. Figure 1 shows the bibliometric analysis process of data extracted from Scopus using BibliometricX (Software R).

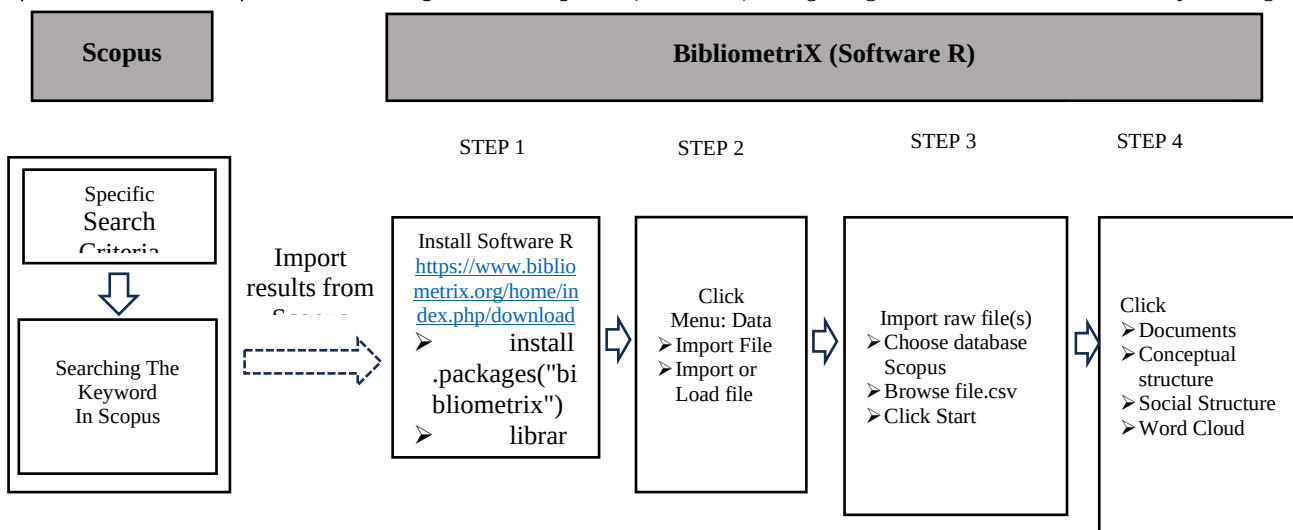


Figure 1. Design of Bibliometric Study with R Software

3. Result and Disscusion

The results of a collection of 1316 articles that have been published in reputable international journals which are correlated with the theme of resilience from 2014 to 2024. Figure 2 shows the annual scientific production which has experienced an increase in resilience research.

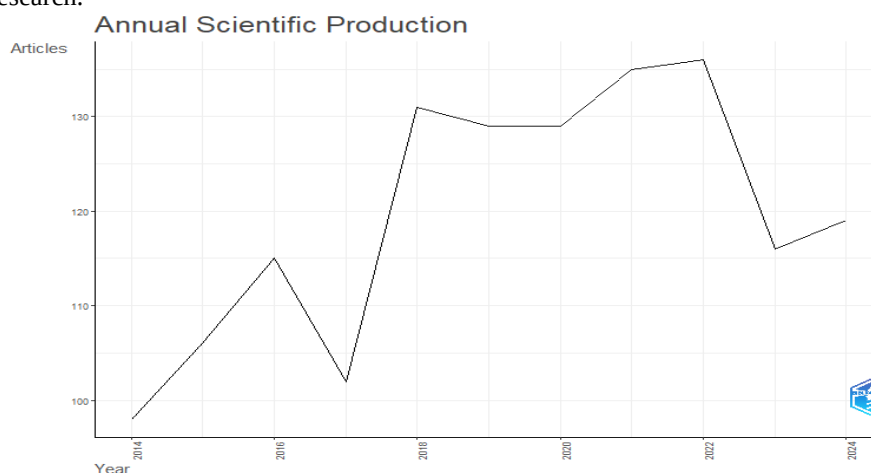


Figure 2. Annual Scientific Production curriculum development student

Figure 2 identifies the Publication action view integrated into Scopus Base data. The x-axis shows the year, and the y-axis shows the cumulative article totals for 2014-2024. The line graph illustrates the annual scientific production in terms of the number of curriculum development articles published each year from 2014 to 2023. The general trend shows fluctuations in the number of scientific articles produced annually. In 2014, the number of articles published was just under 100. This figure increased significantly by 2016, surpassing 110 articles. However, in 2017, the production dropped below 110, marking a dip in output. Following this decrease, there was a sharp rise in 2018, with production levels reaching over 130 articles. The output remained relatively stable from 2018 to 2021, peaking slightly around 2022. In 2022, however, the production experienced a notable decline, dropping to around 120 articles. By 2023, there was a slight recovery, with production numbers rising again. In summary, while there was overall growth in scientific production over the period, the data reveals periods of both significant increases and declines. The most prominent dip occurred in 2022, followed by a modest increase in 2023.

Table 1 displays the 15 most cited documents in the results of the exploration of the Scopus database from 2014 to 2024 regarding curriculum development. This investigation aims to relate the main findings of the ideas and influence which papers have had the most significant impact in influencing curriculum development.

Table 1. The Top 15 Most Cited Articles into Scopus Explore Result.

	Author's name, Year, Journal	Result	Total Citations
1	Lewallen TC, 2015, J Sch Health	10.1111/josh.12310	347
2	Cunningham CM, 2017, Sci Educ	10.1002/sce.21271	190
3	Webb M, 2017, Educ Inf Technol	10.1007/s10639-016-9493-x	167
4	Lomis K, 2017, Acad Med	10.1097/ACM.0000000000001543	164

5	Casey A, 2018, Phys Educ Sport Pedagogy	10.1080/17408989.2018.1429588	144
6	Chiu TKF, 2020, Sustainability	10.3390/su12145568	135
7	Byrnes YM, 2020, Med Educ Online	10.1080/10872981.2020.1798088	130
8	Kelley TR, 2020, Int J Stem Educ	10.1186/s40594-020-00211-w	114
9	Sherbino J, 2014, Acad Med	10.1097/ACM.0000000000000217	104
10	Van De Oudeweetering K, 2018, Curric J	10.1080/09585176.2017.1369136	87
11	Nelson MR, 2016, J Advert	10.1080/00913367.2015.1107871	78
12	Scarino A, 2014, Int J Multilingualism	10.1080/14790718.2014.921176	75
13	Anderson CW, 2018, J Res Sci Teach	10.1002/tea.21484	68
14	Blanco MA, 2014, J Med Libr Assoc	10.3163/1536-5050.102.3.005	68
15	Harris KR, 2016, Policy Insights Behav Brain sci	10.1177/2372732215624216	67

The countries of scientific production of curriculum development for the most productive authors with the most significant repeated contributions to curriculum development sourced from the Scopus database in 10 consecutive countries are USA, UK, Germany, Australia, Canada, China, Indonesia, South Africa, Netherlands, and Malaysia. Meanwhile, the fewest are Argentina, Azerbaijan, Cuba, El Salvador, Iceland, Iraq, Jamaica, Kyrgyzstan, Mozambique, North Macedonia, and Solomon Island with only one article. Across countries, scientific production for resilience in life is shown in Figure 3.

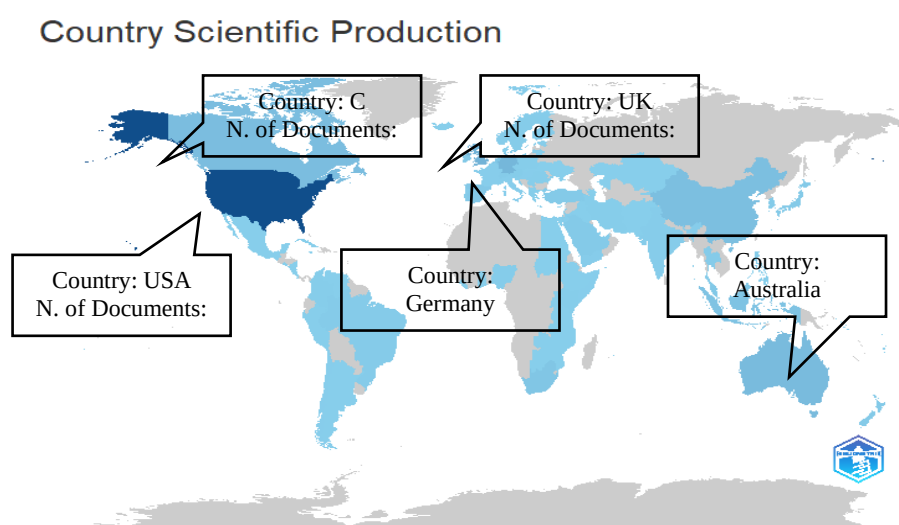


Figure 3. Country Scientific Production

The number of authors from 2014-2024 are 3884 authors, and the number of publish article are Macphail A with 6 articles, Eilks I, Lee JC-K, Peters H, Wang Y, and Yang W with 5 article, Chen Y, Gale J, Li H, Penney D, and Walsh T with 4 articles.

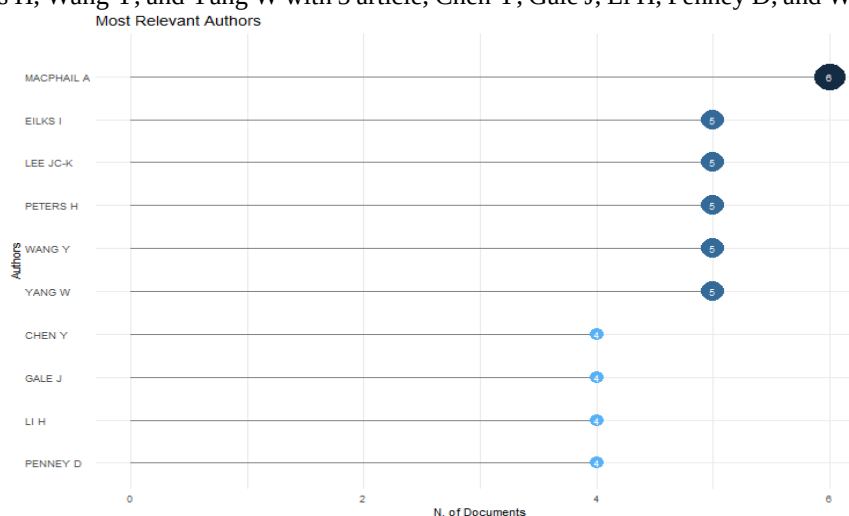


Figure 4. Most Relevant Authors

The results of the top ten wordclouds about resilience in life from highest to lowest consist of the words curriculum 416, human 285, humans 221, curriculum development 204, female 183, male 175, article 166, medical education 156, medical school 131, and education.

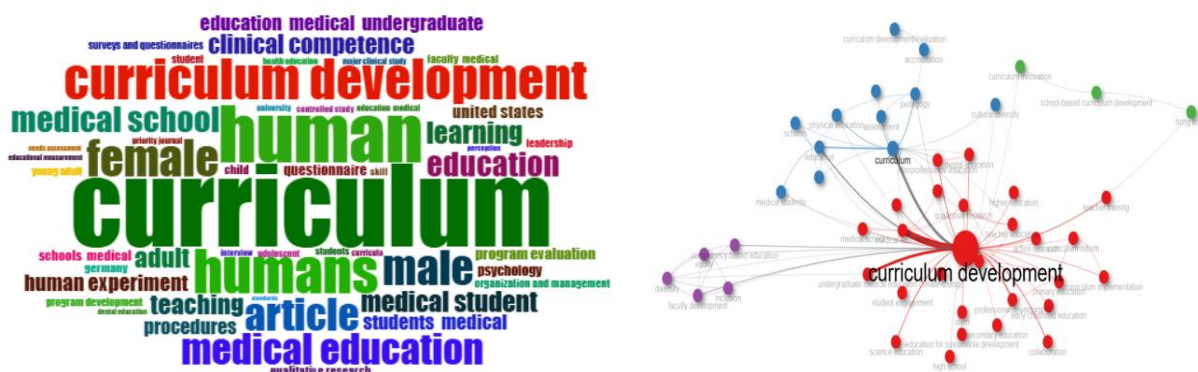


Figure 5. Word cloud and C0-Occurrence Network of Curriculum Development in Scopus

Document Type obtained from the Scopus database for curriculum development through articles, books, and book chapters. Visualization with R Software Bibliometrix with three visualizations: Annual Scientific Production, most cited articles, Country scientific production, word cloud, and Co-occurrence network. The results of the analysis show that curriculum is the dominant topic. The topics that are rarely of interest are need assessment, educational measurement, program development, and leadership.

Need assessment o be carried out to adapt the curriculum to student needs (Ornstein & Hunkins, 2017), determine the competencies and skills that need to be developed in the curriculum (Tyler, 2013), improve teaching effectiveness (Oliva & Gordon, 2012), increase student learning motivation (Doll, 1970), keeping up with the times (McNeil, 2014). Meanwhile, educational measurement is important in curriculum development because it provides objective data and information about how effective the curriculum is in achieving educational goals (Tyler, 2013), provides useful feedback to improve the quality of the curriculum (Ornstein & Hunkins, 2017), ensures the suitability of the curriculum to educational standards (Opham, 2017), supporting accountability in education (Shinkfield, 2007), and adapting teaching methods to student needs (Nitko & Brookhart, 2011). Program development is important in curriculum development because this process helps ensure that the resulting curriculum is relevant, effective, and in accordance with student needs and societal developments because identify and meeting student and community needs (Taba & Spalding, 1962), adapting the curriculum to social and technological change (McNeil, 2014), improving the quality of learning and teaching (Ornstein & Hunkins, 2017), Ensure Alignment between curriculum goals, content and evaluation (Tyler, 2013), encouraging innovation in learning (Fullan, 2015), increasing educational accountability (Shinkfield, 2007).

The topic of leadership is important to research on the theme of curriculum development because a good leader is set a Clear vision and goals (Fullan, 2015), inspire and motivate the curriculum team (Sergiovanni, 2005), encourages innovation in curriculum development (Leithwood & Jantzi, 2006), manages resources effectively (Bush, 2008), developing effective relationships and communication (Glickman, et. al., 2001), ensuring accountability and ongoing evaluation (Shinkfield, 2007).

4. Conclusion

This research emphasizes the importance of developing a curriculum that is adaptive to social changes, technology and job market demands. Through a bibliometric analysis of 1,316 documents published from 2014 to 2024, it was found that curriculum development is the dominant topic in educational literature. This research also shows a significant increase in scientific production related to curriculum development, although there are fluctuations in the number of publications from year to year. The results of the analysis show that the most researched topics include curriculum, medical education, and program development, while less researched topics include needs assessment and educational measurement. This research provides a global roadmap for educational researchers and practitioners to understand trends and needs in curriculum development, and emphasizes the need for innovation and relevance in curriculum design to improve student learning experiences.

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Teaching Philosophy and SDGs Through Community Service

Ezechiél THIBAUD

Department of International Education, The Education University of Hong Kong, Hong Kong SAR, China

ethibaud@eduhk.hk

Abstract: *This paper examines the relation between teaching philosophy and integrating SDGs into teaching practices through community service and charity work. University students in Hong Kong who took a philosophy class were asked to collaborate with a local NGO specializing in helping people who experience homelessness. This initiative was aiming at establishing whether philosophical concepts and SDGs can be made relevant to real-life issues and gain palpability through first-hand experiences and direct encounters. This paper goes through this initiative and its positive outcomes reported by students. Some of these outcomes include enhanced empathy, challenged preconceptions about homelessness, increased understanding of philosophical concepts studied in class, and greater global understating of the complex causes of homelessness and how to help people who experience it. This initiative was supported and made possible through the Innovative Teaching Grant 2023 provided by the Education of Hong Kong.*

Keywords: philosophy, sustainability, community service

1. Introduction

One common question about teaching and learning philosophy is whether its abstract nature can find resonance with “real-life” issues and help us address world problems. We believe that despite its theoretical weight, philosophy can be helpful to identify and comprehend these problems, but can also provide the tools to work towards reaching the Sustainable Development Goals (SDGs). This paper explores how SDGs can be integrated into higher education teaching practices, in the context of a philosophy class and through a partnership with a local Hong Kong NGO. It presents the collaborative work done between students enrolled in a philosophy course about the nature of suffering and hope, and a local NGO specializing in helping people experiencing homelessness in Hong Kong. This initiative shows that (1) philosophical concepts are made more comprehensible when illustrated by real-life issues and in-person experiences, (2) that combining theoretical knowledge and exposition to the work of professionals is an effective way to work towards SDGs, and (3) that students’ understanding of the problems in question, as well as the concepts studied, has been improved.

2. Teaching Philosophy & SDGs: Why and How?

It is sometimes expected that students *learn about* philosophy by *doing* philosophy (Kienstra et al., 2015). Often, *doing* philosophy refers to discussions about philosophical concepts, engaging in Socratic dialogue, or the articulation of ideas through formal arguments and essays. However, the practical aspect of doing philosophy can be neglected, as philosophy often remains mainly or solely focused on the discussion of abstract concepts. Philosophy is considered important to think critically and logically, cultivate values, or improve our understanding of life’s fundamental questions (Kruger, 2021). But the skills it teaches seem hardly applicable to concrete issues, and it is rarely seen as capable of motivating positive social change. We believe, however, that the dichotomy between the abstractness of philosophy and the concreteness of real-life issues should be challenged. In fact, it has been argued that philosophy can be a way for students to learn how to relate to life (Janning, 2015). It can also be said that only through careful scrutiny of these abstract concepts can we understand the complexity of our modern world and live a fully considered and examined life (Grayling, 2011).

One way to challenge this false dichotomy is to incorporate real-life examples into philosophy class, but also to incorporate philosophy into real-life experiences. This paper suggests that teaching and learning philosophy and engaging in field work are not only compatible but also enforce each other. Our initiative aimed at connecting philosophical theory to community service, in order to illustrate the concepts studied in class and boost problem-solving and sustainability learning. It sought to answer the following questions: can a direct lived experience contribute to a better understanding of the philosophical concepts studied in class? Can knowledge of these theoretical concepts positively impact students’ understanding of the real-life issues at play? Finally, can this experiment be understood as a way to incorporate SDGs into teaching practices?

Education for sustainable development is one of UNESCO’s goals, which states that it “empowers people with the knowledge, skills, values, attitudes and behaviours to live in a way that is good for the environment, economy, and society”. The importance to develop sustainability education is often seen as a way to understand and address the various crises that contemporary societies face (Marouli, 2020). The work toward SDGs accomplishments requires the pursuit of actions that support positive change; but this direction cannot be taken without a conceptual understanding of the issues at play. Philosophy can provide helpful theoretical tools to fully grasp what values are being mobilized, but also what important problems need to be solved, and what approach could or should be applied. Mixon (2024) proposes a philosophical analysis of the SDGs,

and suggests that “integrating philosophical dimensions into policymaking to create effective, inclusive strategies for sustainable global progress” (p. 45). Kioupi and Voulvoulis (2019) suggest implementing various sustainable development pedagogical strategies, which they argue, can act as important drivers for change. Some of these strategies include project and problem-based learning, active learning or community service learning. But just like philosophy can seem too abstract to tackle real-life issues, SDGs too can at times seem distant and difficult to attain. Our hope through this initiative is for students to connect ethical concepts with reality, in order to make the issues carried by SDGs more palpable, and start a discussion about potential solutions.

3. Experiment and Objectives:

This project involved a class of 28 university students in Hong Kong, who took a class on the philosophical meaning of suffering and hope, and a local Hong Kong NGO specializing in helping people who experience homelessness. The course covered a multitude of concepts such as theories of suffering, injustice, reparation, theories of happiness, various cultural positions on suffering, the meaning and essence of hope, existentialism, nihilism, compassion, and many more. As for the NGO, it proposes an empowerment holistic program aiming at rehabilitating people experiencing homelessness and assist them in their quest for a new life (though medical assistance, psychological help, emotional support, social activities, etc.). Part of this program involves daily distribution of food and basic necessities, in various neighbourhoods of Hong Kong. The activity was divided in 2 parts: first, the NGO’s CEO gave a talk to students about their goals as an organization, which was a great opportunity to discuss preconceptions and stereotypes about homelessness, as well as students’ expectations. The class also learned more about the various struggles people who experience homelessness may go through, as well as the best ways to assist them. Students were asked to connect this new knowledge with the philosophical concepts studied in class. In the second part of the initiative, students were divided in two groups, and distributed food and basic necessities to people experiencing homelessness, under the guidance of the instructor and the NGO staff. The activity took place at the end of the semester, when the philosophy of suffering and hope had already been studied and discussed.

The objectives of this collaboration were the following:

- Learning about the meaning of suffering and hope through the experience and testimony of people experiencing homelessness in Hong Kong, and those who help them.
- Understanding the complexity of homelessness and challenge preconceptions.
- Enhancing student’s values: compassion, empathy and respect.
- Understanding of structural socioeconomic global issues that can contribute to homelessness.
- Understanding the deep meaning of the philosophical concepts of well-being, pain, and hope, through a real-life experience rather than a theoretical conversation.
- Discovering what they can do to contribute to solutions, think of innovative ways to tackle the problem of homelessness, and engage in their community.

This project sought to explore and develop the following pedagogical strategies: sustainable learning, experiential learning, application and illustration of philosophical concepts outside the classroom, cultivation of feelings that are aligned with the goals of life and values education (empathy, collaboration, solidarity, ethics, etc.).

Due to the nature of this philosophy course and the specific activity planned, this project was mainly related to SDGs 1, 2, 3 and 10. SDG 1, “no poverty”, relates to the question of the direct suffering caused by poverty. Our hope was that helping people who experience homelessness and extreme poverty could help students understand the effects that poverty has on wellbeing, social isolation, shame, and other negative associated feelings (Ali et al., 2018). It also raises philosophical questions about meritocracy (whether people *deserve* their economic situation), free will and social determinism (whether poverty can ever be a choice or simply is the result of accidents and systemic issues). As a rehabilitation and empowerment organization, the NGO we worked with has a direct impact on reducing poverty, as it seeks to reduce the number of people experiencing homelessness in Hong Kong.

SDG 2, “zero hunger”, is directly related to the NGO’s role and the activity proposed (food distribution). Our hope was that this experience would raise awareness on pragmatic questions such as food waste, but also philosophical ones related to distributive justice and equality of human basic needs.

SDG 3, “good health and wellbeing”, relates to the NGO’s holistic rehabilitation programme aiming at providing new opportunities through the development of the whole person (physical, psychological, relational, material, emotional, etc.). This important aspect informs us on the importance of not only providing material support (shelter and food) but also emotional and/or medical assistance. Populations who experience homelessness are at greater risk of experiencing assault or injuries (Miller et al., 2020). Research also shows strong correlations between adverse childhood experience, homelessness, and poor behavioural health outcomes (Koh & Montgomery, 2021), alerting us on the importance to provide a holistic form of assistance.

Finally, SDG 10, “reduce inequalities” raises important philosophical questions about the nature and importance of equality (outcome versus opportunities), the causes of inequality, as well as profound reflections on human worth, empathy and justice.

4. Outcomes

Reactions and outcomes were mainly measured through final essays, in which students had to explain if and how this experience informed their view of suffering and what can be done to bring hope in this specific situation. Students were asked to describe their experience of the activity, and to connect it to the philosophical themes studied in class. Based on these testimonies, we observe that this experience impacted students in the following ways:

1. **Surprise.** Students often described having been surprised to learn that homelessness was an issue in Hong Kong. In fact, contrary to other major cities in the world, homelessness in Hong Kong is not always visible, and is mainly located in specific pocket areas of the town. Many students mentioned hearing and thinking about this problem for the first time, or being unaware that such NGOs existed in Hong Kong.
2. **Change of perspective.** Students often mentioned that their perspective on homelessness had changed. Some mentioned preconceptions about people who experience homelessness (being lazy, not wanting to get better or receive help, homelessness being a personal choice, etc.), and that these preconceptions were challenged. This made us particularly optimistic about the capacity of this sort of activities to raise awareness and challenge stereotypes about homelessness.
3. **Improved empathy.** As a result of this shift of perspective, many students mentioned feeling more empathy for people who experience homelessness than before. This was also the result of the information provided by NGO’s staff members and CEO (one of them having experienced homelessness themselves in the past), about how homelessness affects people, and the amount of suffering involved.
4. **Enhanced global understanding of homelessness and its causes.** Some students mentioned understanding that homelessness is not necessarily a personal choice, but often a result of complex causes that are not always under an individual’s control. Childhood trauma, mental disorders, unemployment, economic inequalities, or simply a lack of familial and/or social support, are all variables that can play a determining role in one’s risks of experiencing homelessness.
5. **Increased motivation to help.** Students reported that direct face-to-face encounters increased compassion and therefore the desire to help people who experience homelessness through volunteering. This activity also gave them a better understanding of how suffering affect people in real life.
6. **Other aspects.** Students also mentioned how this experience enhanced their understanding of various philosophical concepts. They included, but are not limited to: human nature, Buddhist and Christian views of suffering and charity, suffering as a consequence for one’s action versus suffering as an accident, hope through human compassion, the importance of community, etc. Many mentioned reflecting on themselves (their own identity or wellbeing/suffering), and on how their own view had evolved through this experience.

5. Discussion

Overall, this experience was largely positive and reached the expected objectives. Students’ reactions confirmed the hypothesis that direct experiences help illustrate complex concepts and give them a personal and relatable dimension. Learning becomes a personal experience that involves not only cognitive skills but also emotional and relational capacities. Most students insisted on the difference between learning from hearing someone talk, and learning by being in the situation themselves: the latter impacted them much more directly and personally. The hope is that the learning experience will be long-lasting and transformative.

We also believe that this experience is an efficient way to integrate SDGs into teaching practices. The effects mentioned by students illustrate how these goals can be illustrated through community-work, in a way that is both emotionally impactful and motivational. This experience reminded us that homelessness is a complex and multifaceted problem, that has various causes and cannot be reduced through superficial measures but requires a structural and comprehensive approach. This NGO insisted on the importance of their holistic programme, to try remedy these factors together; whether they are medical, emotional, social, or material. SDG education could therefore benefit from a global and comprehensive approach, which includes not only exploring various solutions but also looking at the root-causes of these complex issues.

This experience has given us great hope that philosophical concepts and SDGs can be made relevant to students’ lives by immersive experiences and community work. This suggests that educators and institutions could benefit from implementing such experiential programmes, even for disciplines in the humanities. This experiment invites us to challenge the preconception that philosophy is too abstract to address real-life issues, or SDGs too distant and broad for students to feel involved. It has shown that direct-learning and immersive activities impact students in a long-lasting and transformative way.

6. Conclusion

Cheng, M. H. M., Xu, G., Cheng, G., Kong, S. C., Song, Y., Erni, J. N., Chen, J., & Macfarlane, B., Yeung, S. S. (Eds.). (2025). *Proceedings of the International Conference on Learning and Teaching 2025 (ICLT 2025)*. Hong Kong SAR: The Education University of Hong Kong.

This experiment conducted with our university students was fruitful and reached the set objectives. The benefits observed included challenged stereotypes about homelessness, higher empathy, enhanced global understanding of homelessness's causes, and increased will to help. It highlights that philosophy can help understand social issues and be relevant to students' lives if connected to concrete problems. It also shows that SDGs can effectively be integrated into teaching and learning practices through community-work. Finally, it stresses the interconnectedness of the issues at play: whether they have to do with philosophy, sustainability, economics or social policy, addressing them requires a comprehensive and global approach. We believe that this approach can be successfully implemented through the combination of philosophical theories, SDGs education, immersive community work and talks with professionals. Education institutions could therefore benefit from investing in the implementation of such practices as part of their curricula.

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Empowered or Excluded? Exploring Student-Workers' Perception of Power

Dynamics in Educational Leadership

Muhamad MAULANA

Faculty of Education, Indonesian International Islamic University, Indonesia
muhamad.maulana@uiii.ac.id

Abstract: *Being a student-worker in education brings about a complex set of experiences related to power dynamics in educational leadership, as they are typically a university student and a teacher or teacher assistant at the same time. Consequently, this research aims at examining what kind of empowerment and exclusion they perceive in their interactions with the institutional leaders. Subsequently, the flexible and open leadership that has been practiced among the student-workers who are members of a university in West Java, Indonesia has been found to be the cause of the clarity in guidance, skill development opportunities, and the need to meet their dual needs for support. Despite this, students' involvement in decision-making could be less and at the same time could lead to their feelings of being neglected. On the whole, flexibility in management encourages not only the staff but also them to be their own leaders as well as to grow and become professional. Consequently, this study presents suggestions on how to create a more inclusive and empowering leadership model that would be of value to student-workers.*

Keywords: student-worker, educational leadership, power dynamic

1. Introduction

Amid technological development and rapid changes in society, students' participation in higher education is increasing, preparing human resources who can face challenges and take advantage. This participation is reinforced by global factors including uncertainty in the job market and family commitments (Kasworm, 2023). This trend, followed by the rising cost of higher education, means that some students have to work and manage academics on campus and professionalism in the workplace with the conflicts and lack of resources they face (Park & Headrick, 2018). In Indonesia, the job market competition among fresh graduates is highly competitive; however, it is not matched by the required competencies (Chalid, 2021). Therefore, working while studying becomes one of the strategies for students to better prepare themselves for the job market while simultaneously developing the necessary skills. In this case, the role of higher education in providing educational services that suit their needs, and support from the school leader where they work are indispensable in developing competencies while meeting the demands of professional qualifications.

In the education field, some students work either full-time or part-time as teachers, filling vacant teaching positions in a school, with limited skills and considering their last high school achievement. As mentioned by Effendi (2023), the lack of teachers, which is still far from the ideal needs, the number of teachers in 2022 is around 3.1 million with a need of around 4.2 million teachers, is a problem of the education system in Indonesia. Moreover, Abdul Mu'ti, Minister of Primary and Secondary Education, in Mahendra (2024) mentions that although many teachers in primary and secondary education have teaching experience, many of them do not meet the minimum qualifications of Diploma 4 or Bachelor's degree. This is important to note because the quality of education is highly dependent on the competence and qualifications of its educators, which can be enhanced through professional support and continuous training (Graham et al., 2020). Therefore, teachers need support from school leaders and opportunities from higher education to be educated considering the minimum qualification to be a professional teacher. However, more specifically, the power dynamics between school leaders, and student-workers are often overlooked and continuous critical reflection is needed in educational leadership practice (Young & Arnold, 2020).

Power dynamics in education play an important role in building relationships between all educational stakeholders, including students, institutions, teachers and even student-worker (Sidky, 2017). According to Sinha (2023), this power is formed through interactions between various stakeholders that create the powerful and the controlled and results in how student-workers should play a role in the existing school structure. This dynamic can be manifested through various means including formal and personal authority and can influence decision-making processes, classroom interactions, and the overall educational experience (Sinha, 2023). Referring to educational leadership research conducted by Massiah et al. (2024), leaders who can manage power dynamics inclusively are needed, who are committed to creating an educational environment that provides opportunities for all parties to maximize individual potential, including student-workers, to form a positive school culture. Conversely, leaders who are unable to manage power can lead to exclusion and inequality resulting from policies that ignore individuals' rights to education, which in the context of student-workers, has a negative impact on their well-being, and academic and professional teaching performance (Liasidou, 2008).

Unfortunately, research on student-workers' experiences and perceptions of educational leadership is limited, as evidenced by searches in academic databases such as Scopus, ERIC, and Google Scholar, and supported by Park and Headrick (2018), who highlight the need for further research to understand them comprehensively. This is because generally, previous

research has only focused on the experiences of students in other settings such as business and company, and limited research in educational context. Nonetheless, Nyand et al. (2009) stated that the work environment faced by students is often unfavorable, which affects their mental well-being and academic performance. Therefore, understanding the dynamics of power and control over two different responsibilities is crucial to understanding the impact of these dynamics. Thus, this study bridges the gap by exploring the views and experiences of student-workers on the dynamics of educational leadership power that can empower or exclude. Moreover, this study aims to understand factors that can influence the relationship between principals and student-workers that impact their academic and professional lives.

2. Method

This study used a qualitative approach with a case study research design to explore student-workers perceptions of power dynamics in educational leadership. A qualitative approach allows for an in-depth and detailed exploration of the research context that may reveal subtle and less overt personal understandings (Gay et al., 2012). The case study design was chosen to examine the student-workers' unique experience in a particular school context in order to gain a detailed understanding of power relations in educational leadership. Participants in this study were selected using purposive sampling or non-random sampling techniques, allowing relevant participants to be obtained according to the specified criteria (Etikan, 2016). The selection criteria of participants in this study are students who are enrolled in the faculty of education at university in West Java, Indonesia; who have dual roles as students and educators teaching at educational institutions ranging from early childhood to secondary education; and who have a minimum of two years teaching experiences, ensuring they had sufficient experience and understanding to reflect interaction with educational leaders. A total of 7 students-workers participated in this study with their approval and consent, where they worked in different educational institutions offered varied insight into power dynamic.

The data in this study was collected through semi-structured interviews, which provided space for student workers to share their perceptions comprehensively while focusing on answering open ended questions on the specific topic. The interviews were conducted in-person and online depending on the availability of participant, allowed the researcher to explore their experiences, thoughts, and feelings, particularly about the power dynamics of educational leadership that they experienced. Data gathered from interview were recorded and transcribed for analysis process. Data analysis in this study used a thematic analysis approach following the six-phase framework that highlighted recurring themes in the interview transcripts (Braun & Clarke, 2006). Moreover, to ensure reliability and credibility of data, researcher employed several strategies including member checking, peer debriefing and data triangulation by comparing the findings with relevant literature. These sequences aim to ensure that the data interpretation process is objective and the data representation is accurate according to the student worker's experience.

3. Findings and Discussions

Based on interview results conducted with students, several main themes were obtained including leadership flexibility, the importance of effective communication, empowerment through the support provided, and the influence of justice in the distribution of tasks and responsibilities. Power dynamics within educational institutions play an important role in shaping the experiences and working relationships between educational leaders and student workers. These findings highlight the importance of democratic and inclusive leadership, creating an educational environment that empowers students to achieve school goals. The other important finding is the critical role of leadership in fostering a balanced role of student-workers between academic and professional demands, ensuring they feel supported and empowered in managing their tasks. Further in-depth discussions will explore the implications of these findings, making recommendations for improving effective and sustainable educational leadership practices.

3.1. Openness and Flexibility in Leading

The findings show that the openness and flexibility of education leaders greatly affect the student-worker experience in the education environment. This openness of the leader can be seen in one statement *"Alhamdulillah, the leadership style or leaders in the school where I currently work, thank God, use a leadership style that is quite open, and the leaders are leaders who want to listen to subordinates. When there is input or suggestions from below, the leader, especially the leader in the school I work in, does not hesitate to accept suggestions or criticism"* (Respondent 2). Leaders' openness to suggestions and criticism from subordinates can build a harmonious relationship to support each other in advancing the school. According to Javed et al. (2020), the openness of leaders in providing experience to their subordinates encourages the development of innovative work behaviors that contribute to the development of its organization. When leaders actively listen to their subordinates' concerns, and use them as a basis for decision-making, it encourages participation. This openness has a personal effect on student-workers, encouraging them to be disciplined in their job, and still pay attention to the importance of continuing their undergraduate studies. Likewise, the openness of school leaders is a means to learn, develop pedagogical skills, and maximize the potential of student workers, especially related to student-related issues in the classroom. This shows

that openness can contribute to the personal and organization's development, building positive relationships between student-workers and their principals.

Furthermore, the flexibility of leaders in assigning responsibilities to student-workers is indispensable, helping them meet their need to balance duties and responsibilities. One student-worker pointed out “*My principal's leadership style is flexible, prioritized and must be responsible for the tasks assigned*” (Respondent 5). Other respondents also stated that leaders who can adjust job expectations to their study schedules help maintain a professional and academic balance. This is done by giving them time to complete their educational tasks, while still giving their professional responsibilities proportionately and considering the situation and circumstances. Flexibility is important in leadership practices to improve individual innovation performance (Gerlach et al., 2021). The flexibility provides a space for student-workers’ self-development; and gives an overview of the reality of the workforce in the school context. More than that, this flexibility not only supports the dual role of student-worker; but can also increase their loyalty and motivation at work.

In leadership theory, an open and flexible leadership style is closely related to servant leadership, positioning the leader as a facilitator and supporting the team. According to Canavesi and Minelli (2022), servant leadership is a moral-based leadership practice that emphasizes the importance of meeting the needs of its followers which positively influences the performance of individuals and the organization as a whole. The openness and flexibility of the principal is also in line with democratic leadership which has a positive effect on teacher performance (Sarwar et al., 2022). Leadership that serves is appropriate to be used in facing job challenges in the modern era, through the formation of worker identities and family relationships between them, encouraging each other's capacity building in meeting organizational (Eva et al., 2019). This leadership approach greatly affects the satisfaction and performance of students and workers in carrying out their duties as educators in schools, while meeting the demands of professional qualifications through further study in higher education. As such, this flexibility and openness positively impact student-workers' experience in balancing their dual roles.

3.2. Leader Support as Empowerment

The responsibilities given to working students are seen as their empowerment process. This can be seen in a statement “For example, if a leader or principal gives a class teacher the confidence to give a big responsibility, it can be very motivating. I feel valued and empowered and tend to have a greater sense of responsibility towards the work, for example in a farewell event” (Respondent 7). This response aligns with other respondents’ answers which consistently highlighted the importance of support from education leaders through recognition, encouragement, and practical direction, creating confidence and engagement in the workplace. Referring to Li et al. (2017) the empowerment given to the team proportionally, through the support felt by the individual, affects their psychology and impacts positive organizational behavior. This support allowed them to practice the knowledge gained from lectures in real life context, such as providing counseling, and contributing in national examinations. These supports not only empower them professionally; but also help hone other skills such as leadership and managerial skills.

Empowering leadership is considered a leadership pattern that provides many benefits, giving autonomy, power, and responsibility to subordinates, to increase internal motivation in achieving work goals effectively (Cheong et al., 2019). One respondent even stated that she was trusted to be the vice principal for student affairs, which was not only a new responsibility in addition to teaching and studying; but also, a basis of motivation for her to perform her duties better. This can be seen in the statement “As the Vice Principal for Student Affairs, I have the authority and policy from the leadership regarding student management and care. In this case, I am responsible for managing order and cleanliness in each classroom. Thus, I can share my expertise and continue to discuss and share experiences with the principal” (Respondent 1). This responsibility is perceived as a trust to be maintained, requiring them to effectively build good relationships with the principal and his staff, supporting their academic responsibilities as students. However, educational leaders need to understand the difference between rewards and recognition, and give them fairly, which has an impact on student-worker motivation and performance in carrying out their job (Hansen et al., 2002). There is a sense of exclusion and not being appreciated by student-workers when the tasks are not proportionally given, and lack of recognition for their contributions to the school. Leadership practice must fairly and transparently give duties and responsibilities; to foster a sense of empowerment while still paying attention to the student-workers’ schedule and course load. Therefore, education leaders need to provide consistent, fair, and transparent support, which not only aims to improve the skills of all staff; but also creates an inclusive and empowering school climate.

The importance of fair distribution of tasks was also a focus of respondents in looking at how their relationship with education leaders. Fairness here is not related to the same number and responsibilities between them, but a proportional division that also affects the salary they get. In addition, the education leader of one of the respondents always considers the priority scale of student-workers, between work and education go hand in hand. As stated by Yukl (2012), good leaders are able to choose the right actions according to the situation and positively influence the trust of the people they lead. Interestingly, one respondent emphasized that “*the success of one's leadership is when he or she is able to breed the next leaders,*” which shows that the willingness of educational leaders to accept student-workers in their institutions is one of the steps to develop the educational institutions they lead. This trust is the main support for student-workers to give their best performance in accordance with their initial commitment when joining the school.

3.3. Communication is a Key Factor

The findings of the study show that the factor that greatly affects the working relationship between education leaders and working students is communication. As can be seen in one statement “*My principle where I work always prioritizes deliberation and discussion. They always communicate well. Why is that? To avoid miscommunication. Although there may be one or two miscommunications or misunderstandings, all problems are always resolved properly. The existence of good communication will certainly produce a clear understanding and prevent us from miscommunication*” (Respondent 6). This statement underlined open, two-way, and transparent communication as an aspect that affects their experience in educational institutions and supports the creation of a harmonious work environment. Leaders who are open to input and suggestions from their subordinates are considered successful in building trust and mutual understanding, and even do not hesitate to discuss their needs. This was reinforced by the other respondents who stated that he felt comfortable conveying all the academic problems he faced, without any worries about conflicts with the job expectations given.

The finding is in line with Yukl (2012) who stated that effective communication plays a crucial role in facilitating cooperation and collaboration in work, providing a clear organizational vision and goals in building members' work commitment. In this case, effective communication helps working students balance their dual roles, helps leaders understand their responsibilities better, and collaborates with other teachers in fulfilling work responsibilities when they are busy with lectures. This effective communication begins with a good explanation of duties and directions to working students, making them feel appreciated by the education leadership. As mentioned by one of the respondents who stated that “*I feel very supported, especially when it comes to scheduling. The principal often asks, “What day is your class?” This shows that he cares and provides support for my academic activities*” (Respondent 4). This highlights through effective communication with the principal, the division of teaching duties at the beginning of each academic year always takes into account the schedule and lecture load they have. This certainly has a positive impact on the individual working students in balancing their dual roles; and on the educational institution itself in relation to the effective contribution they can make.

Effective communication is also at the core of the transformational leadership style, where a strong relationship between leaders and student-workers is built through positive interactions. According to Men (2014), transformational leaders support communication through a variety of communication channels, both directly and through the media, supporting the establishment of two-way communication, preventing conflicts, and being able to increase job satisfaction. Therefore, the lack of transparency, lack of duty, and policies that do not support the development of students-worker skills; are the main challenges that may result from miscommunication between them and education leaders. Thus, effective communication is not only the basis of a harmonious working relationship; but also supports the productivity of working students by listening to the needs of subordinates in building an inclusive work environment.

4. Conclusion

This research highlights the importance of openness, flexibility, leadership support, and effective communication in building working relationships that empower students and workers in the educational context. The findings show education leaders who can manage power dynamics wisely; creating a work environment that encourages students-workers' self-development. Several important factors need to be highlighted to create a sense of empowerment among working students such as the development opportunities, recognition of contributions, and adjustment of workload according to their schedules and academic load. On the other hand, ineffective communication, and injustice leaders' treatment, are the main causes of feelings of exclusion that hinder productivity.

Several limitations exist in this study, which include: first, data collection in research that only uses interviews does not allow generalization of findings; second, the educational context is almost the same, namely in one area in West Java, allowing differences in dynamics with other places; finally, the possibility of respondent bias occurs through their emotional involvement in the reported experience. Henceforth, given the limited reference sources on student-workers' perceptions of leadership power dynamics can be a reference for future research, taking into account the broader context of education or in non-education organizations. A quantitative approach can also be an alternative to statistically measure the relationship between leadership style and level of empowerment. Thus, a deeper understanding of these power dynamics can be the basis for developing more inclusive and empowering leadership practices.

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Exploring the impact of Hong Kong Benchmarks (HKBM) on career and life development in secondary schools

Kin Cheung Adrian YAN^{1*}, Yam Wing Stephen YIP², Ka Wing Kelly YUNG³, Wai Sun Derek CHUN⁴
^{1,2,3,4}Research and Development Office, The Education University of Hong Kong, Hong Kong SAR, China
akcyan@eduhk.hk, sywyip@eduhk.hk, kkwyung@eduhk.hk, dwschun@eduhk.hk

Abstract: The increasing importance of career and life development (CLD) suggests the need for curriculum changes to facilitate students' school-to-work transition. The school curriculum now extends from sacrosanct subject knowledge to other learning experiences that are related to career planning and development. The Hong Kong education system largely follows this trend, which is evident from the several waves of reform that seek to adopt the notion of lifelong learning, diverse further studies pathways and introduce career-related elements to the school curriculum. Against this backdrop, we examine the enactment of school-based CLD policy. In so doing, we focus on a youth project called CLAP@JC, which involves local secondary schools adopting the Hong Kong Benchmarks (HKBM) to promote school-based CLD. We based our analysis on research data from semi-structured interviews with twenty career leaders. We found that the impact of adopting the HKBM was most salient in the following three aspects. First, HKBM systematized existing school-based CLD practices by providing a practical and measurable framework for the interviewees. Second, HKBM increased the agenda visibility of CLD at the school programmatic level, thus giving interviewees more bargaining power to persuade subject teachers to incorporate CLD elements into their routine teaching. Third, HKBM offers a 'common language' for individual schools to engage in professional exchanges on CLD-related matters with other participating schools. This created a platform for interviewees to share good practices and to initiate joint-school CLD activities. We discuss the implications of this study for a whole-school approach to enacting educational changes.

Keywords: Career and life development, curriculum development, Hong Kong benchmarks, whole-school approach, Hong Kong

1. Introduction

The increasing importance of career and life development (CLD) suggests the need for curriculum changes to facilitate students' school-to-work transition. The school curriculum now extends from sacrosanct subject knowledge to other learning experiences that are related to career planning and development. The Hong Kong education system largely follows this trend, which is evident from the several waves of reform that seek to adopt the notion of lifelong learning, diverse further studies pathways and introduce career-related elements to the school curriculum. The first wave of reform took place in the early 2000s and adopted lifelong learning and whole-person development as the two over-arching themes of the reform, signifying the embrace of progressive pedagogies (Education Commission, 2000). The second wave of reform took place in the late 2000s in the form of introducing the New Senior Secondary Curriculum (Education and Manpower Bureau, 2005). This reform has two intentions: first, to provide a broad-based curriculum for senior secondary schooling, and second, to diversify further studies pathways. The third wave of reform took place in the mid-2010s in the form of enacting school-based career and life development (Leung, 2014). Under this mandate, schools are expected to promote CLD by providing career-related learning experience as a core component of routine teaching. Against this backdrop, we are aligning with the burgeoning literature in CLD in Hong Kong (e.g., Ngai et al., 2023; Yip, Holman & Lam, 2024) to explore the enactment of school-based CLD in local secondary schools. To this end, we draw on a youth project called CLAP@JC (CLAP for Youth@JC, 2020), which involves local secondary schools adopting the Hong Kong Benchmarks (HKBM) to promote school-based CLD.

2. Background: CLAP@JC and the Hong Kong Benchmarks for schools

CLAP@JC is a youth project funded by the Hong Kong Jockey Club Charities Trust and is co-created by the Chinese University of Hong Kong and the Education University of Hong Kong. It is a ten-year project that involves two phases. The first phase (2015-2019) concerns the training of school personnel for the preparation of implementing school-based CLD. The second phase (2020-2025) concerns the adoption of the HKBM for schools. The HKBM (Schools) framework is categorised into three components, *Core*, *Student-focused activities* and *Enabling environment*. Each component describes tangible best practices in the respective whole school sub-systems in Hong Kong that aligned with the core principles laid out by the Gatsby Benchmarks. The benchmarks are:

Core:

- 1) A Stable and Visible Career and Life Development Policy (BM 1)
- 2) Professional Competencies and Leadership (BM 2)

Student-focused activities:

- 3) Learning from Multiple Pathways Information (BM 3)
- 4) Address the Needs of Each Student (BM 4)
- 5) Student Engagement and Co-creation (BM 5)
- 6) Personal Guidance for Developing Career Roadmaps (BM 6)

Enabling environment:

- 7) Linking Curriculum Learning to Career and Life Development (BM 7)
- 8) Meaningful Encounters with the Workplace (BM 8)
- 9) Meaningful Encounters with Further and Higher Education (BM 9)
- 10) Parent Engagement and Support (BM 10)

The HKBM (Schools) serves *more than a* ‘checklist of good practice principles’ with close reference to the Gatsby-based global standards in CLD. It is also designed to be a self-improvement tool to unleash micro-processes in the school systems that are ecologically feasible in Hong Kong school and policy contexts (Holman & Yip, 2020)

3. Research design

This study belongs to a large research project that evaluates the impact of adopting the HKBM by local secondary schools on students’ career readiness. In particular, the qualitative study aims to unveil the ‘black box’ of implementing school-based CLD through the HKBM. The research data set we draw on consists of a study of 20 schools which have adopted HKBM. It employed semi-structured interviews with school personnel, including career masters/mistresses and the school principal. Data collection took place from June 2023 to October 2024 as part of a regular project evaluation exercise. Each interview lasted from 45 to 60 minutes. Prior to the beginning of each interview, the interviewees were briefed with the particulars of the research study and were assured that their names and affiliated schools were anonymized in any form of publications. All interviews were audio recorded, translated and transcribed from a mixture of spoken Cantonese and English to written English.

4. Findings

The impact of HKBM on school-based CLD activities was evident in three main aspects, namely: systematization of existing school-based CLD practices, increased agenda visibility of CLD in school operations, and enhanced school networking and social learning in implementing CLD.

4.1. Systematization of existing school-based CLD practices

One of the most significant impacts of HKBM on school-based CLD was the systematization of existing school-based CLD practices. By ‘systematization’, some of the interviewed career masters/mistresses elaborated:

“What we mean by ‘systematize’ is avoiding the overlooking of certain aspects (in CLD), such as student groups and resources; HKBM offers something that is measurable and transferrable. For the latter, it means that CLD could be passed on smoothly from one career master/mistress to another. This does not rely on the commitment of individual teachers” [School 01]

“Giving career masters/mistresses a sense of scale, that is, how much is enough? This perplexed me prior to joining CLAP@JC. For instance, when it comes to workplace visits, how many visits shall we arrange? How do we strike a balance between students’ preferences and the business organizations/NGOs available? HKBM gave clear guidelines on this regard, level of engagement and student participation percentage” [School 02]

These two quotations are insightful because they underscore some of their concerns regarding the implementation of CLD prior to joining CLAP@JC. For School 01, their concerns revolved around the lack of tangible indicators reflecting their progress and achievement, as well as the passing of CLD-related duties from one career master/mistress to another. As for School 02, their concerns were more on the lack of sense of scale in terms of organising CLD-related activities.

In the light of these concerns, what HKBM could offer is a clear framework that outlines the key aspects of implementing CLD and provides guidelines on the particulars of organising related events. This was reflected in the participating schools’ juxtaposition of their CLD practices before joining CLAP@JC with those after:

“Prior to joining CLAP@JC, our school did not deliberately count the number of activities held and the percentage of student participation. The activities were rather sporadic – we would let the students participate when the opportunity presented itself” [School 01].

“Prior to joining CLAP@JC, we tended to focus solely on students, we did not realize the significance of school environment and curriculum” [School 03]

“HKBM fostered a more comprehensive understanding of school-based CLD. Newcoming teaching staff were able to grapple with the major aspects within a short period of time. The HKBM consists not only ‘numbers’, but also a list of related vocabularies such as ‘World of Work’, ‘needs’, and ‘levels of participation’” [School 04]

“HKBM provided a clear framework (with guidelines, procedures and criteria) for school-based CLD which could be passed on from one career master/mistress to another. [...] he reckoned that there was a limit if everything was down to personal experiences” [School 05]

As reflected in the above quotations, HKBM offers career masters/mistresses a clear idea of the key areas to be covered in implementing CLD. Some of them have been overlooked due to a lack of systematic framework and manpower. More importantly, HKBM provides a clear framework that can be passed down from one career master/mistresses to another. This contrasted with previous practices which were largely dependent on individual teachers' commitment. As a result, the succeeding career masters/mistress often experienced difficulties in acquainting themselves with such as a vast amount of knowledge and practical wisdom. Also, HKBM allows newcomers to quickly familiarize themselves with the key aspects of CLD within a short period of time. This is especially crucial when the teacher turnover rate is quite high or that the CLD team is expanding.

4.2. Increased agenda visibility of CLD in school operations

The second significant impact of HKBM was the increased agenda visibility of CLD within school programme planning. Here school programme planning refers to the annual practice of highlighting the prioritized agendas in the forthcoming school year and arranging school-level and subject-level teaching activities in a systematic manner. This effectively determines the distribution of manpower and resources. As a common practice in secondary schools, teaching activities that have strong links to matriculation examinations are often accorded a higher priority than those with more indirect links. Therefore, most secondary schools are managing multiple agendas which demand manpower and resources. In the light of this, BM 7 emphasizes the importance of linking CLD to the school curriculum, more specifically, the subject departments. This helps to make CLD a more visible agenda in the school programming planning and thus prompts subject teachers to incorporate CLD-related elements into routine teaching.

What emerged from the interview data was that the agenda visibility of CLD increased through elevating the agenda as a 'major concern' shortly after joining CLAP@JC. These major concerns were spotlighted agendas that the school management would monitor across a three-year span, aligning with the three-year duration of senior secondary schooling after the implementation of the New Senior Secondary Curriculum in 2009. When CLD was promoted to a major concern, all teaching staff had to incorporate CLD-related elements into their subject teaching. Thus, it became easier for career masters/mistresses to convince their colleagues to implement CLD with reference to the HKBM. This contrasted with the existing practices, as the interviewee from School 06 pointed out, that implementing CLD was almost the sole responsibility of the career guidance team with minimal involvement with other subject departments or functional units. The following presents some of the quotations from the interviewees that reflects the increased agenda visibility of CLD:

"Joining CLAP@JC facilitated the elevation of CLD to a Major Concern in school year planning, this provides the leeway to convince subject teachers to devote a portion of their lesson hours to implement the related HKBMs" [School 01]

"The status of school-based CLD has been enhanced. Both teachers and students realised the need to implement CLD. Everyone goes for the extra mile, acknowledging the synergies created when subject departments were heavily involved in implementing CLD (1+1>2)" [School 02]

"HKBM gave school-based CLD a clear orientation, which made it easier for career master to motivate his colleagues to help implement CLD. It allowed other teachers to realise that implementing CLD is meaningful and connected to their subject teaching" [School 05]

"Prior to joining CLAP@JC, CLD was perceived as the sole responsibility of the CLD team. In other words, the CLD team tended to work in a silo, although all teachers teaching Form 6 should be acquainted with the knowledge about further study pathways." [School 06]

The interviewees gave examples of how CLD-related elements were incorporated into subject teaching. For science subjects, such as Physics, Chemistry, and Biology, subject teachers introduced their corresponding industries to strengthen the linkage between school knowledge and the world of work, such as engineering and pharmacy. For humanities subjects, such as Economics and Geography, subject teachers introduced polar science. For arts subjects, subject teachers aligned some of their lesson planning with CLD, such as introducing vocabularies associated with the world of work, writing a cover letter, and understanding job requirements. As for subjects with a closer connection to the world of work, including Tourism and Hospitality, Health Management and Social Care, subject teachers placed more emphasis on the essential knowledge, skills, and attitudes that were directly related to the subjects' corresponding industries.

The increased agenda visibility of CLD in school operations largely affirmed the indirect effects of adopting BM 2 on students' career readiness. This is evident in the career masters/mistresses' leadership in persuading their colleagues to incorporate CLD-related elements into subject teaching. As a result, the implementation of school-based CLD is no longer confined to a single administrative unit; instead, it is distributed across subject departments and thus leads to a higher level of students' career readiness. Moreover, this impact of HKBM corroborated the indirect effects of adopting BM 3, BM 4, and BM 6 on students' career readiness. This can be explained by the fact that, with CLD being a prioritized agenda in school programme planning, more resources and manpower are allocated. Students are then benefited from a range of CLD-activities at whole-school, subject-based, and individual levels.

4.3. Enhanced school networking and social learning in implementing CLD

The third significant impact of the HKBM on school-based CLD is the schools' enhanced networking and social learning in implementing CLD. It is important to point out that there were numerous school networks on various initiatives, such as teachers' professional development, Information and Communication Technologies (ICTs); nevertheless, networks established under the guise of CLD were rare. This was reflected in the remarks from the career mistress in School 01 (Cluster 2):

"Prior to joining CLAP@JC, the school had no particular concept of the 'hub'. The closest thing to a 'hub' was a WhatsApp group with teachers from other schools. However, since there were so many members in the group, the exchange of ideas remained superficial. Nevertheless, after becoming a Hub school, there were regular meetings with teachers so that they had a clearer idea of what they were going to discuss about CLD."

This quotation was illustrative of the state of implementing CLD prior to joining CLAP@JC that even if some forms of connections were established, meaningful interactions were rare.

As recounted by the interviewees, when their schools joined CLAP@JC, they were inducted to a school network comprising 'hub' and 'resource' schools. This created a platform for the participating schools to meet regularly and share their experiences in implementing CLD. In particular, the HKBM provided a 'common language' for career masters/mistresses to compare and contrast CLD practices. A notable benefit of such a school network was establishing good rapport among teachers and thus this facilitated the exchange of good practices across schools. The following quotations highlighted the instances of exchanging ideas with other schools within their corresponding hubs:

"When the school was promoted to a Resource School, we were in charge of organizing joint-school CLD activities, such as workshops teaching photography, alumni sharing, erecting information booths for elective subject selection (with the help of senior form students)." [School 02]

"The Network School held 3 to 4 meetings per school year, sharing insights into organizing activities, such as sending Career Ambassadors to Career Expo, workplace visits." [School 04]

"Learning from other schools: Signature activities, including talks about further studies during teacher-student dinner galas." [School 04]

"Learning from the good practices at other schools: Elective subjects selection need not be led by teachers. Senior form students who had first-hand experiences of taking the elective subjects were a more relatable figure to their junior form counterparts. The senior form students would share their understanding of the school subjects, their classroom experiences, and their jotted notes." [School 06]

Learning and referencing the good practices from other schools was crucial because it showed that the adoption of HKBM was not a solitary activity; instead, it was a process of social learning within a community of practice (Wenger, 1999). More importantly, the concept of 'school hubs' facilitated the pooling of collective wisdom accumulated by career masters/mistresses in the course of implementation. This was particularly the case when some benchmarks were especially challenging to meet. For example, the majority of schools reported that BM10 (i.e., parent engagement) was a huge challenge. In the light of this, School 02 gathered from other schools that career masters/mistresses could ask students to put down their career aspirations on postcards, which would be handed by the class teachers to their parents on Parents' Day. This allowed the parents to better understand their children's thoughts and thus would be more supportive of their CLD-related activities.

5. Discussion and concluding remarks

The enactment of school-based CLD through the adoption of HKBM testifies to some of the enduring challenges within the Hong Kong schooling system, notably the existing teacher staffing arrangements along the lines of subject departments. Such an arrangement implicitly reinforces the importance of subject teaching that is closely tied to matriculations and this discourages the coverage of curricular contents, in this case, CLD, that previously lack curriculum standing. Even if the CLD team or equivalent is present at schools, they mostly work 'in silo', indicating a lack of collegial support from senior school management and across subject departments. These structural barriers are especially prevalent in education systems from the East Asian region, such as Singapore, Japan, where their schooling systems largely inherit from their colonisers or borrow from a range of Western curriculum models. In the context of promoting curriculum development, these obstacles may hinder cross-departmental collaboration and the changing of role of schooling prompted by changes in the global labour market.

In the light of this, the HKBM, borrowed and modified from the Gatsby Benchmarks, is capable of providing a framework for local secondary schools to highlight the key aspects in promoting school-based CLD in such a way that aligns with the school administrative structure. This enables the career leaders and their taskforce members to persuade other subject teachers to include CLD-related elements into routine teaching. Moreover, the HKBM can function as a 'common language' across school networks and hubs to promote professional exchanges on CLD-related matters. Given the diverse practices and demographic features across schools, the HKBM allows professional exchange to be much more precise, which then enriches the career leaders' practical wisdom in promoting school-based CLD. Domestically, the enactment of school-based CLD through HKBM may serve as an exemplary example of promoting curriculum development 'from the bottom' in the sense that non-governmental organizations play a crucial part in introducing foreign influences (e.g., Gatsby Foundation) and in initiating pilot schemes within a selected sample of schools for others to follow. Further studies may compare and contrast the reform experiences using similar benchmarks or equivalent beyond the Hong Kong context.

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Integrating Instructional Leadership in Developing Intangible Cultural Heritage

Courses: A Case Study of Suzhou Embroidery in a Chinese Primary School

Yicheng MA¹, Linfen YAO²

¹Department of Education Policy and Leadership, The Education University of Hong Kong, Hong Kong SAR, China

²China Youth Committee of Arts and Crafts Association, Junlin Xuan Embroidery, China
s1142193@s.eduhk.hk, 1579740705@qq.com

ABSTRACT

Since UNESCO adopted the Convention for the Safeguarding of the Intangible Cultural Heritage (ICH) in 2003, countries worldwide have initiated waves of protection and inheritance of intangible cultural heritage. Against the backdrop of the New Curriculum Reform, China's education sector advocates for comprehensive and high-quality student development. This reform has granted schools autonomy in developing courses. This study aims to investigate the pathways for developing ICH courses in schools by implementing a Suzhou embroidery curriculum in primary education, while exploring the principals' instructional leadership practices in this process. Integrating extracurricular school activities and ICH not only represented an effective exploration of educational inheritance and protection of ICH but also utilized rich cultural heritage resources to enhance school curriculum systems and promoted comprehensive local educational development. Based on the local educational context and characteristics of school A, this study developed a Suzhou embroidery curriculum suitable for grades 5-6, emphasizing the construction of multi-dimensional curriculum objectives, multiple selection criteria for course content, multi-effective empowerment of curriculum subjects, and comprehensive course evaluation. The research revealed that internal school resources for developing such courses are relatively limited, and Chinese school principals currently tend to implement these programs through either integrating local resources or third-party procurement. Finally, this study discussed strategies for principals in developing relevant courses within schools.

KEYWORDS

extracurricular school activities, instructional leadership, course development

Internationalization of School Counselor Education: Strategies for Enhancing Global Citizenship

Susi FITRI^{1*}, Dede Rahmat HIDAYAT², Karsih³

^{1,2,3}Jakarta State University, Indonesia

susi.fitri@unj.ac.id, dederhidayat@unj.ac.id, karsih@unj.ac.id

ABSTRACT

The Purpose of this study is to obtain preliminary data to develop professional preparation of school counselors by fostering an understanding of international issues, diverse cultures, and the importance of global citizenship in school counselor works. Three methods are used to gather data for this study 1) documentation, 2) interviews with students, and lecturers 3) questionnaire about internationalization positioning and Global Citizenship. The results shows that the Guidance and Counseling study program has a fairly excellent value in the lecturer research aspect (55%), potential value to be developed at lecturer and governance aspect (42.8%). Students aspect is the lowest (12.5%). The Global Citizenship questionnaire, completed by 265 students, indicates a low global citizenship attitude (35.09%). Despite the relatively higher value of social responsibility (38%), it remains low. The the Guidance and Counseling study program has established cooperation with foreign institutions, enabling lecturers and students to engage in research and learning with external educational entities. However, current internationalization activities are sporadic and lack systematic programming. These findings suggest that the Guidance and Counseling Study Program should: 1) strengthen existing collaborations and seek new opportunities, 2) integrate internationalization programs into the curriculum, and 3) enhance governance to support internationalization, thereby effectively fostering global citizenship among students. This suggestions is use as baseline to develop internationalization program.

KEYWORDS

Internationalization, Global Citizenship, School Counselor, Multiculturalism

Developing Pedagogical Play-framework in Early Childhood STEM Ecology for Teachers' Future Readiness

Xinyun HU¹, Yutong LIANG^{2*}, Mingwei GAO³, Xuerui YANG⁴
^{1,2,3,4}The Education University of Hong Kong, Hong Kong SAR, China
xinyunhu@eduhk.hk, s1130593@s.eduhk.hk, mwgao@eduhk.hk, yangx@eduhk.hk

ABSTRACT

Play is essential for driving children's learning. Hong Kong's kindergarten curriculum included *play*, but its teachers often lacked the support to integrate play into the curriculum and pedagogy. This study aims to use the Pedagogical Play-Framework in a teacher education course to prepare in-service kindergarten teachers' future readiness for designing and using play activities to develop STEM ecology. We modeled 41 in-service Early Childhood (EC) teachers' uses of three types play, including open-ended, modelled, and purposefully-framed play. Their antecedents and their mechanisms in their 2,460 minutes of lessons for children aged 3 to 6 years via structural equation modeling. The findings show that compared to open play, these teachers used modeled play more often for (a) engineering, and progressively less often for the learning areas related to mathematics, science, and art, (b) small groups, and progressively less for individuals and large groups, and (c) circles than others. Compared to open play, these teachers used purposefully-framed play more often for (a) science, and progressively less in math, art, and engineering; (b) large groups, and progressively less for small groups and individuals; (c) circle activities, and progressively less for playground; table and chair, computer room, or learning corner; and least for outdoors.

KEYWORDS

Early Childhood Education, Pedagogy, Play, STEM, Teacher Education

Principal Well-Being Literacy: A Qualitative Investigation in Hong Kong

Junjun CHEN

The Education University of Hong Kong, Hong Kong SAR, China

jjchen@eduhk.hk

ABSTRACT

Current research mainly focuses on understanding and promoting principal well-being outcomes rather than well-being processes. Principal well-being literacy, a process-oriented well-being construct, is a ‘missing link’ in the current principal well-being literature both in Hong Kong and internationally. Well-being literacy begins with an individual's mechanisms for internal change, which establish interactive connections with the external environment to maintain and improve positive functioning. Therefore, well-being literacy is not about quick fixes and/or short-term well-being gains. Instead, well-being literacy is about a sustained shift in language, knowledge, and skills, whereby the use of language and co-created actions result in sustained well-being for individuals and groups. This study aimed at understanding how school principals perceived principal well-being literacy using a sample of 24 school principals from Hong Kong. Thematic analysis was employed to handle the interview data. Thematic analysis is a theoretically flexible method focusing on patterned meaning identified across a qualitative dataset. The participant's experiences of well-being literacy were coded according to the five dimensions - accessing, understanding, communicating and appraising well-being information, and promoting well-being intentions and behaviours. This project enables policymakers to identify policy priorities to better craft related public policies for cultivating principal well-being literacy to establish well-being promotion schools. This will be one step ahead of the OECD's call for a ‘wellness society’ by enhancing public health in Hong Kong and beyond.

KEYWORDS

School principal, well-being literacy, qualitative method, Hong Kong

教師團隊成為變革領導者：一家托育機構的經驗

Teacher team as change agents: Lessons learned from a childcare institute in

Shenzhen

Qiujuan GONG^{1*}, James KO², Jiafang LU³

^{1,2,3}The Education University of Hong Kong, Hong Kong SAR, China
s1139526@s.eduhk.hk, jamesko@eduhk.hk, lujf@eduhk.hk

摘要

Kotter 主張領導者通過制定戰略和願景來創造變革。有研究發現，分佈式的教學領導與幼教教師願意委身教學兩者是互為影響的，但該論點對教師團隊在變革中的角色和任務缺乏實證。數據來自對深圳一家托育機構負責人和管理人員及教師半結構化訪談的個案研究，探究幼兒教育工作者在實施托育新政策後如何變革以克服困難與挑戰。研究結果顯示，托育教師團隊發展成為變革領導者，領導力在變革進程中有以下呈現：用心培養內部優秀教師；教師個人的職業生涯規劃和差異化推進；將創新思維和戰略思維滲入教師團隊中；展示自身優勢和競爭力，成為變革領導者。

關鍵字

教師團隊；分佈式領導力；變革領導者；托育機構

Strand

Other Topics Related to Learning, Teaching and Assessment

其他與學習、教學和評估相關的主題

The Relationship Between Rural Junior Middle School Students' Belief in a Just World and Learning Engagement: The Mediating Role of Academic Emotions

Mengying WANG¹, Wuming HE^{2*}

¹The Education University of Hong Kong, Hong Kong SAR, China

²Faculty of Educational Sciences, Lingnan Normal University, Guangdong, China

²Guangdong Provincial Key Laboratory of Development and Education for Special Needs Children, Guangdong, China
s1158088@s.eduhk.hk, psyhewm@163.com

Abstract: To explore the predictive role and underlying mechanisms of belief in a just world (BJW) on learning engagement among rural junior middle school students, A survey, combining convenience sampling with purposive sampling, was conducted among 431 rural junior middle school students (Grades 7-9), including 122 males and 149 females, with a mean age of 14.45 ± 1.10 years. Utilizing the Just World Beliefs Scale, Adolescent Academic Emotions Questionnaire, and Learning Engagement Scale, the survey was administered both online and offline, resulting in 271 valid responses, representing a response rate of 62.88%. The findings indicated after controlling for gender and grade, a significant positive correlation between belief in a just world (BJW) and learning engagement. Both positive and negative academic emotions were found to partially mediate this relationship, with the mediation effect of positive academic emotions (47.73%) being greater than that of negative academic emotions (17.44%). In a nutshell, belief in a just world, as a psychological resource, emerges as a crucial predictor of learning engagement among rural junior middle school students. It is imperative to uphold their belief in a just world, maximize the elicitation of positive academic emotions, and thereby enhance their levels of learning engagement. That means: beliefs in a just world of rural junior middle school students can be influenced by academic emotions and affect their level of learning engagement.

Keywords: Belief in a Just World, Academic Emotions, Learning Engagement, Rural junior Middle student, Mediating Role

1. Introduction

Learning engagement serves as an important indicator of academic achievement (Liu, 2016; Zhou et al., 2021) and is a significant concern for society, schools, and parents. Fredricks et al. (2004) define learning engagement as a complex and multidimensional concept that encompasses the time, energy, and effort students invest in behavioral, cognitive, and emotional aspects of learning. Most research focuses on external factors influencing the learning engagement of rural middle school students, such as family functioning (Qi et al., 2023) and teacher autonomy support (Chen et al., 2015), while neglecting the interplay between internal and external factors. Belief in a just world (BJW), as an important psychological resource (Dalbert, 2002), may significantly influence the learning engagement of rural middle school students. Therefore, it is necessary to explore the relationship between belief in a just world and learning engagement, as well as the underlying mechanisms involved.

The concept of belief in a just world (BJW) was first introduced by American psychologist Lerner (1965), who stated, "In a just world, people get what they deserve, and they deserve what they get." On one hand, BJW can serve as a psychological buffer, helping individuals cope with the negative emotional experiences resulting from unjust events (Zhou & Guo, 2013). On the other hand, holding a belief in a just world can influence individuals' investment of time and energy in long-term goals (Hafer & Sutton, 2016).

Academic emotions refer to the various emotions experienced by students during the learning process, both inside and outside the classroom, including feelings of happiness, disappointment, and anger (Dong & Yu, 2007). Middle school represents a critical period in adolescent development, during which students' psychological growth is still immature, emotions are unstable, and identity confusion is prevalent. Students at this stage often have unclear self-perceptions and are highly susceptible to influences from school, community, family, and peers (Ling et al., 2022). Groups in disadvantaged positions within society can experience reduced negative emotional responses and increased subjective well-being when they possess a strong belief in a just world (Wu & Li, 2018). Rural middle school students, compared to their urban counterparts, occupy a relatively disadvantaged social position, making the study of this unique group particularly worthy of in-depth exploration.

Academic emotions constitute pivotal factors that influence academic engagement (Li & Zhang, 2018; Zu et al., 2021). Research has demonstrated that, amidst the pandemic, positive emotions facilitate students' adaptation to novel conditions, thereby enhancing their focus on learning tasks (Wu & Sun, 2021). Notably, when positive high-arousal academic emotions are prevalent, school adaptation among middle school students emerges as a significant predictor of their academic engagement (Yong et al., 2021). Additionally, another study has shown that negative low-arousal emotions are primary determinants of online deep learning among graduate nursing students (Ding & Li, 2022).

In Pekrun's control-value theory, different event evaluations lead to varying impacts on individuals' learning emotions, outcome emotions, and achievement emotions. The arousal of positive emotions alters the achievement within the behavioral

process, and the perceived value and control over the outcomes of learning serve as the primary basis for the elicitation of students' academic emotions (Gao, 2020). Based on this theory, belief in a just world can function as a cognitive resource that independently influences academic emotions by evaluating events, while the arousal of these emotions affects achievements within the behavioral process, such as learning engagement. Therefore, this study constructs a parallel mediation model grounded in control-value theory to provide empirical and theoretical support for enhancing learning engagement among rural middle school students. Consequently, this study hypothesizes that belief in a just world significantly predicts learning engagement among rural middle school students (H1), and that academic emotions (positive academic emotions/negative academic emotions) mediate the relationship between belief in a just world and learning engagement (H2).

2. Method

2.1. Participants

Convenience sampling is utilized in this study to administer questionnaires to students spanning from the seventh to ninth grades at a rural middle school located in Maoming City, Guangdong Province. Questionnaires were distributed via both online and offline means. Following the collection of 431 questionnaires, incomplete responses and those exhibiting consistent answering patterns were excluded, resulting in 271 valid questionnaires (122 males, 149 females; mean age: 14.45 ± 1.10 years). The overall response rate is 62.88%.

2.2. Instruments

The revised Belief in a Just World Scale (Su et al., 2012), which comprises 13 items. Utilizing a 6-point Likert scale, higher scores are indicative of a stronger endorsement of BJW. In this study, the scale demonstrated a Cronbach's α coefficient of 0.85. Confirmatory factor analysis (CFA) confirms good structural validity of the instrument ($\chi^2/df = 2.13$, CFI = 0.93, TLI = 0.91, RMSEA = 0.065).

The Adolescent Academic Emotions Questionnaire, developed by Dong and Yu (2007), is composed of 72 items and is divided into two subscales: Positive Academic Emotions (30 items) and Negative Academic Emotions (42 items). Higher scores on the 5-point Likert scale indicate greater intensity of the respective academic emotions. The internal consistency coefficients for the Positive and Negative Academic Emotions subscales were found to be 0.86 and 0.94, respectively. CFA suggests moderate structural validity of the questionnaire ($\chi^2/df = 2.34$, CFI = 0.61, TLI = 0.60, RMSEA = 0.072).

The revised Learning Engagement Scale (Fang et al., 2008), consists of 17 items. A 7-point Likert scale is employed, with higher scores reflecting greater levels of learning engagement. The instrument demonstrated an internal consistency coefficient of 0.95 in this study, indicating good reliability. CFA confirms good structural validity of the scale ($\chi^2/df = 2.65$, CFI = 0.94, TLI = 0.93, RMSEA = 0.078).

3. Results

We tested a mediation model using Hayes' PROCESS Macro (Hayes & Preacher, 2013: Model 4) with 5,000 bootstrap samples. The tendency to learning engagement was entered as the dependent variable with BJW as the independent variable and the academic emotions (positive vs negative) as a mediator. The results indicated that after controlling for gender and grade, BJW significantly predicted learning engagement ($\beta = 0.31$, $t = 5.56$, $p < 0.001$), positive academic emotions ($\beta = 0.32$, $t = 5.66$, $p < 0.001$), and negative academic emotions ($\beta = -0.17$, $t = -2.94$, $p = 0.004$) were significant.

Further analysis indicates that beliefs in a just world exert an influence on learning engagement via academic emotions. Specifically, the mediation effect attributed to positive academic emotions accounts for 47.73% ($\beta = 0.46$, $p < 0.001$, 95%CI: 0.14, 0.37), whereas the mediation effect linked to negative academic emotions constitutes 17.44% ($\beta = -0.32$, $p < 0.001$, 95%CI: 0.03, 0.17).

4. Discussion

Belief in a just world significantly and positively predicts learning engagement, supporting Hypothesis 1 and aligning with the findings of Li et al. (2021). This result also corroborates self-verification theory (Swann, 1997), which posits that individuals tend to seek information that confirms their beliefs. Specifically, the belief that "one reaps what one sows" encourages students to invest more time and effort in their academic pursuits. Students with a strong belief in a just world construct favorable cognitive frameworks to interpret their situations when faced with injustice (Liu & Han, 2021). Through self-adjustment, they take their studies seriously and strive to change their circumstances, thereby increasing their learning engagement.

The findings indicate that both positive and negative academic emotions partially mediate the relationship between belief in a just world and learning engagement, supporting Hypothesis 2. This validates the control-value theory, which suggests that academic emotions are emotional responses formed through cognitive evaluations of control over outcomes, thereby

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influencing engagement in the behavioral process (Gao, 2020). Individuals with a high belief in a just world can transform "stumbling blocks" into "stepping stones," maintaining an optimistic and open-minded attitude (Tian & Huang, 2020), which drives them to persistently pursue long-term goals (Tan et al., 2018).

This suggests that belief in a just world fosters positive academic emotions to cope with academic challenges, thereby buffering the threat posed by negative academic emotions to learning engagement. It also validates the broaden-and-build theory, which states that positive emotions facilitate individuals' active consideration of various actions, thereby expanding their attention, cognition, and behavioral scope (Gao & Tong, 2010). Factors such as perceived discrimination and attribution styles influence belief in a just world (Hafer & Sutton, 2016). When rural middle school students encounter unjust events, they can mitigate negative emotions through rational interpretations of their circumstances, leading to more long-term academic goals. Conversely, when they fail to form reasonable interpretations of their situations in the face of injustice, they may exhibit more negative emotions (Zhang et al., 2012). Such emotions consume significant cognitive resources, making it more challenging for individuals to focus on their learning tasks.

Therefore, in order to enhance the learning engagement of rural junior middle school students, we can take the following measures. Firstly, by organizing school workshops related to fairness, justice and resilience, we can strengthen students' belief in a just world (BJW) and enhance their psychological resources. Secondly, we can design interactive teaching activities and courses to cultivate positive academic emotions (such as interest and pride), while reducing negative academic emotions (such as anxiety) through stress management training and psychological counseling. Additionally, we can strengthen teacher training to enhance their understanding and support for academic emotions, and through parent education programs help parents understand the importance of BJW and academic emotions, jointly creating a supportive environment. On this basis, we can provide personalized learning experiences through technological tools (such as AI) and establish a peer assistance mechanism to promote the transmission of positive emotions. Finally, we should regularly evaluate the intervention effects, optimize the plans based on feedback, and conduct longitudinal studies to explore the long-term impacts of BJW and academic emotions, ensuring the sustainability and effectiveness of the intervention measures. These measures should be adapted to the cultural and socio-economic background of rural students to ensure their feasibility and effectiveness.

Certainly, here is a more concise version addressing the limitations of the research:

(1) The research sample is confined to rural junior high school students in a specific region of Maoming City, Guangdong Province, convenience sampling limits the generalization of the study results. Expanding the sampling scope in future studies would enrich the research and bolster conclusion accuracy.

(2) The methodology relies solely on questionnaires, with inadequate control over administration and environment, hindering comprehensive understanding. Incorporating qualitative research or longitudinal studies could provide deeper insights.

(3) The Adolescent Academic Emotions Questionnaire exhibits moderate validity fit indices, potentially due to item fatigue and consistent responses. Revising the questionnaire is recommended.

(4) Besides academic emotions, potential mediators or moderators like social support, socioeconomic status, peer relationships, and teacher-student relationship quality may also influence the relationship between beliefs in a just world and academic engagement. Future studies should explore these complexities further.

5. Conclusion

Belief in a just world, categorized as a psychological resource, is a notable predictor of academic engagement among rural junior high school students. As a variable that encompasses emotional elements, both positive and negative academic emotions partially mediate the relationship between belief in a just world and academic engagement.

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English-Medium Instruction in Vietnamese Higher Education:

Novel(ising) Pedagogy and Courses for Students' Voices and Engagement

Hoa Khanh TANG^{1*}, Khanh Hoang NGUYEN², Nguyen Huong Nguyen LUONG³

¹The Education University of Hong Kong, Hong Kong SAR, China

²International University, Vietnam National University, HCMC, Vietnam

³Ho Chi Minh City University of Foreign Languages and Information Technology, Vietnam

tkh8591@gmail.com

Abstract: *Teaching and learning in higher education have attracted research emphasising student-centred pedagogy and students' voices and participation. These are of great importance when it comes to English-medium instruction (EMI). There has been call for more research into what transpires in EMI classrooms to identify appropriate EMI pedagogy and practices that encourage student participation, engagement, and interaction. Therefore, this paper, being contextualised in Vietnamese higher education, investigates the pedagogical practices in two EMI courses: Algebra and Discrete Mathematics and Introduction to Business Management. It drew upon classroom observations and adopted Bakhtin's differentiation between the literary genres epic and novel in relation to voicedness as its theoretical framework to analyse the observed pedagogical practices. Data analysis identified closed pedagogy in the maths course, thereby identifying the course as an epic one. That is, not only the students' voices but also the instructor's voice was not permitted. By contrast, data analysis identified open(ended) pedagogy in the business course, thus identifying the course as a novel one. That is, the students' previous experience and various voices were recognised and allowed (for), and the students could be then regarded as active participants in the taught content. The open(ended) novel pedagogy is in accord with the student-centred instructional approach whereby students partake in communication and have their voices permitted, thereby constituting the appropriate EMI pedagogy and practices.*

Keywords: English-medium instruction, novel(ising), pedagogy, students' voices, engagement

1. Introduction

The interrelated processes of teaching and learning in first basic education and then higher education have attracted much attention and research emphasising student-centred pedagogy (Brown, 2003) and students' voices and participation (e.g., Briffett Aktaş, 2024; Weimer, 2013; Wong et al., 2023). Students are encouraged to "make-meaning" (Brown, 2003, p. 53) and have the power as to how they learn the taught content and when they partake in communication shared with them.

In higher education, learning should be held to be a socially constructed process in which instructors facilitate dialogues for learning (Hughes et al., 2023). What is called for is "meaningful interaction" whereby students interact with the taught content "at the level of meaning and meaning making" with interaction translating into students playing a part in producing the meaning of lectures (Gray, 2019, p. 473).

Student-centred pedagogy, students' voices and participation, and meaningful interaction are of greater importance when it comes to English-medium instruction (EMI). EMI is often referred to as "the use of the English language to teach academic subjects (other than English itself) in countries or jurisdictions where the first language of the majority of the population is not English" (Macaro et al., 2018, p. 37). More light should be shed on what transpires in EMI classrooms so that "appropriate EMI pedagogy and practices" can be identified (Sah, 2022, p. 126). EMI research is needed "to define the most suitable strategies to foster student participation, engagement and interaction" (Lasagabaster, 2022, p. 60).

Thus, this paper responds to the aforementioned calls. Being contextualised in EMI in Vietnamese higher education, it investigates the pedagogical practices in two EMI courses by drawing upon classroom observations. The paper adopts Bakhtin's differentiation between the literary genres epic and novel in relation to voicedness, for it provides a lens through which the pedagogical practices can be viewed in relation to the acknowledgement and permission of voices, or the lack thereof.

2. Theoretical Framework: The Epic versus the Novel

Bakhtin (1981) differentiates between the epic and novel in terms of voicedness. The world is held by Bakhtin to be replete with voices. The epic was born and nourished in the eras of closed and deaf coexistence of voices. It is marked by "[a]bsolute conclusiveness and closedness" (Bakhtin, 1981, p. 16). The epic discourse is passed on "by tradition" with the same world view that is "indubitably true" being shared by all (Bakhtin, 1981, pp. 16, 35). As a result, the epic does not provide access to personal experience, so authors speak or write from a "reverent" perspective about a past that is not accessible to them (Bakhtin, 1981, p. 13).

By contrast, the novel emerged and came of age in the eras of voices coming into contact with one another. The novel is associated with the “openended” present in which speakers/writers and listeners/readers are closely partaking (Bakhtin, 1981, p.7). It is directly influenced by “experience, knowledge, and practice (the future)” and is related to the “unofficial thought” (Bakhtin, 1981, pp. 15, 20). The novel entails rendering objects “familiar,” and people with their opinions represent the “starting point” (Bakhtin, 1981, pp. 23, 25).

3. Method: Participant Observation

3.1. Data Collection

The data were collected from an interdisciplinary EMI programme of Computer and Information Sciences at a Vietnamese university. The data were comprised of classroom observations of two courses: a maths course – Algebra and Discrete Mathematics (ADM) – and a business course – Introduction to Business Management (IBM). The first author obtained permission for the observation first from the Vice Director of the EMI programme and then from the instructors of the two courses. For each course, four lectures, each lasting three hours and a half, were observed with the first author sitting at the back of the classroom, taking notes of the pedagogical practice(s), and taking photos of the slides. All of the lectures were audio recorded and subsequently transcribed verbatim.

3.2. Data Analysis

The transcripts of the lectures were divided into units of analysis upon Canagarajah’s (2018) recommendation. Canagarajah (2018) suggests that the unit of analysis – i.e., “the scale or boundary of the interaction that is analysed” – should be activity (p. 806). Hence, what constituted the units of analysis were both short monologues and long polylogues. Afterwards, the identified units of analysis of the observational data were viewed through the lens of the differentiation between the *epic* and the *novel* in terms of *voicedness*.

4. Findings and Discussion

4.1. Algebra and Discrete Mathematics: Closed Pedagogy and Epic Course

There existed standard definitions of mathematical terminologies, and the closed pedagogy manifested itself in not only written language on the slides but also the oral presentation by the instructor. With regard to written language on the slides, the instructor presented them, such as the definitions of a homogeneous linear system and a trivial solution (Figure 1 below) in one of the lectures observed, in the form of categorical assertions. The employment of categorical assertions did not acknowledge or permit other voices and dialogistic alternatives. As such, the definitions of a homogeneous linear system and a trivial solution presented on the slide were rendered indubitably true.

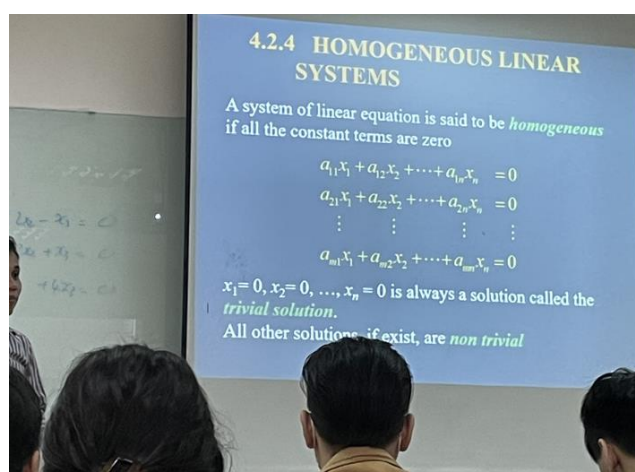


Figure 1. Standard definition of a ‘homogeneous linear system’

Excerpt 1

OK, now what is the homogeneous linear system? A homogeneous linear system is equation is said to be homogeneous if all the constant terms are zero. So you can see all five items are zero. This is homogenous linear system. Can you tell me the solution of homogeneous linear system? Yea, this is zero. OK, for example, x_1 plus 2 x_2 minus x_3 equal zero x_1 minus 2 x_3 equal zero x_1 plus 4 x_3 equal zero. We always have a solution. So this is trivial solution. Ah... All other solutions, if exist, are non trivial solution. **(ADM instructor)**

With respect to oral presentation, the instructor opted to present the definitions and properties at the outset of the teaching process and in a closed manner – that is, primarily through monologues. For example, the definition of a homogeneous linear system was presented by dint of a monologue whereby he asked a question as to what a homogeneous linear system was and immediately answered it himself by reading the definition on the slide out loud (Excerpt 1 above). Not only the definition on the slide but also its oral presentation by the instructor was in the form of a categorical assertion. As such, the students' voices were not allowed (for), and the definition of a homogeneous linear system was rendered absolute and conclusive.

Given that the definition of a homogeneous linear system was simply read aloud, not only the students' voices but also the instructor's voice was not permitted. In fact, the only voice that was enabled was that of the standard definition on the slide. The terminology and its definition were passed on to the students by tradition, and the personal experience of both the instructor and the students was not mobilised. The teaching and learning processes thus entailed the instructor speaking and the students listening from a reverent perspective about a homogeneous linear system that was not accessible to them. The students could be then regarded as passive receptacles of the taught content, the pedagogical practice closed, and the ADM course an epic one.

4.2. Introduction to Business Management: Opened Pedagogy and Novel Course

Just as there were standard definitions of mathematical terminologies from the coursebook, so there existed standard definitions of business ones. In terms of written language, they were presented on the slides also by way of categorical assertions (e.g., Figure 2 below). The employment of categorical assertions did not acknowledge or permit other voices and dialogistic alternatives, thus rendering the standard definitions and properties of business terminologies indubitably true.

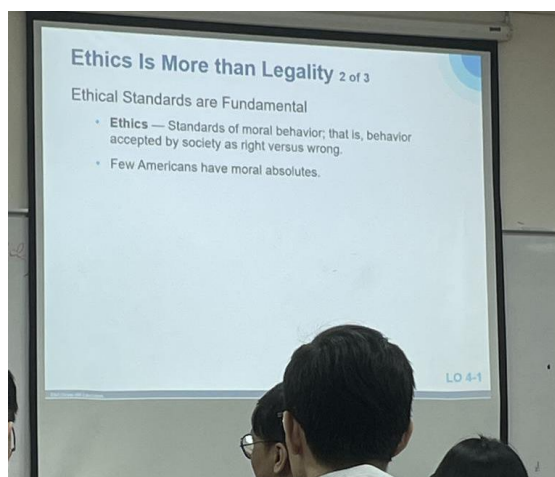


Figure 2. Standard definition of 'ethics'

Excerpt 2

Instructor:	In general, what do you understand about ethics? What is the Vietnamese term?
Students:	Đạo đức.
Instructor:	So what do you understand about ethics? Don't use Google, based on your understanding.
Students:	The rules you should follow.
Instructor:	Nice, one definition. It's something you should know because if you violate ...
Students:	You affect someone in bad way
Instructor:	OK you affect someone in a bad way. That's a definition. What else?

- Students: You do something that you never regret or feel guilty of your action
- Instructor: OK, you do something that you never regret or feel guilty about your action. Right. The action that violates the law. Thank you. So that's it. Each of us define ethics differently. Right, for example I throw my money on the floor. You see my wallet on the floor. Will you bring it to me?
- Students: NO [laugh]
- Instructor: So your answer depends on which items you find in my wallet. So ethics, generally, ethics is defined as the system of principles that guide the action based on right or wrong, good or bad and this system is accepted from a community, a society, not everyone, we have different systems, right.

However, for the terminologies of which the students had previous experience such as *ethics*, notwithstanding the standard definition (Figure 2 above), the instructor opted for an inductive approach. That is, he and the students partook in a polylogue in an open(ended) manner (Excerpt 2 above) whereby he asked the students the Vietnamese translation of *ethics* and their own understanding of it. He then commented, brought up a hypothetical case, and asked follow-up questions to draw out more answers. In response, with their previous experience and voices permitted, the students put forth their thoughts about *ethics*. Their several different ideas of *ethics* were acknowledged by the instructor and represented the starting point of the teaching and learning processes. By recognising and allowing (for) the students' previous experience and various voices, the instructor rendered *ethics* more familiar with them before presenting its standard definition. The students could be then regarded as active participants in the taught content, the pedagogical practice open(ended), and the IBM course a novel one.

5. Conclusion

This paper investigates the pedagogical practices adopted in two EMI courses in Vietnamese higher education "to define the most suitable strategies to foster student participation, engagement and interaction" (Lasagabaster, 2022, p. 60). In the Algebra and Discrete Mathematics course, the closed pedagogical practice has the course gravitate towards the epic. In such an epic course, the content is absolute and conclusive, and the students are rendered as passive recipients of it. Further, the content is presented through monologues at the outset of the teaching process, during which neither the voice of the instructor nor the voices of the students are allowed (for). The epic course does not provide access to personal experience. In consequence, the instructor speaks and the students listen from a "reverent" perspective about the content that is not accessible to them (Bakhtin, 1981, p. 13). The students do not interact with the taught content, nor are they encouraged to "make meaning" (Brown, 2003, p. 53). The closed epic pedagogy mirrors the teacher-centred instructional approach, thus not constituting the appropriate EMI pedagogy.

In the Introduction to Business Management course, the more open(ended) pedagogical practice has the course lean towards the novel. In such a novel course, the students are rendered as more active agents in the learning process. Even though the taught content is also absolute and conclusive, the instructor opts to employ polylogues, enabling the students' voices. By partaking in the polylogues, the students put forth their "unofficial thought[s]," which represent the "starting point" of the teaching and learning processes (Bakhtin, 1981, pp. 20, 25). Additionally, the mobilisation of Vietnamese translations, examples, and opposites by the instructor renders the taught content "familiar" to the students (Bakhtin, 1981, p. 23), assisting them in interacting with it "at the level of meaning and meaning making," hence "meaningful interaction" (Gray, 2019, p. 473). The open(ended) novel pedagogy is in accord with the student-centred instructional approach whereby students partake in communication (Weimer, 2013) and have their voices permitted (Wong et al, 2023), thereby constituting the appropriate EMI pedagogy.

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Transcending Formative Assessment: “Humorous” Use of e-Learning Platforms

Bernie Chun Nam MAK¹, Mike Hin Leung CHUI²

¹Hong Kong Baptist University, Hong Kong SAR, China

²The Education University of Hong Kong, Hong Kong SAR, China

bcnmak@hkbu.edu.hk, mikechui@eduhk.hk

Abstract: While humor has established its significance in classroom settings, literature on formative assessment has illustrated various approaches to utilizing educational technologies to achieve intended learning outcomes. Yet, it remains unclear how the affordances of them can be applied for purposes beyond the subject matter. This study aims to explore the use of such technologies for managing relationships between teachers and students and supporting their academic or personal growth through planned humor. Through an analysis of the digitized materials collected from a post-secondary English teacher and a focus group with four of his students, it was found that the functionalities of e-learning tools could be adapted to new pedagogy: The “additional details” and “Multiple Choice” on Mentimeter as well as the “Teacher feedback” on Edpuzzle could be used for teacher-initiated humor aimed at giving fun facts or developing rapport between the teacher and students. Students in the focus group recognized the teacher’s adaptation of these functions to enhance their e-learning experience and make it more enjoyable or meaningful, especially when the tools were used in a student-paced format. It is concluded that the primary functions of educational technology can be transcended by innovative pedagogy and a commitment to a sustainable, compassionate student-centered learning environment. Teacher educators are recommended to enlighten their student teachers on thinking outside the box when designing e-learning materials.

Keywords: digital formative assessment, educational technology, classroom humor, language education, higher education

1. Introduction

This paper reports a mini-study aimed at exploring the potential use of humor on e-learning platforms. Over the past decades, academics in the field of classroom humor have come to the consensus that at least some types of teacher-initiated humor, such as affiliative humor, can help develop or strengthen teacher-student relationship, implicitly creating a pleasant or comfortable learning environment (Andarab & Mutlu, 2019). Alongside this realm is the literature on educational technologies, such as student response systems, which has illustrated diverse pictures of how they can engage students’ attention (Tarazi & Ortega-Martin, 2023). However, probably because studies on humor tend to concentrate on spontaneous humor vis-à-vis planned humor, little is known about whether the latter may play a role in the increasingly digitalized classroom. The current study is intended to investigate the application of planned humor to teaching English as a second language in higher education, focusing on its performance in two famous apps, Mentimeter and Edpuzzle, and probing how it may serve specific purposes of enriching e-learning experience through addressing two research questions: i) *What functionalities of Mentimeter and Edpuzzle can provide new space for planned humor in classroom settings*, and ii) *What impacts will planned humor create on students’ e-learning experience when using the two apps?*

2. Theoretical Background

2.1. Digital Formative Assessment

Although the line between summative and formative assessments blurs, it has been recognized that the former is designed primarily to assess student learning outcomes at the end of a learning period, and that the latter is mainly to monitor student learning by providing feedback over the learning process. Traditionally, formative assessments were carried out in the format of question-and-answer session during class time (synchronously in spoken form) and comments on students’ homework or in-class exercises (asynchronously in written form). Technological advancement has made it possible to conduct formative assessments on e-learning platforms or apps, which can help provide students with timely feedback about the state of their subject knowledge (Petrović et al., 2017) and begin a constructive dialogue between teachers and students (Faber & Visscher, 2018). However, such a dialogue needs to be skillfully fostered as the digital environment may make communication less personal and interactional than thought, resulting in missed opportunities for deep learning in time (Vattøy & Gamlem, 2024). This may be why providing feedback on e-learning platforms by itself is not enough to change students’ learning behavior (Cosi et al., 2020). Hence, the use of digital tools for formative assessment should be strategized for student needs considering the local school- and class-based context.

2.2. Mentimeter and Edpuzzle

Many e-learning platforms or apps have been developed for student-centered learning as a positive response to the call for a constructivist approach to learning for the 21st century skills. There are those classified as student response systems (e.g., Socrative), tailored for game-based learning (e.g., Kahoot!), and designed for the flipped classroom (e.g., Microsoft Flip).

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Two exemplars are Mentimeter and Edpuzzle. Mentimeter is a student response system through which students can answer their teachers' questions with their mobile devices in class and teachers can discuss their answers projected onto the big screen. It can help engage students (Moorhouse & Kohnke, 2020), increase the voice of passive learners (Mayhew et al., 2020), and create a relaxed learning atmosphere (Pichardo et al., 2021). Edpuzzle is an app for teachers to integrate notes and questions into customized videos to be watched by students before, during, or after class. It can arouse students' interest in the subject content in advance (Gallardo-López et al., 2022), provide immediate feedback out of the class time (di Cesare et al., 2021), and keep students accountable for the upcoming learning activities (Shelby & Fralish, 2021). In short, the functionalities of both tools have been acknowledged by scholars and practitioners.

2.3. Humor in Educational Settings

There has been a large amount of research on the use of humor in classroom settings, from primary to higher education. Some can be classified as "spontaneous humor" arising from a naturally-occurring conversation in an impromptu manner; others are termed "planned humor" or "canned jokes", which are crafted with forethought and tailored to the imagined audience before use (see Dynel, 2009). Despite its informal nature as a discursive speech event in social interaction, humor has been found conducive to relating subject contents to students' daily lives (Bakar & Kumar, 2019), lowering their anxiety (Farnia & Mohammadi, 2020), developing teacher-student relationships (Lu'mu et al., 2023), and developing their sense of school belonging (St-Amand et al., 2024). Some researchers (e.g., Alemi et al., 2021; Andarab & Mutlu, 2019) even recommend teacher education programs include more formal training in using humor in the classroom.

To sum up, the present mini-study adds to the growing research on classroom humor, humor online, and digital formative assessment. It echoes Köroğlu's (2021) finding that students often welcome innovative design assessment even when it is test-based, rather than multimodal. It is hoped that the preliminary findings can fill the research gap among planned humor or canned jokes in the classroom, synchronous formative assessment, and educational technology.

3. Method

3.1. Setting and Participants

The study was conducted at a post-secondary institution in Hong Kong (the College hereafter) using a first-year course on English academic writing in which freshmen, regardless of their majors, would learn to employ the classic five-paragraph essay model to compose an English essay for evaluative purposes in APA style. These students were pursuing associate degrees (ADs), often considering ADs as stepping stones to senior entries into undergraduate degree programs upon the completion of study. The main participants were one of the course instructors and four of his local students in the course. While the course instructor was a linguist himself, none of the four students majored in English, and their results in the public examination for university entrance had been "level 2", which indicated a "basic" level of English proficiency that was not up to the standard of entering an undergraduate degree program offered by any local universities.

3.2. Instruments and Procedure

At the initial stage of this study, the course instructor already utilized Mentimeter and Edpuzzle in his academic writing course for four semesters. Previously, his students noted in the course feedback exercises that his lectures were dry and dull. He admitted that he had adhered to a traditional teaching style and struggled to captivate his students. To address this issue, he considered incorporating humor into his materials through canned jokes on the two aforementioned apps. Participation varied across sections, but at the end of the semester some students had left positive comments on their use of e-learning tools in the course feedback exercise. They pointed to his humor that was infused into the practices on the two platforms. Thus, his latest Mentimeter presentations and Edpuzzle videos were collected and analyzed, centered on the textual contents that could have been humorous from the student's perspective. Subsequently, four students from the latest cohort were invited to a focus group aimed at discussing why his e-learning tools could have been funny. Since the course instructor was the researcher himself, the focus group was conducted by another instructor of the same course to reduce possible bias that might exist in the data collection process. The recordings were transcribed into text, key themes regarding effective or ineffective humor were identified during the coding process, and the codes were further conceptualized into broader themes. Upon the results, the course instructor reflected on his practices and the outcomes, followed by conducting an internal workshop for his colleagues on the innovative use of e-learning apps in late 2024.

4. Data Analysis and Discussion

In the 13-week module on English academic writing, seven Mentimeter presentations were used in class; three were set to be "student-paced", which meant students would go through the slides at their own pace outside class. The slides were mainly "Multiple Choice", "Word Cloud", "Open-Ended", and "Ranking", together with some suggested answers. Six

Edpuzzle videos were provided for flipped learning, while two played in “Live mode” during class. The analyses below focus on the text-based planned humor performed by the course instructor using the functionalities afforded.

4.1. Humor performed in “additional details” on Mentimeter

Analyses of the course instructor’s Mentimeter presentations indicate that he will input humorous contents to the “additional details” of the question, which will appear only on students’ mobile devices when they see it, unless he rolls over the question in his own account logged on at the teacher desktop. The primary function of the box is to provide extra information to help students further make sense of the question, but here it is turned to an area for pre-constructed humor related to the wording of the question. This use has been well acknowledged by his students; as interviewee 3 said, “it makes us laugh when we think about the answers”. It aligns with the finding from various studies that Mentimeter can decrease the probability of boredom among students (Tarazi & Ortega-Martin, 2023). Figure 1 illustrates an example of this creative use by joking that students who fail to put the moves in the correct order will be “arrested”. The joke is shown on the student’s smartphone only (on the right), not directly on the lecture room’s big screen (on the left).

4.2. Humor performed as a nonsensical choice in “Multiple Choice” on Mentimeter

While humor can emerge when students read the question, sometimes it is the design of question itself that serves the punchline, as shown in Figure 2. Academically, choice 4 is unreasonable, but choices of this kind have been well noted by his students. Interviewee 1 stated, “it shows he can still be funny, though he always looks serious”. This echoes the perspective that successful teacher-initiated humor during e-learning is often appreciated by students (Moalla & Amor, 2020). Such humor may not transfer knowledge or serve any rhetorical functions related to understanding the subject content, but it is pedagogically meaningful to manage the teacher’s impression, especially when it has been mistaken.

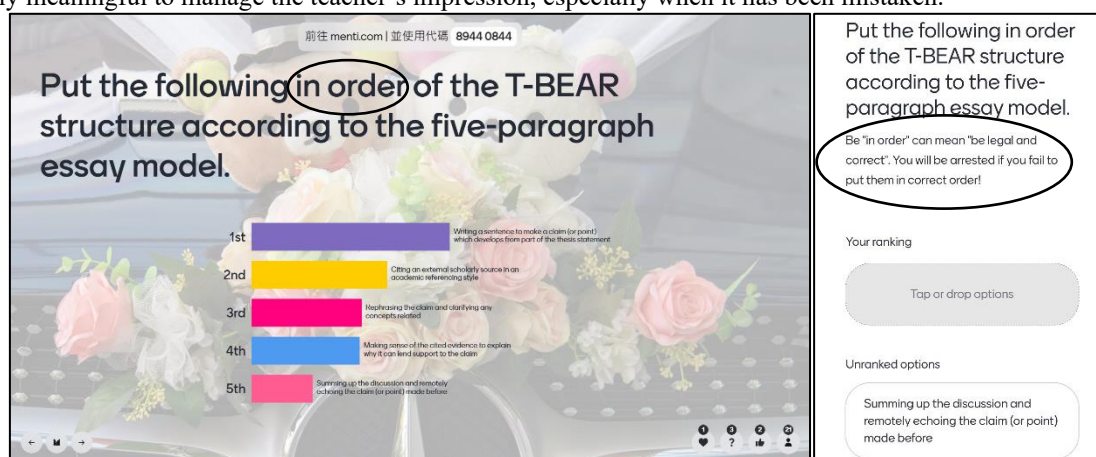


Figure 1. Adapting “additional details” of the question to tell a corny, canned joke.



Figure 2. Adding a nonsensical choice to “Multiple Choice” to make fun of the teacher himself.

4.3. Humor performed as “Teacher feedback” on Edpuzzle

Edpuzzle allows teachers to set “feedback” in multiple choice questions that appear when videos play and after students submit the answer. Different feedback can be given for different choices. The course instructor will adapt this function to a gadget for humor. Figure 3 delineates an example of giving feedback on right and wrong answers in a hilarious manner. On the right, the feedback on the first choice (right), half-jokingly indicates the nature of knowledge creation; the one on the second choice (wrong) teases the answer while pointing out the nature of academic reading. Such feedback hides its academic

value under humor, as described by interviewee 4, “the feedback seems to poke fun, but if you read it seriously, it often teaches us something new and at higher level. I know he wants us to grow.” This adaptive use adds to the existing perspective that Edpuzzle pre-set feedback is aimed at motivating students to take efforts to learn (more), not measuring their intelligence (Griggs & Moore, 2022). This goal can be achieved by providing humorous but valuable feedback. Such humor in itself will show the teacher’s rich experience in the subject area (Lu’mu et al., 2023). Additionally, interviewee 4 commented in the focus group, “some feedback is really funny to make me remember. Then I am better prepared and more relaxed for the next lesson”. This view mirrors the idea that Edpuzzle when used in flipped learning can increase students’ preparedness and decrease their anxiety due to uncertainty about what to learn (Shelby & Fralish, 2021). Since students are often expected to watch the videos before lectures, the humorous feedback, albeit canonical, will make them relaxed and help them remember the knowledge needed for the coming in-class discussions.

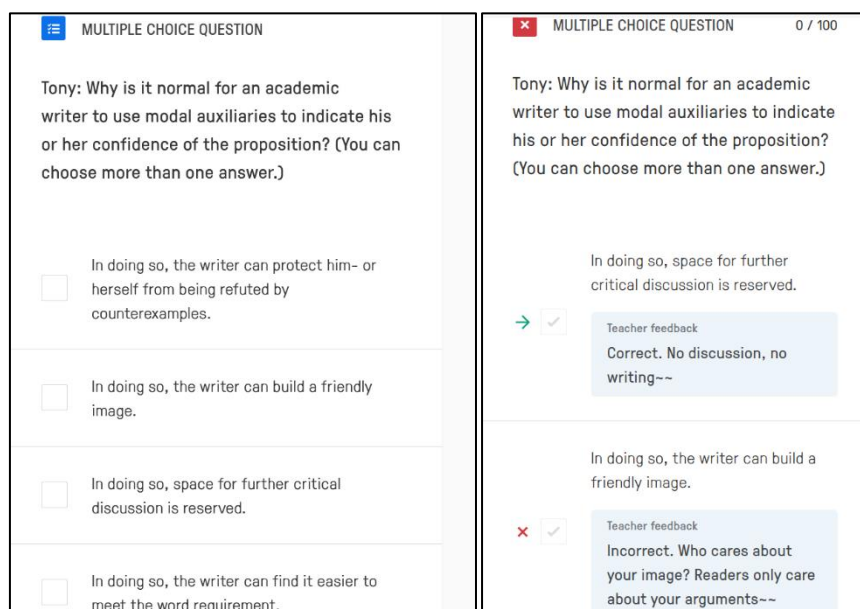


Figure 3. Making the automatic “Teacher feedback” hilarious but inspirational.

5. Conclusion

This study has described three innovative ways to perform planned humor when using Mentimeter and Edpuzzle. Strategically planned humor could take place as additional details, nonsensical choices in multiple choice questions, and preset feedback on student answers. As it can be prepared, edited, and reused, teachers (especially those who struggle to joke organically in situated context) will find it easier to adjust and ensure the alignment between humor, teaching, and learning. This flexibility further reveals an interesting phenomenon that planned humor can be tailored for the present setting but adapted for changing contexts in the future. Participants in the focus group declared that such humor would have made e-learning more enjoyable (#4.1), the teacher more approachable (#4.2), and preparation more memorable and rewarding (#4.3). The perceived advantages point to the developing potential of planned humor as a pedagogical practice and assessment strategy in the e-learning environment. Their appreciation also indicates the characteristic of education technology that the functionalities can be used creatively for purposes beyond their intended uses. Conclusively, it can be argued that education technology can be transcended by the effective use of innovative pedagogy during formative assessment. While innovation is an added merit, such an aptitude for enhancing students’ learning experience is credited to a commitment to a sustainable, compassionate student-centered classroom. It is suggested that teacher training programs include relevant topics in their courses on pedagogical design, e-learning, or digital formative assessment.

Acknowledgements

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Investing in informal digital learning of French: A multiple case study of French majors in China

Shiyuan WEN^{1*}, Yue ZHANG^{2*}

^{1,2}The Education University of Hong Kong, Hong Kong SAR, China
s1158186@s.edu.hk, yuezhang@edu.hk

ABSTRACT

The emergence of Informal Digital Learning of Languages (IDLL) has spurred growing interest in the field of computer-assisted language learning. Despite this attention, a sociolinguistic perspective of this issue remains under-explored, especially among learners of Language other than English (LOTE). This study explores the extent to which five Chinese undergraduates majoring in French invested in informal digital learning of French (IDLF) to claim as legitimate French users using the model of L2 investment. Drawing on data collected through semi-structured interviews and reflective learning journals, thematic analysis was performed to identify four recurring themes: (1) IDLF enabled learners to accumulate cultural capital, inspiring personal growth, such as the art de vivre (e.g., the art of living well); (2) IDLF allowed students to challenge the examination-oriented educational belief and ideology that once dominated their learning; (3) participants actively and agentively engaged with French language and literacy practices that accentuated their own positions and voices; (4) participants managed to invest in their legitimate French user identities in their imagined French communities (e.g., social media networks), providing resource-rich, supportive and interactive environments that empowered learners. These findings suggest that investing in IDLL can empower language learners to negotiate, construct, and perform language and imagined identities in the digital language communities, providing them with a sense of achievement, satisfaction, and ownership of the LOTE. Additionally, language practitioners should facilitate the exploration of digital tools and resources that ignite learner agency for IDLL learning, promoting such learner investment in IDLL.

KEYWORDS

Informal language learning, Language other than English (LOTE), investment, identity, Chinese learners of French

Exploring Collaborations Between Kindergarten and Music Schools: A Case Study from Hong Kong

Nikolay Tomov DEMERDZHIEV

Director of JSBM Hong Kong, Johann Sebastian Bach Music Academy, Hong Kong SAR, China
jsbm.hk@gmail.com

ABSTRACT

This research explores the critical role of performing arts education in early childhood programs, as emphasized in the kindergarten education curriculum guide by the Curriculum Development Council (2017). Grounded in JSBM, a local music school, the study highlights the need for enhanced music education for young children through partnerships with early childhood education providers. A significant shortage of qualified music teachers willing to work in local kindergartens was identified, linked to insufficient pedagogical training and a lack of dedicated study majors in the performing arts. To address these challenges, a proposal was made for a comprehensive music educational program to the Knowledge Transfer office of The Education University of Hong Kong, aiming to develop a learning hub that fosters interaction, creativity, and engagement among teachers and students. This hub will integrate various arts into combined learning activities based on Piaget's cognitive-developmental theory and Vygotsky's theory of scaffolding. Additionally, it will extend learning experiences to children at home through an online program that encourages knowledge sharing with family members. Furthermore, collaboration with the Hong Kong Science and Technology Park Corporation (HKSTP) is envisioned to leverage innovative technology, creating an engaging learning experience that enables children to interact with music and art, thereby enriching their early experiences.

KEYWORDS

Performing Arts Education, Early Childhood Education, Curriculum Design, Teacher Professional Development, Scaffolding Theory

From Text to Art: Integrating Storytelling and Art-Making to Foster Creative

Thinking An Empirical Study in a Nanyang Art Training Center, China

Yang LIU¹, Taoying WEI^{2*}

¹Guangdong Baiyun University, Guangzhou, China.

²Guangdong University of Foreign Studies, Guangdong, China.
150328019@qq.com; wwttty@gmail.com

Abstract: This study aimed to implement curriculum integration within art pedagogy, transforming classical Chinese language from a tool of knowledge transmission to a dynamic medium for emotional and cultural expression. A random sample of 149 students from an art training center in Nanyang, Henan Province, participated in a two-month experimental teaching program. Moving beyond traditional approaches, the study utilized the Classical Chinese text *Happy Excursion* as a pedagogical intervention in visual arts classes. By integrating storytelling with art-making, students were encouraged to interpret and express classical Chinese texts through the creation of expressive and interpretative artworks. The results demonstrated that this innovative approach not only facilitated a deeper understanding and long-term retention of textual material but also sparked greater student interest in classical Chinese studies. Additionally, the findings highlighted a significant improvement in students' imaginative and creative abilities, suggesting that this pedagogical strategy can reshape how classical Chinese language is taught and perceived. This study contributes to the discourse on educational innovation, providing empirical evidence that integrating language, culture, and art enriches the learning experience while fostering cognitive and creative development in students.

Keywords: Storytelling, Classical Chinese, Art-making, Empirical Study, Creative Thinking

1. Research Background

Traditional Chinese culture is increasingly integrated into school curricula at all levels. There has been a rise of trend in the study and academic research of traditional Chinese culture, arts, and humanities. The inclusion of classical Chinese literature, and traditional arts is meant to enhance students' appreciation of traditional values and cultural heritage.

The *Art Curriculum Standards* (Ministry of Education of the People's Republic of China, 2021) emphasize that art education should not merely focus on the training of skills and techniques, but should be viewed as a form of cultural learning. In this context, integrating traditional Chinese knowledge into art classes provides students with the opportunity to explore the connections between different forms of knowledge. This approach encourages a deeper understanding of how various cultural and intellectual traditions intersect and inform one another.

Curriculum integration involves combining multiple disciplines through content, skills, and affective objectives (McCullar, 1998). The integration of text and drawing has been systematically explored in prior research. Several studies have employed an integrative approach, combining drawing with other subjects to enhance learning efficiency and academic performance. For instance, Hall et al. (1997) found that college students who engaged in drawing as part of a mechanics lesson demonstrated improved learning outcomes on a transfer test. Similarly, Van M.P. et al. (2006) instructed students to draw from a science book, encouraging them to depict what they believed the content to look like. Schmeck A. et al. (2014) suggest that drawing while learning from a text—by creating visual representations of the content and mentally visualizing it during reading—can significantly support comprehension. Leutner D. et al. (2009) further assert that drawing pictures when reading a text can trigger metacognitive processes, leading to better text comprehension and learning. Van also emphasizes the importance of considering both verbal and nonverbal forms of prior knowledge, alongside the relevant knowledge activated from long-term memory. The previous study revealing that drawing not only enhances writing but also facilitates the integration of writing and drawing in a sophisticated and creative manner. These studies suggest that drawing from a text enhances students' understanding, improves learning outcomes, and fosters greater cognitive engagement. Schmeck (2014) emphasizes that this approach shifts students from passively receiving information to actively integrating and processing the content they are learning.

2. Conceptual Framework

This conceptual framework is grounded in curriculum integration theory, blending painting and text to foster artistic creation and create a novel learning experience. It prioritizes the development of a student-centered classroom environment and is informed by Schmeck's strategy of transitioning from verbal to non-verbal (visual) forms of expression.

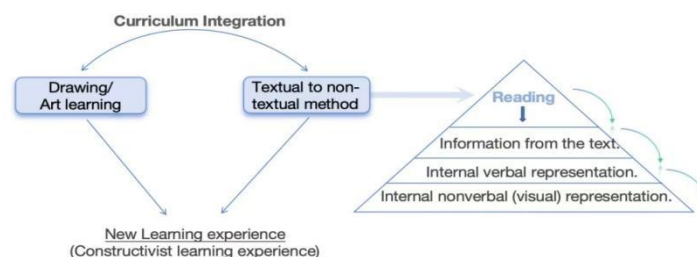


Figure 1. Conceptual Framework

The figure emphasizing the interplay between drawing/art learning and a textual-to-non-textual approach to create a constructivist learning experience. On the left, the framework highlights the integration of drawing and art learning as a core pedagogical strategy. This is complemented by the application of a textual-to-non-textual method, which involves transitioning from traditional text-based instruction to non-verbal (visual) forms of learning. On the right, the pyramid model elaborates on the textual-to-non-textual process, particularly in the context of reading. It outlines three key stages:

1. Information from the text: the initial acquisition of knowledge through textual input.
2. Internal verbal representation: the cognitive transformation of textual information into verbal understanding within the learner's mind.
3. Internal non-verbal (visual) representation: the subsequent shift from verbal to visual understanding, where information is represented and processed in non-verbal, visual formats.

These two components—art learning and the textual-to-non-textual method—are integrated within the framework to provide a new learning experience, which is rooted in constructivist learning theory. This approach aims to actively engage students in constructing their own understanding by combining verbal and visual modes of learning, fostering deeper cognitive engagement and creativity.

3. Research Design

This study research design is inspired by Schmeck's model (Fig.1) that advocates for an integrated approach to education, which transcends traditional boundaries between text-based learning and non-text-based learning. This design is meticulously crafted to explore and evaluate the effectiveness of transitioning from textuality to non-textuality in educational settings.

3.1. The Definition of Terms in This Research

Textuality and Non-Textuality: Textuality in this research is defined as the content that is directly related to or derived from textual sources. This includes sequences of language that are communicated through written, printed, or spoken forms. The concept of textuality extends beyond the mere linguistic forms to encompass the structure, meaning, and the interplay of language with social practices and cultural contexts (Fairclough, 1995). It involves a deep interpretation, analysis, and study of language content, which is central to understanding how textual information is processed and understood.

Conversely, non-textuality refers to the modes of communication that are not dependent on written or spoken language. This includes visual, auditory, or kinesthetic expressions that convey messages and ideas. Non-textual elements utilize multimodal methods such as images, sounds, and symbols to transmit complex ideas and cultural symbols collaboratively. These elements are crucial in education, media, and semiotics, as they allow for a broader and more inclusive range of communication and expression (Kress & van Leeuwen, 1996).

Curriculum integration views the shift from text to non-text as a way to enhance knowledge expression in multiple dimensions, surpassing the constraints of a single language format. It employs a cross-sensory symbol system, allowing students to better understand and apply knowledge through various modes of expression.

Pathways from Textuality to Non-Textuality: Drawing on Schmeck's (2014) recommendations, the transition from language (text) to non-language (visual) forms is a complex process that involves three distinct steps: extracting key information, constructing verbal expressions, and establishing visual representations. This research adopts this strategy to delve into classroom practices and understand how textual and non-textual forms interact and transform within an educational context. This research focuses on three primary pathways for transforming textual material into non-textual forms:

Visual Representation: the first pathway involves converting textual content into visual images or diagrams. This transformation allows students to engage with complex concepts in a more intuitive and visually accessible manner, leveraging the power of visual learning to enhance comprehension and retention. **Auditory Representation:** the second pathway pertains to the presentation of textual content through audio or sound demonstrations. This approach aims to enhance students' perception of emotion and tone, providing a richer and more immersive learning experience that engages the auditory senses. **Reverse transformation:** the third pathway involves the reverse process of converting non-textual elements, such as images or videos, back into text. This exercise in reverse engineering trains students in abstract thinking and expressive abilities, challenging them to articulate what they see and hear in textual form. This process, facilitated by a flexible symbolic system,

expands students' thinking and assists them in integrating knowledge across diverse learning situations, thus promoting deep learning.

In summary, the research design is structured to explore the pedagogical benefits of integrating textuality and non-textuality in educational practices. By examining the transformation processes and their impact on student learning, this study aims to contribute to the field of educational theory and practice, offering insights into how multimodal approaches can enhance cognitive and creative development among students.

4. Research Process

4.1. Research Location and Sample Selection

The research was conducted in an art training institution in Nanyang City, Henan Province, which operates several teaching centers in the region. The research team conducted a routine classroom observation and documented a classroom activity before implementing the new strategy (Figure2).



Figure 2. Regular class

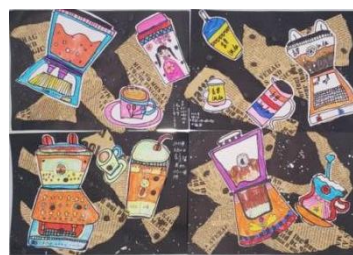


Figure 3. Artworks in regular class

Each regular class had a pre-selected theme, and the instructors explained foundational knowledge and painting techniques around the theme to inspire students' interest in art and nurture their creative thinking and painting skills. To enhance the class's visual appeal and engagement, teachers often borrow visual tools, such as displaying relevant images or playing videos. However, upon evaluation of students' artwork, the team observed a high degree of similarity among students' artwork (Fig.3). It indicated that students' originality and creative potential had not been fully stimulated or displayed, suggesting a gap in fostering innovation skills.

Following the conclusion of regular classes, the study formally commenced one week later. The team randomly selected two classes of 6-8-year-olds (96 participants) and 9-10-year-olds (53 participants), amounting to 149 students in total. The instructional material was selected from a short passage in Zhuangzi's *The Happy Excursion, Chapter 1*.

In the Northern Ocean there is a fish, the name of which is Kun - I do not know how many li (500 meters) in size. It changes into a bird with the name of Peng, the back of which is (also) - I do not know how many li in extent. When this bird rouses itself and flies, its wings are like clouds all-round the sky. When the sea is moved (so as to bear it along), it prepares to remove to the Southern Ocean. The Southern Ocean is the Pool of Heaven (北冥有魚，其名為鯤。鯤之大，不知其幾千里也；化而為鳥，其名為鵬。鵬之背，不知其幾千里也；怒而飛，其翼若垂天之雲。是鳥也，海運則將徙于南冥。南冥者，天池也。).

4.2. Classroom Observation

The observations revealed that students aged 6-8 showed significant interest and a positive attitude towards a new learning method, eagerly participating in the course. Despite their developmental stage in understanding complex subjects like classical Chinese, they maintain a high level of participation. According to the teacher's feedback, and compared to previous courses, this session exhibited an unprecedented level of full engagement and focused attention, resulting in a lively classroom atmosphere.

During interactive activities, some students showed strong cognitive skills, generating many innovative ideas that boosted their peers' thinking. This interaction engaged students and promoted divergent thinking, creativity, critical thinking, and intellectual freedom. A particularly notable example was the artwork of a 7-year-old boy (Fig. 5), which displayed extraordinary imagination. His depiction of the "Kun" diverged from traditional fish-like representations, instead placing it within a cosmic setting, dancing among the stars—an inventive concept with profound meaning. This artwork showcased the creative potential of a young child surpassing typical age expectations. Other students' artworks also reflected unique thinking, with each piece showing distinct composition, color schemes, and creativity, thus highlighting a high level of individuality and originality.



Figure 4. Student artwork

Another noteworthy phenomenon was observed with two boys, aged 9 to 10, who, inspired by their recent viewing of the movie *Godzilla vs. Kong*, drew a comparison between the movie's characters and the "Kun" from *The Happy Excursion*, deliberating whether the two could coexist. Under the teacher's guidance, they integrated these independent narratives to construct a novel story framework (Figures 5&6). This creative exercise not only stimulated their imagination but also sparked considerable interest among other students, especially the boys, in themes of "war" and "monsters."



Figure 5. Student artwork



Figure 6. Student artwork

It is evident from the students' artwork that they displayed distinctive insights and creativity. Although presented with the same theme, the students' modes of expression varied significantly, showcasing a rich diversity in artistic styles. Even though the works come from the same theme, they express completely different images, highlighting the diversity of creation. Even when starting from a similar point of inspiration, students can produce artworks that were distinctively different from before, rooted in their personal experiences.

In summary, most students were highly interested in text-to-image drawing, but a few felt hesitant and anxious because they lacked reference images. The overall classroom atmosphere was positive, with students remaining highly focused, especially during discussion sessions where they enthusiastically shared insights, demonstrating effective interaction and a productive learning environment. During the drawing practice phase, differences in student attitudes began to emerge. Most students were able to independently conceptualize and complete their artwork, displaying a high level of creativity. However, a small number of students encountered challenges, expressing that they found it difficult to convey their ideas without reference images, and thus preferred relying on visual aids. By the end of the course, the feedback had indicated a division: 80% of students enjoyed the process of creating images from text and appreciated the freedom of expression it provided; 11% preferred using reference images, believing it made the task easier; and 9% displayed no clear preference.

5. Conclusion

Classical Chinese as a vehicle for ancient Chinese thought and culture, encapsulates rich emotional and aesthetic experiences. Through expressing classical Chinese texts via painting, students can not only appreciate the beauty of language but also deepen their understanding through visual cognition. This approach emphasizing a student-centered learning where teachers transition from traditional knowledge transmitters to guides, supporters, and facilitators. This model aims to foster cognitive development and imagination in students by respecting their knowledge backgrounds and experiences, encouraging autonomous expression and exploration, creativity while reflecting their perceptions of life and emotional experiences.

The pedagogical practice of transforming textual to non-textual offers significant insights for creative art classrooms. This approach creates an environment conducive to multidimensional thinking, enabling students not only to comprehend knowledge through language but also to articulate their understanding of the text through visual and other non-textual means. Students can transform abstract textual information into concrete visual representations, leading to a deeper understanding and internalization of diverse knowledge.

Overall, it not only cultivates students' creativity and imagination but also promotes a holistic development across multiple academic domains. Through cross-domain transformation between textual and non-textual forms, students gain a richer learning experience, enhancing their overall competencies and thereby advancing the goals of integrated education

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theory—to cultivate well-rounded individuals with independent thinking, cross-disciplinary application capabilities, and creative thinking.

6. Limitations

This study, while involving students from various age groups, utilized a relatively small sample size, which may affect the generalizability of the results. The data obtained are from a short-term teaching experiment, lacking long-term follow-up analysis. The research subjects are concentrated on Nanyang City, Henan Province, with limited comparative data from other regions, potentially introducing regional bias. Although some student feedback was collected, a systematic and comprehensive response from both students and parents was insufficient. These limitations will be addressed in future research through further course implementation and analysis.

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Exploring the Impact of Feedback Self-Efficacy and Utility on Feedback-Seeking Behaviors in English Writing Education: A Control-Value Theory Approach

Hetian YU¹, Lan YANG^{2*}

^{1,2}The Education University of Hong Kong, Hong Kong SAR, China
s1146961@s.eduhk.hk, yanglan@eduhk.hk

ABSTRACT

This study applied Control-Value Theory to examine the roles of feedback self-efficacy (FSE) and feedback utility (FUT) in feedback-seeking behaviors (FBSB) among senior secondary students (n=357) in English writing classes in China. FSE was conceptualized as the control variable, reflecting students' perceived confidence in their ability to interpret and use feedback effectively, while FUT, the value variable, assessed the perceived usefulness of feedback for improving academic performance. We used a modified version of Pekrun's Achievement Emotions Questionnaire tailored to English writing contexts. Bootstrap analysis with 5000 samples tested the mediating effects of positive and negative emotions between FSE, FUT, and FBSB. The results revealed significant direct and indirect effects of both FSE and FUT on FBSB through the mediation of positive emotions. We observed a stronger mediating effect of FSE ($p < .01$) compared to FUT ($p < .05$), suggesting that students' confidence in their feedback-handling abilities might play a more pivotal role in eliciting positive emotions than FUT, although the later also was associated with positive emotions. These responses, in turn, were related to an increased tendency among students to seek further feedback. Negative emotions, however, did not show a significant mediating effect on the relationship between feedback perceptions and feedback-seeking behaviors. The findings suggest that positive perceptions are associated with enhanced emotional and behavioral engagement with feedback in educational settings. This association highlights the potential benefits of fostering such perceptions to improve feedback practices and student outcomes in English writing education.

KEYWORDS

Feedback self-efficacy, feedback utility, feedback-seeking behaviors, control-value theory, English writing education

Synthesizing the Impact of External Feedback on Secondary School Students'

English Writing: A Scoping Review Based on the Feedback Ecological Model

Hetian YU¹, Lan YANG^{2*}

^{1,2}The Education University of Hong Kong, Hong Kong SAR, China
s1146961@s.eduhk.hk, yanglan@eduhk.hk

ABSTRACT

Over the past decade, external feedback has become a focal point in second language (L2) writing research, yet a comprehensive synthesis through the lens of the feedback ecological model is absent. This model emphasizes the interconnectedness of external feedback with individual feedback orientation, feedback processing, and feedback engagement, which in turn influences learning opportunities. It is significant because it provides a holistic view of how feedback operates within the learning environment. This scoping review synthesizes the impact of external feedback on secondary school students' English writing performance, employing the Preferred Reporting Items for Systematic Reviews and Meta-Analyses methodology to analyze 26 journal articles selected from an initial pool of 2556. The search strategy included database queries in ERIC, ProQuest, Scopus, and Web of Science, covering publications from 2010 to June 2024. The review specifically explores research designs and findings within the feedback ecological model framework, aiming to delineate how external feedback shapes learning opportunities and engagement in L2 writing. Rigorous screening excluded non-peer-reviewed materials, ensuring a focus on high-quality academic articles. The review revealed an increasing interest in this area, with most studies concentrating on students' perceptions of teacher and peer feedback. A significant relationship was identified between students' feedback orientation, their feedback processing, and their feedback engagement. These findings underscore the intricate dynamics of feedback in L2 writing and suggest implications for future research and pedagogical strategies in feedback practices, emphasizing the necessity to enhance students' receptivity and effective uptake of feedback in educational settings.

KEYWORDS

Feedback ecological model, external feedback, feedback orientation, feedback processing, second language writing education

Assessing the Impact of Feedback Orientation on University Students' Career

Adaptability

Qishuai ZHANG¹, Lan YANG^{2*}

^{1,2}The Education University of Hong Kong, Hong Kong SAR, China
s1147050@s.eduhk.hk, yanglan@eduhk.hk

ABSTRACT

University graduates face a challenging labor market influenced by the COVID-19 pandemic, economic fluctuations, and rapid AI advancements. Career adaptability is crucial for adapting to job demands and managing unpredictable work environment challenges during the school-to-work transition. While the role of career adaptability (CA) is well-recognized, the specific impact of individual feedback orientation (FO) on CA has been less explored. Trying to fill this gap, we examined the association between feedback orientation, referring to university students' overall receptivity to feedback across university courses, and their career adaptability (n=227). Using the feedback ecological model as the conceptual framework, feedback orientation was assessed across four dimensions: feedback utility (students' perceived usefulness of feedback), feedback self-efficacy (students' confidence in interpreting and using feedback), feedback accountability (students' responsibility for using feedback), and feedback social awareness (students' recognition of social value in using feedback, e.g., maintain and enhance positive student-teacher relationship). The results showed feedback orientation significantly predicts career adaptability. Specifically, feedback self-efficacy mediated the effects of feedback utility, feedback accountability, and feedback social awareness on career adaptability. This result suggests that students with greater feedback self-efficacy tend to amplify the positive effects of feedback utility, accountability, and social awareness, thereby enhancing their career adaptability. This result also suggests that universities can purposefully implement programs to boost students' feedback self-efficacy, equipping them to interpret and use feedback in higher education effectively for career development. Studying FO and CA is vital for preparing university students to navigate the demands of higher education and modern workplaces.

KEYWORDS

Feedback orientation, career adaptability, higher education, school-to-work transition

Developing 21st Century Skills: University Students' Perceptions of the Feedback

Environment and Its Association with Self-Directed Learning

Qishuai ZHANG¹, Lan YANG^{2*}

^{1,2}The Education University of Hong Kong, Hong Kong SAR, China
s1147050@s.eduhk.hk, yanglan@eduhk.hk

ABSTRACT

Self-Directed Learning (SDL) is an essential skill in the 21st century for its role in promoting adaptability, critical thinking, and continuous personal and professional development amidst rapid technological and economic changes. Through SDL, learners can proactively manage their educational paths, adapting to and integrating global perspectives, which are crucial for thriving in the digital age. In education, feedback has been highlighted as a significant influence on student achievement in John Hattie's extensive synthesis studies. However, the role of students' perceptions of their feedback environment in fostering SDL has not been explored. This gap is critical to address because how students evaluate the feedback environment offered in higher education may significantly influence students' motivation and engagement, which are foundational to SDL. In this quantitative study based on the self-system processes model of motivation, over two hundred and twenty university students in mainland China joined. The Structural Equation Modeling analysis results showed that the association between the positive feedback environment and SDL was strong and statistically significant, as evidenced by a substantial path coefficient of $\beta=0.60$ ($p<.001$). Conversely, the negative feedback environment showed a non-significant and slightly negative association with SDL. The model accounted for 43.2% of the variance in SDL, demonstrating a substantial association between feedback environment and SDL. These findings underscore the importance of cultivating positive feedback environments to enhance SDL. Effective strategies include improving educators' feedback literacy and fostering students' high-level feedback self-efficacy to interpret and use feedback, which are critical for nurturing skills for 21st-century learners.

KEYWORDS

Self-directed learning, feedback environment, educational assessment, structural equation modeling, higher education

Chinese Reading Strategies among Adolescents in Three Asia-Pacific Regions:

Hong Kong, Mainland China and Taiwan

Xiaoqing LIN¹, Duo LIU²

^{1,2}Department of Special Education and Counselling, The Education University of Hong Kong, Hong Kong SAR, China
s1151953@s.edu.hk, duoliu@edu.hk

Abstract: *This paper discusses Chinese reading strategies among adolescents in three Asia-Pacific regions: Hong Kong, Mainland China, and Taiwan, highlighting the challenges adolescents face in reading comprehension, particularly due to declining motivation and the ineffectiveness of traditional teaching methods. The paper indicates that cognitive reading strategies are commonly used in these three regions, with motivational factors included in reading strategies in Hong Kong and cross-disciplinary reading instruction in Taiwan. The paper then advocates for a shift from basic cognitive skills reading strategies towards higher-order thinking skills to enhance reading proficiency among Chinese adolescents. It also emphasizes the importance of considering other impactful factors in reading strategies to promote reading performance. Teachers should incorporate a mixed reading methods to promote long-term reading habits. Furthermore, it calls for differentiated strategies tailored to various reading stages—pre-reading, during-reading, and post-reading—and supports adopting genre-based approaches to improve comprehension for future reading teaching practices.*

Keywords: *reading strategies, reading comprehension, Chinese reading, adolescent*

1. Introduction

Adolescents often feel unprepared for reading challenges due to shifts in their academic and personal lives (Faggella-Luby et al., 2009). PISA data reveals that many secondary students, especially eighth graders, struggle with reading comprehension (OECD, 2019). In Chinese-oriented regions, middle school reading motivation is declining, worsened by the digital age (Liu et al., 2016; Wang, 2013). Effective teacher training in reading strategies is essential, as traditional methods can lead to passive learning (Wang, 2021). Without intervention, poor literacy skills risk higher dropout rates and limited job prospects (NCES, 2005). This paper aims to identify reading strategies in Chinese classrooms to enhance adolescents' reading competency and interest.

2. Reading Strategy and Reading Comprehension

Since the 1990s, reading strategy instruction (RSI) has improved reading skills and comprehension (Klingner et al., 2015). It effectively enhances text understanding and self-monitoring for secondary students (Rogiers et al., 2020). In Chinese classrooms, teacher-supported approaches outperform those emphasizing student autonomy (Lau, 2017), as supportive teachers boost motivation and positive attitudes toward reading (Guo, 2022; Xu et al., 2024).

2.1. Hong Kong

In Hong Kong, following the 2003 curriculum reform, junior secondary schools have increasingly focused more on skill-based reading instruction (Lau, 2017). Initially, many teachers lacked experience in teaching reading strategies. This led to two pioneering studies (Lau, 2002; Lau & Chan, 2003) that introduced a reading strategies program aimed at enhancing comprehension through macro-rules and monitoring strategies. While these studies provided support for teachers, they focused concentrated on lexical and cognitive elements. Subsequent programs have incorporated various cognitive and metacognitive strategies, demonstrating a positive link to improved Chinese reading skills (e.g., Lau & Chan, 2007; Zhang, 2008; Lee, 2011; Leung & Lam, 2019). These programs integrate cognitive and metacognitive strategies, showing a positive correlation with improved Chinese reading outcomes. Skilled Chinese readers use more advanced strategies, such as text construction and summarization, than their less proficient peers (Lau & Chan, 2003). Lau and Chen (2007) found that cognitive strategies significantly improved seventh graders' reading comprehension, with benefits lasting four months post-intervention, demonstrating the lasting impact of effective instruction.

As psychological factors increasingly affect reading comprehension, reading-psychological strategies like self-regulated learning (SRL) are being integrated into instruction. SRL has a significant impact on reading progress (Perry et al., 2007). For example, Law et al. (2008) found that high achievers reported more use of self-regulated strategies than low achievers among Chinese adolescents, and self-regulated reading strategies are correlated positively to reading performance. In Hong Kong, most studies on SRL have targeted primary school students (e.g., Bai & Guo, 2021; 2018; Tse, et al., 2022) or focused on English language learning (e.g., Bai & Wang, 2021; Bai & Guo, 2018), with limited studies on adolescents in Chinese

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language classes. These studies indicate that a supportive SRL environment positively correlates with reading outcomes and motivation, which mediates improvements in reading abilities.

2.2. Mainland China

Following curriculum reforms in Mainland China, scholars have updated reading strategies to include metacognitive approaches. Two key studies highlight this. Gu and Lau (2021) found that sixth graders receiving integrated instruction (INI) showed significant improvements in reading comprehension and motivation compared to those in literature circles (LC) and traditional instruction (TLC). Wu, Valcke, and Van Keer (2023) focused on struggling readers in grades 7 and 8, revealing that explicit reading strategy instruction improved reading comprehension and motivation, with both acting as mediators. Both studies emphasized the importance of psychological factors in reading.

To align with the reformed secondary school curriculum, studies have focused on entrance exams like Zhongkao and Gaokao, exploring reading strategies for various text types (e.g., Xiang, 2020; Xu, 2019). Most research is exam-oriented, emphasizing teaching strategies based on exam techniques rather than actual student learning strategies. Additionally, much of the assessment-oriented research concentrates on major cities like Wuhan and Guangdong (Chen, 2021). Recent studies have begun examining rural and ethnic minority students, often in primary education (e.g., He, 2022). These studies typically use Ministry of Education materials and strategies like whole-book reading and group activities to enhance comprehension.

2.3. Taiwan

Effective reading strategies are a key focus of research in Chinese language teaching in Taiwan. Popular strategies include predicting (Liu, 2019), questioning (Weng et al., 2017), text structure organizing (Cheng, 2013), story structure, thinking map (Lin, 2021) and summarizing (Ke, 2018), with summarization being the most effective for enhancing comprehension (Hsieh, 2015). The findings indicate collaborative learning and interactive teaching methods serve as mediators in affecting reading comprehension and are particularly impactful. Through a cooperative learning approach, discussion and interaction among peers can help students strengthen their postulated understanding of the text and enhance their sense of achievement in learning (Weng et al., 2017). In Taiwan, drama-based approaches in education are becoming popular, effectively boosting students' interest in learning Chinese (Lin, 2009). Li (2004) noted a 20% increase in engagement with these methods, while Zheng and Wu (2013) found that storytelling, acting, and still images significantly improved reading comprehension among 15-17-year-olds.

In Taiwan, reading strategies follow a three-stage approach: before, during, and after reading. Pre-reading strategies involve activating prior knowledge and making predictions, while during-reading strategies include summarizing, self-questioning, and inferring (Bai & Liao, 2014). These can be categorized into prediction, questioning, organizational, inference, and comprehension monitoring strategies (Tsai, 2018), all enhancing reading comprehension. Proficient readers use advanced strategies like synthesis and inference, while novice readers rely on basic strategies like paraphrasing (Yau, 2005). Tsai and Chen (2009) found that novice students engage more in metacognitive dialogue about comprehension. This highlights the need for tailored cognitive strategies based on reading levels to facilitate skill mastery.

3. Comparing Reading Strategies Teaching in the Three Regions

Cognitive and meta-cognitive reading skills are widely taught among Chinese adolescents in Hong Kong, Mainland China, and Taiwan. While teachers often focus on low-level strategies like summarizing and predicting, there is a lack of emphasis on higher-order strategies. The diversity of secondary reading genres requires a comprehensive approach to meet curriculum demands. Hong Kong and Taiwan utilize diverse strategies that include pre-, during-, and post-reading skills, targeting both cognitive and psychological aspects, as well as ecological factors like cross-disciplinary and peer collaboration. In contrast, Mainland China employs a more assessment-oriented approach based on different textbook types. Additionally, studies account for differences in students' reading levels, categorizing them into high-level and low-ability readers. More proficient readers tend to employ higher-order strategies, while less proficient readers rely on lower-order strategies (Gu & Lau, 2021; Wu et al., 2021). However, research on reading strategy interventions across different age groups is relatively more extensive in Hong Kong, while studies in Mainland China and Taiwan often focus on specific grade levels. Additionally, scholars in Hong Kong and Taiwan have paid considerable attention to the area of Chinese reading strategies for adolescents.

In summary, Chinese language teaching strategies across these three regions are relatively various, with similarity shared on cognitive-related reading skills. Although some scholars have included motivational strategies that enhance adolescents' reading proficiency, most approaches still focus on low-level skills, with limited considerations on applying pre-and post-tests to validate their strategies, and different Chinese level among adolescents.

4. Suggestions for Future Chinese Reading Strategies Teaching

Teachers in Mainland China, Hong Kong, and Taiwan should prioritize higher-order thinking strategies (e.g., comprehension monitoring and reasoning) for middle school students. These processes help readers address comprehension difficulties (Koda, 2005; Stevenson, Schoonen, & Gloppe, 2007) and are more controlled than automatic lower-level

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processes (Segalowitz, 2000). Research shows that reasoning is a significant predictor of reading comprehension from primary to secondary levels, with its importance increasing in middle school (Asbell et al., 2010; Tighe & Schatschneider, 2014). Thus, developing higher-order reading skills is essential for effective reading in secondary students.

Simply teaching reading strategies is not enough to develop skilled readers. Researchers emphasize that motivational factors are crucial for encouraging students to generalize and consistently apply these strategies (Borkowski et al., 1992; Lau & Chan, 2003). Students will only apply strategies effectively when sufficiently motivated. Besides, teachers should incorporate motivational and psychological factors into reading instruction to foster positive reading habits. They also need to tailor strategies for different reading stages: use prediction and questioning for pre-reading; employ identifying, generalizing, and skimming for during-reading; and apply paragraphing, storytelling, outlining, and summarizing for after-reading (Brown, 2004). In addition, Mainland China has implemented genre-based reading strategies (GBA) to enhance reading assessment outcomes by improving students' awareness of social contexts and promoting metacognitive skills (Swales, 1990). GBA helps students understand various genres through diverse activities that enhance vocabulary and grammar mastery (Fitrawati, 2012). This approach allows students to evaluate their comprehension and performance while emphasizing the importance of genre and language skills. For example, students practice dialogue in transactional texts and grasp key concepts in narratives. Integrating genre-specific skills with cognitive-linguistic skills is essential for improving comprehension.

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Adaptation and Validation of the Math Feedback Orientation Scale for Improving Formative Assessment in Math Education

Yanxin SHAO¹, Lan YANG^{2*}

^{1,2}Department of Curriculum and Instruction, The Education University of Hong Kong, Hong Kong SAR, China
yanglan@eduhk.hk

ABSTRACT

Students' feedback orientation (FO) significantly impacts their engagement and learning outcomes, yet its application to mathematics has rarely been studied. This research adapts the Feedback Orientation Scale (FOS) to create a math-specific version (MFOS), exploring its relationship with math self-concept (MASC). We analyzed data from 878 junior secondary students in Shanghai, confirming the reliability of both MFOS and MASC. Our confirmatory factor analyses — evaluating one general factor, four correlated factors, and a second-order factor — determined that the model with four correlated factors (feedback utility, self-efficacy, social awareness, and accountability) provided the best fit. We conducted measurement invariance testing (Configural, Metric, and Scalar) by gender, with changes in the Comparative Fit Index (ΔCFI) and the Root Mean Square Error of Approximation ($\Delta RMSEA$) remaining below 0.01, which supports the scale's consistency across genders. This affirms its robustness as a tool for assessing feedback orientation in Chinese secondary math education. The study also revealed significant positive correlations between math-specific FO and MASC, suggesting that teachers can enhance students' math self-concept and feedback orientation by tailoring feedback to individual needs for improving formative assessment practice in math education. For sub-dimensions, we also found that feedback self-efficacy and social awareness may be more associated with students' Math self-concept, both sub-dimensions and the whole.

KEYWORDS

Feedback Orientation, Academic self-concept, Mathematics education, secondary education, formative assessment

A Comparative Study on Readability of Reading Texts in Senior High School

Textbooks between RP Edition and BNUP Edition

Xiang LI¹, Zhijian ZHOU²,

^{1,2}The University of Melbourne, Australia

shawn0822ggg@gmail.com, z1793500580@outlook.com

Abstract: *The study compares readability and the complexity of the vocabulary in two widely used senior high school English textbooks in Beijing: one was published by the People's Education Press, RP for short, and the other by the Beijing Normal University Publishing Group, BNUP for short. Three reading passages were selected from each textbook, and readability was measured by the Flesch Reading Ease and Flesch-Kincaid Grade Level Readability. AntWordProfiler was used to explore vocabulary complexity, with the goal of measuring the vocabulary density and vocabulary depth of the two textbooks. The author then compared the textbook reading difficulty with the native speaker reading publications. RP textbooks are relatively more difficult in terms of vocabulary, whether in terms of Lexical Difficulty or Vocabulary Depth. In terms of readability, BNUP is higher than RP, which means it is easier to read. The difficulty level of the RP textbook is Standard, which is equivalent to the textbooks for English native speakers in grades 7 and 8. The difficulty level of the BNUP textbook is Fairly Easy, which is much simpler than the RP textbook and is similar to the English textbooks for grade 6 students. There is a certain correlation between the difficulty of vocabulary and readability, and it can also be seen that RP textbooks are more difficult to read than BNUP.*

Keywords: Textbook, Readability, English Language Teaching

1. Introduction

Textbooks play an important subsidiary role in language education, guiding the way to teach and learn in a structured framework. In EFL contexts, textbooks play a central role in developing linguistic skills through prepared materials in line with curriculum objectives. The two important dimensions of assessment related to textbooks are readability and vocabulary complexity because these features have a great impact on students' comprehension and level of engagement. First, high readability guarantees readability and hence accessibility of the content; advanced vocabulary is necessary to ensure linguistic competence. An optimal compromise between these two is what underlines effective language acquisition.

This research compares two sets of standard English textbooks used throughout Beijing: one published by People's Education Press, referred to as RP, and another by the Beijing Normal University Publishing Group, referred to as BNUP. While both follow the same curriculum, large differences in readability and vocabulary exist between the two textbooks, which has huge implications for students' performance. A comparison of these differences is instructive in showing how textbook design may function to either open up or shut off access to academic achievement. This paper analyzes three passages from each textbook, utilizing tools such as Readability Analyzer and AntWordProfiler, among others, in order to measure certain metrics of interest: Flesch Reading Ease, lexical density, and vocabulary depth.

2. Analysis of RP and BNUP in Readability

According to Vygotsky's Zone of Proximal Development, learners can acquire certain abilities with help and guidance. However, this is not limitless, as every learner experiences a developmental ceiling at different stages. Therefore, reading materials for high school students should be measured in a proper difficulty, which is engaging and supportive for student's learning experience. Also, it is necessary for two editions of textbook to maintain a comparable level, otherwise, inequality may occur in citywide standardized tests.

The Flesch Reading Ease gives a text a score between 1 and 100, with 100 being the highest readability score. A Flesch score of 60 is taken to be plain English. A score in the range of 60-70 corresponds to 8th/9th grade English level. A score between 50 and 60 corresponds to a 10th/12th grade level. Below 30 is college graduate level. Likely, most states require scores from 40 to 50 for insurance documents.

The formula was developed in the 1940s by Rudolf Flesch. He was a consultant with the Associated Press, developing methods for improving the readability of newspapers. The Flesch Reading Ease formula is $206.835 - (1.015 \times \text{ASL}) - (84.6 \times \text{ASW})$.

2.1 Analysis of RP in Readability

The calculations were done by the Readability Analyzer powered by BFSU, and it contains the number of words in each passage and the sentence number, ASL(Average Sentence Length), and Flesch Reading Ease.

Table 1. The Flesch Reading Ease of three texts in RP

	Words	Sentences	Words Per Sentence	Character Per words	Flesch Reading Ease
The Freshman Challenge (Passage1)	253	18	14.06	4.22	72.86
The Night the Earth Didn't Sleep (Passage2)	549	45	11.89	4.49	76.17
The Chinese Writing System (Passage3)	310	16	19.44	4.97	48.37

Overall, Passage 2 has the highest readability score of 76.17, making it the easiest to understand. This passage contains 549 words and 45 sentences, with an average of 11.89 words per sentence and 4.49 characters per word, which contribute to its high readability. Passage 1 follows closely with a score of 72.86. While it has fewer words, its sentence length is slightly longer at 14.06 words per sentence, making it somewhat more complex than the first passage. In contrast, Passage 3 has the lowest readability score of 48.37, indicating significantly higher difficulty. This passage contains the longest sentences, averaging 19.44 words per sentence. Additionally, its character-per-word ratio is the highest at 4.97, suggesting that more complex vocabulary and sentence structures contribute to its lower readability. In summary, the first two passages are relatively easier for students to read and understand, whereas the third passage is considerably more challenging due to its longer sentences and more complex words.

2.2. Analysis of BNUP in Readability

The calculation towards the readability of texts in BNUP is also as similar as the RP's, and the data show in the table below.

Table 2. The Flesch Reading Ease of three texts in BNUP

	Words	Sentences	Words Per Sentence	Character Per words	FRE
Lifestyle (Passage1)	429	30	14.27	4.14	73.16
The Underdog (Passage2)	464	54	8.5	4.12	92.23
The Spring Festival (Passage3)	518	37	13.89	4.29	71.76

The number of words in the three texts is around 400 to 500, the number of sentences is the highest in the second text and the lowest in the first. the Words Per Sentence is in the Passage 1 and Passage 3 were similar, at 14.27 and 13.89 respectively, while the second text was only 8.5, meaning that the second text had shorter sentences than the other two. Flesch Reading Ease scores were highest for the second essay, The Underdog, at 92.23, with the other two essays scoring above 70. This indicates that the second text was extremely easy to read and had little to no reading difficulty, while the other two texts, although more difficult to read than the second, were overall easy for students to read.

2.3 Comparison between RP and BNUP in Readability

Table 3. The Flesch Reading Ease of three texts in BNUP

	Passage	Words	Sentences	WPS	CPW	FRE	FKRA
RP	The Freshman Challenge (Passage1)	253	18	14.06	4.22	72.86	6.59
	The Night the Earth Didn't Sleep (Passage2)	549	45	11.89	4.49	76.17 74.51	5.59
	The Chinese Writing System (Passage3)	310	16	19.44	4.97	48.37	11.34
	Average					65.8	7.84
BNUP	Lifestyle (Passage1)	429	30	14.27	4.14	73.16	6.6
	The Underdog (Passage2)	464	54	8.5	4.12	92.23	2.51
	The Spring Festival (Passage3)	518	37	13.89	4.29	71.76	6.7
	Average					79.05	5.27

WPS: Words Per Sentence; CPW: Character Per words; FRE: Flesch Reading Ease; FKRA: Flesch-Kincaid Grade Level Readability

Table 4. Flesch Readability Score Standards and Application (Yang, 2001)

Reading Ease Score	Description	Representative Magazines	Estimated Reading Level	Percentage of U.S. Adults
0-30	Very Difficult	Scientific	College Graduate	4.5%
30-50	Difficult	Academic	College	24%
50-60	Fairly Difficult	Quality	High School	40%
60-70	Standard	Digest	7 th or 8 th Grade	75%
70-80	Fairly Easy	Slick Fiction	6 th Grade	80%
80-90	Easy	Pulp Fiction	5 th Grade	86%
90-100	Very Easy	Comics	4 th Grade	90%

Table 5. Flesch-Kincaid grade level readability calculator, TextCompare.

FKRA Score	School Level	Comprehension
5.0-5.9	5 th Grade	Very easy to read
6.0-6.9	6 th Grade	Easy to read
7.0-7.9	7 th Grade	Fairly easy to read
8.0-9.9	8th and 9th Grade	Conversational English
10.0-12.9	10 th 11 th & 12 th Grade	Fairly difficult to read
13.0-15.9	College	Difficult to read
16.0-17.9	College Graduate	Very difficult to read
18.0+	Professional	Extremely difficult to read

Although Table 3 provides the FRE scores, indicating significant readability differences between the RP and BNUP textbooks, the average FRE score for the RP textbook is 65.8. According to Table 4, this places its texts between "standard" and "fairly difficult." Although this is acceptable for high school students, it could be demanding for those at lower proficiency levels. With a loftier average of 79.05, BNUP results in a "fairly easy" status for the textbook to be vastly more accessible to its content for far more students. In this respect, the passage Underdog in BNUP shows the highest FRE score of 92.23, which is very easy to read whereas the passage The Chinese Writing System revealed the poorest FRE score of 48.37, thus depicting it to be difficult to read and suitable for higher secondary school learners.

WPS on sentence complexity further underscores the differences of both textbooks. Longer and more complex sentences characterize the RP textbook, which has a higher average WPS at 15.13 to the WPS of the BNUP textbook at 12.89. For example, RP, with the highest WPS at 19.44, entitled The Chinese Writing System, contributes to its lower readability score. On the other hand, supporting that it is more readable and thus more suitable for less proficient students, the BNUP passage The Underdog contains the shortest sentences: its WPS is 8.5. Likewise, CPW analysis gave somewhat higher averages for the RP textbook, 4.56 words, compared to BNUP, 4.18 words, which are indicative of the use of more complicated lexis in the RP texts.

The FKRA scores in Table 5 further support these observations. The RP passages average 7.84, falling into the 8th-9th grade level category, while the BNUP passages average 5.27, which corresponds to the grade level of 5th-6th grade. This is a further confirmation that the RP textbook maintains a focus on academic rigor. More interestingly, the RP passage entitled "The Chinese Writing System" has an FKRA score of 11.34 and falls into the 10th to 12th-grade level, which was remarkably higher than any BNUP passages. While such a level might better prepare students for the academic challenge, it could also do harm to comprehension by students with relatively lower proficiency in English.

By implication, it means that the RP textbook is oriented toward linguistic complexity-as reflected in longer sentences, more sophisticated vocabulary, and overall lower readability scores. Although this may be of immense help to advanced learners, it could result in losing less proficient students. On the contrary, BNUP texts with higher readability scores, shorter sentence lengths, and more straightforward vocabulary make such a text fitting for more classroom environments. These findings point to competing emphases in pedagogies: whereas the RP textbook develops academic rigor, the BNUP textbook emphasizes inclusivity and the engagement of students. Understanding these differences may assist educators and curriculum developers in choosing materials that better meet the specific needs of their students.

3. Conclusion

Table 6. Comparison between RP and BNUP in Vocabulary and Readability

Text Books	Vocabulary		Readability(FRE)
	Lexical Density	Vocabulary Depth	
RP	52.43	110.00	65.8
BNUP	47.18	107.30	79.05

Table 6 illustrates the difference between RP and BNUP textbooks in terms of vocabulary complexity and readability. RP textbook has a higher lexical density of 52.43 with a higher depth of vocabulary of 110.00 as compared to BNUP, with low lexical density of 47.18 and slightly lower with respect to the depth of vocabulary, 107.30. These results suggest a more sophisticated and varied vocabulary in the RP textbook, hence possibly supporting advanced linguistic competence. On the other hand, such a focus on more complicated vocabulary corresponds to its lower readability score: a FRE of 65.8, indicating a standard to fairly difficult level.

In contrast, the readability of the BNUP textbook is pragmatically higher at 79.05 FRE, concretely interpreted as "fairly easy". This accounts for better access to the BNUP textbook for a wider range of students, which might support understanding and more active participation, considering that some students are less proficient. The reduced lexical density and simpler lexis in this text give it higher readability and more suitable material for inclusive learning.

These findings suggest that while the RP textbook may be suitable for advanced learners who desire excerpts of an academic nature, BNUP better fosters the aspect of accessibility and inclusivity in the textbook. Educators and syllabus designers will have to make these trade-offs when selecting materials to teach with, balancing complexity with readability in service of meeting a range of student needs in language education.

This study has highlighted striking contrasts in readability and vocabulary complexity between RP and BNUP senior high school English textbooks. The results indicate that the BNUP textbook was easier to read, as it attained a higher FRE score, sentences were shorter, and vocabulary was simpler. On the contrary, RP had more advanced flow of vocabulary and sentence structures which may effectively develop higher language proficiency at the cost of readability. These results align with previous studies emphasizing the importance of balancing accessibility and challenge in educational materials (Hiebert, 2012; Nation, 2007).

These differences in readability and vocabulary depth reflect different pedagogical priorities. While the emphasis on complexity in the RP textbook may better prepare students for higher challenges in academics and standard testing, there is a grave risk of alienating less proficient learners.

The BNUP textbook would be more appropriate to generate confidence and participation in a larger group of students since this textbook was easier to comprehend. These observations very much highlight the importance of textbooks having a clear design base that includes the aims of a curriculum and diversity among learners (Tomlinson, 2012). However, the generalization of these findings is really limited due to sample size. Further research may extend this data with more texts and other variables of cultural content, cognitive load, and feedback from teachers in order to provide a holistic view of effectiveness in textbooks.

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Enhancing Student Well-Being Through Language Accommodations in Content-Based Course Assessment

Anna-Maria KUTATELADZE^{1*}, Linda SHETABI^{2*}

^{1,2}The University of Hong Kong, Hong Kong SAR, China

¹Charles University, Czech Republic
anna37@hku.hk, shetabi@hku.hk

ABSTRACT

In Hong Kong, English has been the primary medium of instruction (MOI) at the tertiary level for over 170 years. However, research reveals that many students experience considerable challenges using English, often preferring Cantonese or Putonghua, reflecting region's linguistic diversity. While these languages are well accommodated, the push for greater internationalization of higher education introduces additional languages into this challenging mix. This complexity poses language barriers for students in content-based courses, even within 'English-exclusive' curricula. This project investigates how language accommodations enhance student wellbeing and learning outcomes in such multilingual academic environments. Specifically, we explore the impact of providing non-contextual, non-definitive translators during assessments, and the inclusion of interpretation and examples for broadly defined terms in the grading rubrics, within four courses at the University of Hong Kong. Utilizing content-based courses as a case study, we examine whether these accommodations facilitate a more supportive and productive educational experience. Surveys gauge students' perceptions of how these measures impact their academic success and anxiety levels. Furthermore, interviews with course instructors who facilitated these accommodations explore their motivation and the reasons they regard these measures as necessary. Preliminary findings suggest that such measures not only help mitigate language-related stress but also enhance students' overall academic performance and mental health. The project also acknowledges and addresses potential concerns regarding the fairness of these accommodations and their potential impacts on students' motivation to improve English proficiency. Ultimately, the study contributes to ongoing discourse on student wellbeing, aiming to optimize student support in diverse multilinguistic settings.

KEYWORDS

Student Wellbeing, Higher Education, Assessment, Accommodation, Language

Exploring the Influence of Feedback Orientations on Mathematics Self-Concept A Path Analysis Using Social Cognitive Theory in Secondary Mathematics Education

Yanxin SHAO¹, Lan YANG^{2*}

^{1,2}Department of Curriculum and Instruction, The Education University of Hong Kong, Hong Kong SAR, China
yanglan@eduhk.hk

ABSTRACT

Effective feedback is crucial for students' success, particularly in mathematics, where performance is highly valued. Despite its importance, research on how students' perceptions of feedback influence their mathematics self-concept is limited. This study addresses this gap by examining the relationship between mathematics-specific feedback orientation (FO) and mathematics self-concept. The model incorporates key constructs of mathematics-specific FO—feedback utility (Mfbut), feedback responsibility (Mfbat), feedback self-efficacy (Mfbse), and feedback social awareness (Mfbso)—and explores how Mfbse and Mfbso act as mediators between Mfbut, Mfbat, and mathematics self-concept through the lens of Social Cognitive Theory. The path analysis results reveal significant relationships among the constructs. Mfbut positively influences both Mfbse and Mfbso, suggesting that students who perceive feedback as useful and feel responsible for using it tend to have higher self-efficacy and greater awareness of the social aspects of feedback. Both Mfbse and Mfbso serve as key mediators, with Mfbse significantly affecting mathematics self-concept. Students who feel confident in using feedback have a more positive mathematics self-concept. Similarly, Mfbso also positively influences mathematics self-concept, highlighting the importance of the social value of using feedback. The model explains a 34.4% variance in mathematics self-concept, suggesting the role of feedback perceptions in shaping students' mathematics self-concept. Additionally, mathematics self-concept is divided into two sub-components: mathematics competence and mathematics interest, with the model explaining a 26.3% variance of both. This study highlights the mediating role of Mfbse and Mfbso in the feedback process and the importance of feedback-related perceptions in fostering students' competence and interest in mathematics.

KEYWORDS

Feedback Orientation, Academic self-concept, Mathematics education, secondary education, Path Analysis

Understanding EFL Learners' Motivation and Engagement in Informal Digital

Learning of English (IDLE): A Self-Determination Perspective

Ke YANG

Chang'an University, Xi'an, China

ke_yang@chd.edu.cn

Abstract: *A surge in empirical investigations of Informal Digital Learning of English (IDLE) has sparked scholarly attention to language learners' motivation and engagement. Nonetheless, the current line of research has predominantly followed variable-centered and quantitative paradigm, which might overlook the complex, dynamic and intricate nature of motivation and engagement. Therefore, to address this gap, the present study adopted a longitudinal multiple case-study to explore the developmental trajectory of EFL learners' motivation and engagement and the potential influencing factors over eight weeks of IDLE through the lens of Self-Determination Theory. Data were collected through multiple sources, including reflective journals and semi-structured interviews. The findings suggested two distinctive profiles of participants' motivation and engagement during eight weeks of IDLE, 1) intrinsic motivation and declining engagement, 2) extrinsic motivation and consistent engagement. Factors related to participants' perceived competence and autonomy influenced their engagement significantly while perceived relatedness had no effect on IDLE. Discussions of the results and pedagogical implications were also provided.*

Keywords: Informal Digital Learning of English (IDLE), motivation and engagement, Self-Determination Theory, EFL learners

1. Introduction

With the unprecedented rate of development of digital devices and online resources in all forms, the informal digital learning of English (IDLE) has been favored by EFL learners and drawn the attention of language teachers and researchers worldwide (Taherian et al., 2023). IDLE is defined as “self-directed English activities in informal digital settings, motivated by personal interests and undertaken independently without being assessed by a teacher” (Lee & Lee, 2021, p. 359). In other words, IDLE is regarded as a form of self-initiated English learning in out-of-class digital contexts, where students are engaged independently without being evaluated by a language teacher, such as reading entertainment materials (e.g. comics or online news) or communicate with other English users on social media (Lee et al., 2021).

Learners' motivation and engagement has become a growing research agenda as IDLE is believed to provide psychological benefits to students (Chik, 2011; Lee, 2022; Taherian et al., 2023). Ryan and Deci's (2000) Self-Determination Theory (SDT) is one of the most frequently adopted motivation theory in L2 research. According to SDT, three primary categories of motivation exist along a spectrum of autonomy, ranging from amotivation and intrinsic motivation at the extremes to extrinsic motivation in the middle (Ryan & Deci, 2017, 2020). Amotivation signifies a lack of intention to act, while intrinsic motivation involves willingly engaging in an activity for its inherent satisfaction and enjoyment. Extrinsic motivation is categorized into four types based on behavioral regulation styles: external regulation (motivated by external rewards or punishments), introjected regulation (motivated by self and others' approval), identified regulation (motivated by personally endorsed values or objectives), and integrated regulation (motivated by objectives that align with core interests and values). SDT also postulates that meeting individuals' fundamental psychological needs for autonomy, competence, and relatedness is linked to increased intrinsic motivation, whereas failure to satisfy these needs can lead to decreased motivation (Printer, L., 2023). Autonomy entails providing choices, fostering self-directed opportunities, and enabling students to take ownership of their learning (Ryan & Deci, 2020). Competence involves students' beliefs regarding their ability to succeed (Fried & Konza, 2013), and relatedness pertains to feelings of belonging, support, and inclusion within the educational environment (Ryan & Deci, 2000). A growing number of empirical studies have begun to draw upon Ryan and Deci's (2017) Self-Determination Theory (SDT) to examine the role of motivational factors in EFL students' IDLE engagement. For example, Fathali and Okada (2018) found Japanese university EFL learners whose basic psychological needs were satisfied showed greater interest in using digital devices for English learning outside the classroom. In a more recent study, with the Structural Equation Modelling method, Zadorozhnyy and Lee (2024) discovered that Kazakhstani EFL students with higher overall BPNs engaged more in IDLE activities. However, the existing studies are largely cross-sectional studies with variable-centered design, which treated motivation and engagement static and monolithic constructs (Taherian et al., 2023). The dynamic and mechanisms of how motivation and engagement interplay is still unknown (Zadorozhnyy & Lee, 2024). Therefore, to address the gap, this paper spotlights the motivational and engagement trajectory of two adult EFL learners' IDLE experience over eight weeks. Specifically, it was guided by the following two research questions:

1. What are the developmental trajectories of participants' motivation and engagement in IDLE?
2. What are the influencing factors on participants' motivation and engagement during IDLE?

2. Methodology

Adopting a qualitative longitudinal research design, this study examined how two EFL learners, Cherris and Lynn (all pseudonyms), were motivated and engaged in IDLE over the timespan of eight weeks (from a larger sample $N=6$). They were selected as participants with a purposive sampling method, which aimed to focus on specific and unique issues or cases (Cohen et al., 2018). Cherris and Lynn were selected for this study as they demonstrated unique and distinctive patterns in their trajectories. They all provided the informed consents before the outset of the study and informed that they had the right to withdraw the study at any time period during the study. In this study, participants were engaging in IDLE reading activities on a mobile application called *MintReading*, which offers a variety of English reading materials for users to choose from.

2.1. Motigraph

As a frequently adopted tool in L2 motivation research (Lamb, 2018), a motigraph is a graphic representation of perceived motivational levels during specific timeframes. In this study, the vertical axis represents the intensity of students' motivation indicated by the number of minutes they spent on IDLE every week, whereas the horizontal axis signals the point of each week.

2.2 Reflective Journals

Eight reflective journals were collected from each participant on a weekly basis. The journal prompts are semi-structured, with open-ended questions, enabling them to note down their feeling, attitudes, and difficulties when using this application. Journal templates were sent to them every week via the online questionnaire instrument named *Wenjuanxing*. All journal entries were drafted and completed in Mandarin Chinese.

2.3 Semi-Structured Interviews

Two rounds of semi-structured interviews were conducted in the midterm and at the end of this study, which were guided by the participants' motigraph and reflection journals. The interim interview investigated potential factors which might influence their motivation and engagement each week. The post-study interview collected participants' overall evaluation of *MintReading*, especially how the above-mentioned factors influenced their learning motivation during their learning process. In this way, the interviews served as supplementary tools for data gathering, enabling a more comprehensive investigation of the underlying causes and mechanisms behind participants' experiences. All interviews were conducted in Mandarin Chinese, lasting for approximately 15-20 minutes.

2.4 Data analysis

The open-ended questions and two semi-structured interviews were first transcribed verbatim and then analyzed in an inductive qualitative method (Braun & Clarke, 2021). The data analysis started with open-coding, which enabled the researcher to label the transcribed data into possible topics, such as "technical support", "interest and enjoyment" and "language difficulties". After that, the codes were grouped into categories for thematic analysis, which was informed by the three basic psychological needs in SDT (Richie et al, 2003). For example, the codes "language difficulties" and "technical support" were categorized under the theme of "competence" as they both related to students' perceived confidence in IDLE.

3. Findings

3.1 The Case of Cherris

In this study, Cherris was intrinsically motivated to start IDLE. For her, learning English is mainly for self-fulfilling purposes because English offers her chances to get connected with the world and develop a different thinking style. In other words, she holds innate passion for learning English and see the value of learning another language for self-enhancement and promotion. Although her motivation for starting IDLE was intrinsic and intense, Cherris experienced a declining trend of motivation and engagement over the eight weeks, as indicated in Figure 1. In the last three weeks of the study, she only spent around 10–30 minutes on IDLE each week.

For Cherris, the most important factor that facilitated and sustained her IDLE motivation and engagement was her interest in the book as well as the experience of enjoyment. As she admitted in the interview, she found that the fiction she chose was appealing to her, which drove her to continue reading every day. In her weekly journal, she recorded her experience of "flow" and excitement when being immersed in the reading activity:

I haven't read the book "The Magician's Nephew," but I am eager to dive into it. There are moments during my reading when I find English comprehension to be smooth and my intuition kicks in. I start to feel excited about my progress. Then, I realize that I have been so caught up in my happiness and enjoyment. This situation has occurred many times, and I find that I have reached a state of flow in reading. (Reflective Journal 2 of Cherris)

Starting from week 5, however, Cherris's engagement in IDLE activities dropped continuously and dramatically. According to reflective journal and interview, she reported that she was occupied and exhausted with her teaching work as a high school teacher. As a result, she could barely spare any time and effort in IDLE. For example, she mentioned her tight schedule and busy work several times in her diary:

The main reason is that the workload was quite heavy last week, leading to insufficient sleep every night and a lack of energy, making it impossible to complete the reading tasks during the commute. I have been feeling a bit sluggish lately and haven't been reading much. This is related to my current life state—I am in great need of a relaxing break and some adjustment. Despite my interest and the perceived usefulness, it's challenging to dedicate the necessary time. (Reflective Journal 4 of Cherris)

That is to say, her engagement in IDLE activities depended greatly on the disposable time and energy that she was in charge of. Once there were more urgent and important stuffs occupied her time, even though she was still highly motivated, she had to sacrifice the time for IDLE activities. As such, since IDLE was not a compulsory task for Cherris, she gradually became disengaged in IDLE due to a lack of spare time, especially when learning required longer time and cognitive effort.

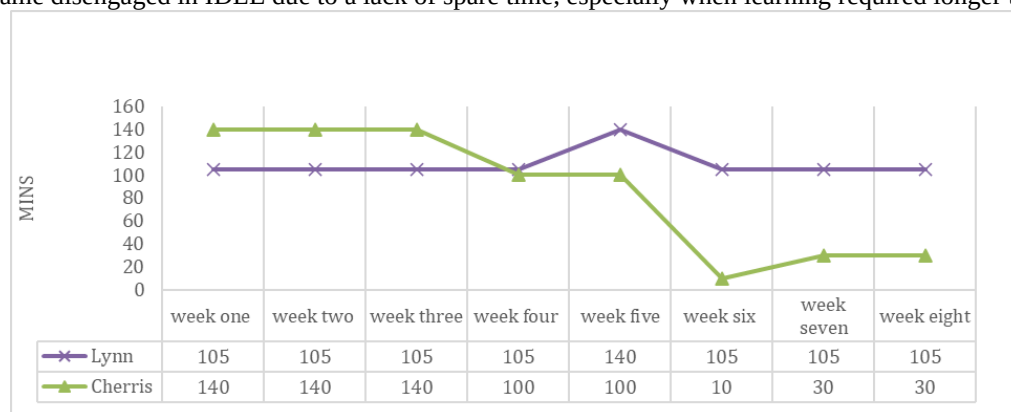


Figure 1. Developmental trajectories of participants' IDLE motivation and engagement.

3.2 The Case of Lynn

Different from Cherris, the primary reason for her to start IDLE driven was that she would like to form a reading habit to prepare for her postgraduate study. In other words, Lynn has more concrete learning goals to start and engage in IDLE than Cherris. This can be considered as a kind of autonomous-regulated extrinsic motivation (i.e., introjected regulation). As shown in Figure 1, Lynn consistently engaged in IDLE during the eight weeks, spending an average of 105 minutes per week on the reading tasks. On week five, her devoted time reached a peak at 140 minutes.

The analysis of Lynn's reflective journal and interview indicated the perceived value of IDLE enabled her to consistently sustain her motivation and engagement. She mentioned that she was interested in psychology and the English book she chose to read was also about psychology. In this way, she found the English expressions were really "beautiful" and "useful" for her to understand the psychological knowledge, even better than the Chinese. For example, in the semi-structured interview she mentioned:

The language is very vivid, almost more comfortable than reading in Chinese. Although there are many parts that I still can't understand, when you read in English, the way those sentences are crafted with some metaphors is quite marvelous. Previously, I would never have thought of constructing sentences in that manner. It's very straightforward and easy to understand. The psychological expressions in it make the knowledge quite clear and well-presented. (Mid-term interview with Lynn)

Lynn also mentioned that the dictionary within the mobile applicable made English reading less difficult, which greatly enhanced her confidence in IDLE. As long as she encountered new words, she could click the work on the screen and the Chinese translation and pronunciation popped out. This technology support of IDLE not only reduces Lynn's language barrier but also ease her psychological and cognitive burden, making her more willing to engage in some challenging tasks.

At the end of this study, when Lynn reflected her gains and experiences in IDLE, she mentioned that, because of this successful reading experience with IDLE, she overcame her fear of reading and formed a routine reading habit.

3.3 The salient role of perceived relatedness

Unexpectedly, this study failed to prove that perceived relatedness influenced participants' motivation and engagement. Both Cherris and Lynn could not feel a sense of relatedness when engaging in IDLE activities. They all mentioned that IDLE for them was a more personalized learning activity so that the learning community was not useful for them. This is because the online instructor could not provide personalized and targeted feedback for students. For example, Lynn wrote in her learning journal, *"I benefited little from the WeChat group because I found the topics and messages were not very useful for me. So I choose to learn by myself, not participating in the group discussion"* (Reflective Journal 3 of Lynn). Cherris also added that the instant and one-size-fit-all responses made her feel that her questions were not respected and given enough attention. She mentioned in her interview:

One day, I finished the reading assignment and asked the teacher a simple question in the WeChat group. But the teacher did not answer my question directly. Instead, she sent me a web link and asked me to find the answer on that web page. Afterwards, I did find the answer I expected but I felt it very boring to ask her questions. You know, it is not a real

person-to-person interaction. It is like I asked a robot and it is so meaningless. I think Artificial Intelligence can do this too. (Interview 1 of Cherris).

4. Discussion and Implication

This longitudinal study investigated IDLE motivation and engagement of two EFL learners over the timespan of eight weeks. The findings revealed that two participants had two distinctive trajectories in terms of their motivation and engagement. Cherris reported intrinsic motivation but displayed declining engagement in IDLE; Lynn had an autonomous form of extrinsic motivation and engaged consistently in IDLE. The analysis of reflective journal entries and semi-structured suggested a variety of influencing factors related to the three basic needs postulated by SDT. Figure 2 illustrates the mechanisms of how these factors interplayed and influenced each other.

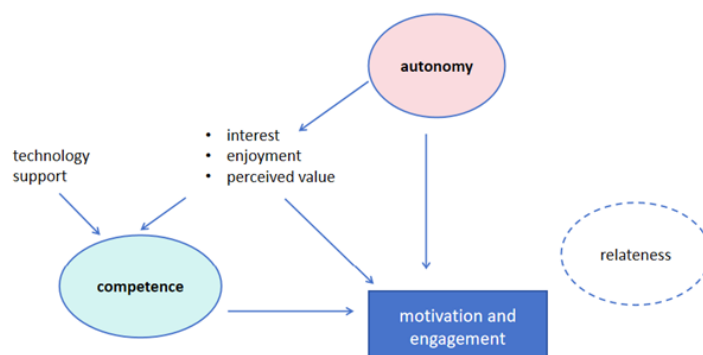


Figure 2. Illustrations of the influencing factors on IDLE motivation and engagement based on SDT

First and foremost, as reported by both participants, the positive emotions and attitudes generated from IDLE are the most salient and influential factors that sustainably motivate EFL learners to engage in IDLE. This finding reflected the significant role of emotions in L2 learning and acquisition (MacIntyre, et al., 2019). Specifically, IDLE offers autonomy for learners to choose their learning materials so that they showed great interest in learning itself, experienced a sense of enjoyment, as well as perceived the learning as valuable for their language development. In consequence, these optimal emotions motivated them to devote more time and energy to IDLE continually. This confirms the theoretical discussions and empirical findings on the linkage between autonomy and IDLE engagement (Fathali & Okada, 2018; Sockett & Toffoli, 2020; Toffoli, 2020; Zadorozhnyy & Lee, 2024). In addition, our study also discovered that such optimal emotions and attitudes also indirectly contributed to their engagement and motivation through boosting their perceived competence in learning the language. As students felt the learning process enjoyable and valuable, they were confident in their English abilities and were more willing to spend more time on the learning task in the future. The mediating role of positive emotions was also noticed in Lee et al. (2021)'s study with Korean EFL learners in the context of English speaking. This finding suggest English language teachers involve students in decision-making process, giving them freedom and autonomy in choosing the learning materials and explore their interest. With more intrinsic motivation and autonomy over the learning content and process, EFL learners could be more motivated and highly engaged in their own English learning.

In addition, this study also noticed possible inhibiting and non-significant factors on IDLE motivation and engagement. The case of Cherris suggests that too much autonomy might be one plausible reason for disengagement in IDLE. Since IDLE is more flexible and less structured (Reinders & Benson, 2017), learners have absolute control over their learning and could adjust the engagement in IDLE based on their own schedule. This advantage of IDLE might transform into "disadvantage" when students are occupied by other stuffs which they perceived as more "essential" and "urgent". This could explain why some students were found to be highly motivated but poorly engaged in IDLE. In this way, too much autonomy might be a double-edged sword on students' "actual" learning engagement, which indicates that teachers might need to cultivate students' self-monitoring awareness and skills to help them be more conscious of their own learning pace and effective adapt the learning according to their own individual schedule. Besides, consistent with previous IDLE studies (e.g., Zadorozhnyy & Lee, 2024; Sørenbø et al., 2009), this study also discovered that perceived relatedness did not influence IDLE motivation and engagement. This is because learners found the online interaction quite "superficial", "impersonalized" and "ineffective", which actually did not fulfill their sense of belonging and relatedness. Moreover, students who chose to start IDLE may consider IDLE as a private and personalized learning activity and do not expect to be related to others (Zadorozhnyy & Lee, 2024). Therefore, teachers are advised to enhance their own feedback literacy and enact more targeted, personalized and effective feedback for students along with their autonomous IDLE with the aim to create a sense of belonging among students.

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An intelligent scoring method for the diagnosis of basic teaching skills of pre-service teachers

Yuyin Zhang^{1*}, Zihui Huang², Minjie Zhu³, Xueni Liu⁴, Zongjie Qin⁵, Yuqi Zhu⁶

^{1,2,3,4,5,6}SOUTH CHINA NORMAL UNIVERSITY School of Information Technology in Education, Guangdong, China
zyuyin@m.scnu.edu.cn, 1095232979@qq.com, 1035908703@qq.com, liuxueni@m.scnu.edu.cn, 1927087955@qq.com, 18867365505@163.com

ABSTRACT

Teachers' verbal expression features, facial expression, and postures influence students' motivation and learning outcomes. Consequently, cultivating pre-service teachers' skills in utilizing these signals, named basic teaching skills in this study, is critical. However, most of the existing research on the teaching analysis of pre-service teachers focuses on teaching skills, without focusing on the basic skills of teaching, and most of the teaching analysis of pre-service teachers relies on classroom observation, which is subject to the influence of subjective factors, and the research granularity is relatively loose. Therefore based on related work and teacher professional competency standards in China, we identified four key dimensions of basic teaching skills (verbal expression, facial expression, posture, and black-board writing) and 18 observable indicators during teaching. We developed the Intelligent Training System for Basic Teaching Skills (ITSBTS) to assess these indicators. Same as a traditional microteaching system, the tool used microphones and cameras to collect the audios and videos of teaching. We extracted metrics from this data using open source algorithms, cleaned the data using python programming, and automatically scored the 18 indicators using a series of formulas. In order to verify the effectiveness of this method, we invited two senior pedagogy experts to score 300 hands-on training videos back-to-back based on 18 indicators, introduced a third authoritative expert for final scoring when the two experts' scores were inconsistent, and finally compared the experts' scores with the intelligent scores constructed in this study.

KEYWORDS

basic teaching skills, pre-service teachers, intelligent scoring

The Role of Gender in Self-efficacy and Self-regulated Strategies of EAP Writing

Jingyang HE

The Education University of Hong Kong, Hong Kong SAR, China

hjinyang@eduhk.hk

ABSTRACT

Gender, as a social variable, is rarely investigated in the field of self-regulated learning strategies (SRL) and self-efficacy (SE). Given the challenge of English writing for Chinese learners, this research examines gender differences in writing SRL and SE by investigating 122 undergraduates of a Chinese university with English-medium instruction (EMI). Data were collected through the Questionnaire of English Writing Self-efficacy (QESWSE), the Questionnaire of Writing Self-Regulated Learning Strategies (QEWRLS) and semi-structured interviews with 10 students. Results showed gender differences in students writing self-efficacy, SRL strategy use, and the relationships between self-efficacy and SRL strategy use, with male students displaying significantly stronger writing self-efficacy than their female counterparts. Self-regulated strategies varied across genders, though the differences were not significant. Correlation results revealed that male learners favored goal-setting techniques to enhance their self-efficacy but lacked seeking-for-help strategies. By contrast, female learners were more inclined to promote self-efficacy by self-evaluating their writing, seeking assistance from peers, and preparing thoroughly before writing tasks. Interview data provided explanations for the quantitative data by showing reasons why female and male students adopted different attitudes towards social strategies and self-evaluation strategies. These insights, derived from both quantitative and qualitative data, inform pedagogical implications to improve students' self-efficacy and SRL strategies in English writing. Specific practices include showing more support to increase the low self-efficacy of female learners, providing instructions for checking grammar for male students, and designing more peer-review activities that foster collaborative SRL strategies for male students.

KEYWORDS

Self-regulated (SRL) writing strategies, self-efficacy, higher education, gender, English as a Foreign Language

Effects of a Teacher Development Project on Pre-service Science Teachers'

Assessment Literacy

Chi-keung CHAN

Department of Science and Environmental Studies, The Education University of Hong Kong, Hong Kong SAR, China
cchikeung@eduhk.hk

Abstract: *Effective teaching in 21st-century education needs to infuse formative assessment tasks into students' personalized learning. This requires teachers to develop their assessment literacy so that they are able to design high-quality formative assessment tasks and provide students with constructive and timely feedback for meaningful conceptual change and self-directed learning. A project was conducted to develop pre-service science teachers' assessment literacy. The project consists of three stages: (1) The project team organized and conducted a series of workshops to provide participants with sufficient knowledge of the conceptual change, metacognition and application of multiple-choice questions (MCQs) for diagnostic purposes; (2) The participants were grouped and intensively shadowed by mentors to develop high-quality MCQs with feedbacks and produce well-planned short teaching videos; and (3) The participants were guided to make reflection in terms of assessor identity after studying the feedbacks from the secondary school teachers and students used the developed materials in their learning and teaching. To examine the project's effects, we developed a 20-item survey instrument that assesses participants' perceptions of their performance assessment literacy. The instrument covers three aspects: design of assessment tasks, providing students with feedback, and instruction based on assessment data. Pre-test and post-test were administered to study the project's effects, where participants rated their views on the items on a 5-point Likert scale. We found that participants' AL significantly developed after completing the project. Furthermore, the project produced a strong effect on the development of participants' AL concerning the design of assessment tasks.*

Keywords: Assessment literacy, diagnostic assessment, alternative conception, metacognition, chemistry education

1. Introduction

Assessment literacy (AL) is regarded as a basic understanding of educational assessment and related skills to apply such knowledge to various measures of student achievement (Stiggins, 1991). AL is now considered as integral to teacher professionalism (Engelsen & Smith, 2014) for two reasons. First, teachers are the key transforming agents in educational assessment (OECD, 2019). Second, assessment is indivisible from student learning (Black & William, 1998). Consequently, teachers are required to make effective assessment-related decision-making, such as developing quality assessment items and providing feedback to facilitate learning and teaching. In 21st-century classrooms, assessment tasks should provide students with an adaptive, personalized pathway for their self-directed learning (Zimmerman & Martinez-Pons, 1990).

Multiple-choice questions (MCQs) are commonly used as assessment items in public exams as well as daily learning and teaching in science education. There are two significant advantages of using MCQs in assessment tasks. First, we can assess learners' understanding of concepts fairly and efficiently if the MCQs are well-designed. Second, we can reveal learners' alternative conceptions/misconceptions provided that the distractors are purposefully set (Treagust, 1988). It is very common for both students and teachers to use MCQs that appeared in past public exams during instruction and studies. However, although the MCQs from the past public exams are well-developed, they may be unable to facilitate effective learning and teaching for two significant reasons. First, MCQs in public exams are set for summative purposes, where the items are used to distinguish candidates into various levels and grades rather than facilitating learning and teaching. Second, some MCQs in the public exam are cross topics to assess candidates' knowledge in the mastering of knowledge of the whole curriculum after a few years of studies. Consequently, teachers are required to apply AL to adapt the MCQs from the public exam papers in daily learning and teaching. It would be more meaningful if teachers could exercise their AL to develop MCQs to meet student learning needs.

An MCQ can be an effective learning tool, especially when it is able to induce a learner's conceptual change (Carey, 1991; Chi, 1992 & 2008) and metacognition (Brown, 1987; Flavell, 1987; Kuhn & Dean, 2004). An MCQ is able to achieve this goal when the following two features are included. First, the distractors are set based on learners' possible alternative conceptions/misconceptions. Second, immediate and constructive feedback is provided to learners when they are not able to select the correct answer. Additionally, some educationists (e.g., Chou & Chiu, 2004; Chandrasegaran, Treagust & Mocerino, 2007; Adadan & Savasci, 2012) advocate the use of two-tier MCQs as diagnostic instruments where learners' factual knowledge and conceptual knowledge are to be assessed in the first and second tier respectively. In short, a high-quality MCQ is able to facilitate effective learning, teaching and assessment. Yet, significant effort is required to develop high-quality MCQs because it involves practical application of AL (Xu & Brown, 2016).

However, key stakeholders such as school principals, experienced teachers and teacher educators constantly criticized inexperienced and pre-service teachers who performed relatively weakly in designing assessment tasks and providing

Cheng, M. H. M., Xu, G., Cheng, G., Kong, S. C., Song, Y., Erni, J. N., Chen, J., & Macfarlane, B., Yeung, S. S. (Eds.). (2025). *Proceedings of the International Conference on Learning and Teaching 2025 (ICLT 2025)*. Hong Kong SAR: The Education University of Hong Kong.

feedback. In this connection, nurturing pre-service teachers' AL in teacher education programmes is essential. As a result, we referred to the conceptual framework of Teacher Assessment Literacy in Practice (TALiP) (Xu & Brown, 2016), which consists of three levels of mastery when designing and implementing our teacher development project.

2. Methodology

2.1. Participants and Procedures

The participants were 31 student-teachers. Of the 31 of them, 20 (65%) were male and 11 (35%) were female. Twenty-eight (90%) of them majored in science education, specializing in chemistry in their five-year full-time undergraduate degree, while the remaining 3 (10%) majored in science education, specializing in chemistry in their two-year part-time postgraduate diploma of education. The former were prospective teachers, while the latter were in-service chemistry teachers with less than 4 years of teaching experience.

The project team comprised a teacher educator (the author), a former curriculum development officer, a former senior manager of assessment development, a retired secondary school principal with chemistry teaching experience, and two in-service teachers with more than 20 years of experience in teaching chemistry.

At the beginning of the teacher development project, we provided each participant with a printed survey questionnaire (hard copy) to complete. After finishing the project, the participants took the survey again. The two sets of surveys were identical and can be regarded as pre- and post-tests on their perceptions of their AL.

2.2. The Teacher Development Project

I am the lecturer teaching the chemistry pedagogy course at the undergraduate and postgraduate levels. Students were invited to join the teacher development project on a volunteer basis. The project consists of two phases, which can be further divided into three stages.

In Stage 1 of each phase, the project team organized and conducted a briefing session and a series of workshops to provide participants with sufficient knowledge of the conceptual change, metacognition and application of MCQs for diagnostic assessment. The total duration of the briefing session and workshops was 9 hours. In this stage, participants joined the project as the *participants*.

In Stage 2 of each phase, the project team members grouped and intensively shadowed participants to develop high-quality MCQs with written feedback and produce well-planned short teaching videos. The total duration of this mentoring stage was 6 months. In this stage, participants engaged in the project as the *co-developers*.

In Stage 3 of each phase, the project team developed an open online platform to contain all the developed MCQs and materials. Chemistry teachers and students teaching and studying the HKDSE Chemistry (equivalent to grades 10-12) in two secondary schools used the platform. The participants were guided to revise the materials according to the feedback gathered from the secondary schools. Furthermore, a moderation meeting and a debriefing session were held to facilitate them to make reflections on the development of their AL. The total duration of the meeting and debriefing session was 5 hours. In this stage, participants engaged in the project as reflective *practitioners*.

We suffered from the constraint of a small class size and thus divided the project into two identical phases. A total of 31 students from the undergraduate and postgraduate diploma of education programmes participated in the project, where 19 participated in phase 1 and 12 participated in phase 2 (for details of the project, please see Chan, 2024). Through their active and collaborative engagement in the project, they developed their AL in practice, in particular:

- (1) They developed 208 valid MCQs regarding specific learning objectives;
- (2) They developed written feedback for each distractor to induce the learner's conceptual change and metacognition;
- (3) They developed 20 short teaching videos to explain the concepts involved in the selected MCQs; and
- (4) We developed an open online platform that included all the MCQs, feedback, and videos for secondary school teachers and students.

2.3. The Survey Instrument

To study the impacts of the teacher development project on participants' AL, we developed a survey instrument composed of 20 items to cover three aspects: (1) design of assessment tasks, (2) providing students with feedback, and (3) instruction based on assessment data.

The first principle guiding the design and development of the MCQs is that the items can facilitate students' learning. Furthermore, the MCQs should validly align with the assessment objectives. The second principle is that the MCQs should provide students with written feedback to induce conceptual change and metacognition. Finally, the third principle is that teachers refer to students' performance in the MCQs to design or adjust their teaching.

We, based on the three principles and referred to the PAL scale (Kelly et al., 2020), developed a 20-item survey instrument for our project. The items are presented in Table 1. Meanwhile, the items were randomly distributed in the survey questionnaire. We asked the participants to rate their degree of agreeability on each item on a five-point scale from 1 (very disagree) to 5 (very agree).

Item analysis was conducted on the 20 items. The Cronbach's alphas of the items in the pre-test and post-test were 0.87 and 0.82, respectively. The values were greater than 0.7, suggesting that internal consistency was obtained among the items (Muijs, 2022).

2.4. Data Analysis

We investigated whether the participants significantly improved in AL after the teacher development project. A paired-samples *t*-test was conducted to analyze the effectiveness of the teacher development project. Levene's tests of equality of error variances were conducted to check whether the statistical assumption of homogeneous variance was violated. The above analysis was conducted using SPSS 29.0. In case there was a violation of statistical assumption, we conducted the Wilcoxon test, which is a non-parametric test to analyze the main and interaction effects for the data with the violation of statistical assumptions (Green & Salkind, 2014). The effect size of a *t*-test was indicated using Cohen's *d*, with a range of 0-0.20 indicating a weak effect, 0.21-0.50 a modest effect, 0.51-1.00 a moderate effect and equal to and greater than 1.01 a strong effect (Muijs, 2022).

Table 1. Survey instrument items.

Item id	Question no in the survey	Item text
D_1	1	I am able to design assessment tasks as diagnostic instrument of student learning
D_2	4	I am able to design assessment tasks that provide students with feedback to make decisions about their learning
D_3	5	I am confident to develop assessment tasks that are clearly aligned to the curriculum
D_4	8	I am able to design assessment tasks that allow students to monitor their own learning
D_5	9	I am able to develop assessment tasks to assess students' understanding of knowledge
D_6	12	I am able to develop assessment tasks that provide students with opportunities to reflect on their learning
D_7	13	I am able to design assessment tasks to identify student's alternative conceptions/misconceptions
D_8	16	I am able to design assessment tasks that promote an academic growth mindset (i.e., the belief that their academic abilities are not fixed and can improve with effort)
D_9	7	I am confident to develop assessment tasks that are clearly aligned with state objectives
D_10	20	I am confident to design assessment tasks to promote student learning
F_1	2	I am able to provide students with concrete written feedback to facilitate their learning
F_2	6	I am able to write specific feedback based on students' performance in assessment tasks
F_3	10	I am confident to provide students with feedback to facilitate their conceptual change
F_4	14	I am confident to provide students with feedback to facilitate their metacognition
F_5	18	I am able to write feedback to facilitate students' learning
I_1	3	I am able to modify instruction for students based on student assessment data
I_2	7	I am able to adjust instruction for particular groups of students based on student assessment data
I_3	11	I am able to provide individual students with personalized instruction based on student assessment data
I_4	15	I am able to refer to student assessment data to design/plan my lessons
I_5	19	I am confident to develop teaching videos to explain the concepts that are related to the assessment tasks

3. Results

3.1. Overall Analysis

We conducted a paired-samples *t*-test to evaluate the effectiveness of the teacher development project on participants' AL. In general, the results indicated that the mean of post-test ($M = 79.06$, $SD = 6.23$) was significantly greater than the mean of pre-test ($M = 68.83$, $SD = 8.79$), $t(17) = 3.74$, $p < .01$. The standardized effect size index, *d*, was .88, with very little overlap in the distributions for the 5-point Likert ratings in the survey instrument, as shown in Figure 1. The 95% confidence interval for the mean difference between the two ratings was 4.46 to 15.99.

The results supported that the participants self-perceived their AL, which had been significantly developed after completing the teacher development project.

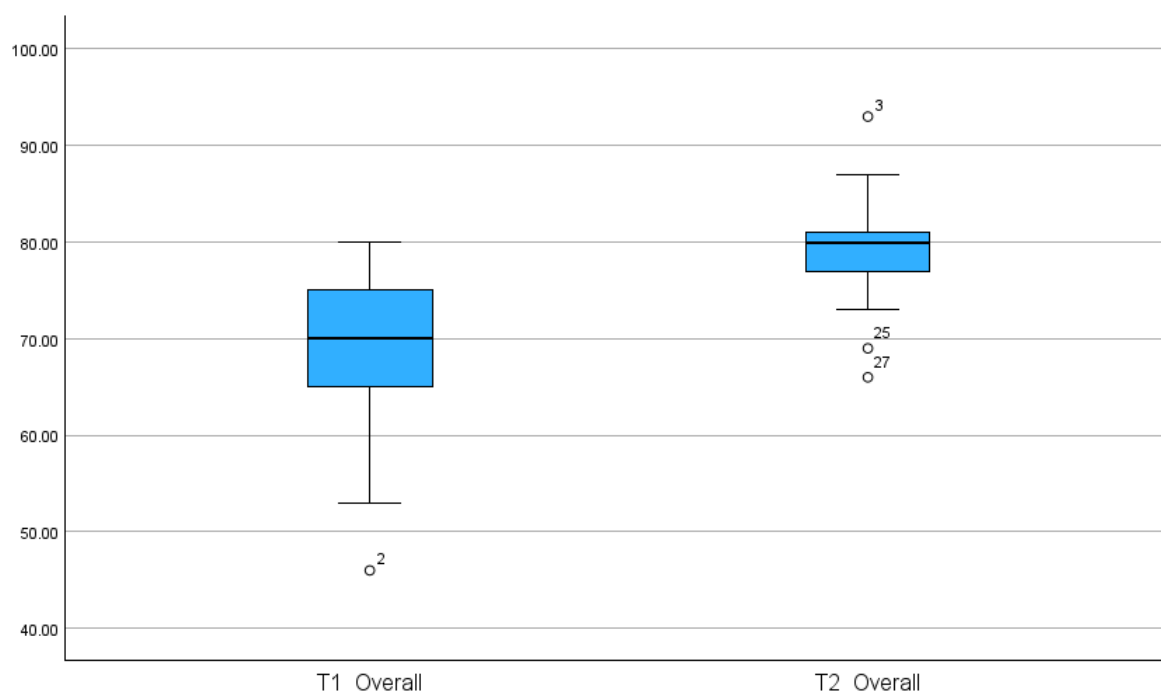


Figure 1. Boxplots of pre-test (T1) and post-test (T2) ratings.

3.2. Aspects Analysis

The 20 items in the survey instrument covered three aspects: (1) design of assessment tasks, (2) providing students with feedback, and (3) instruction based on assessment data. We conducted a paired-samples *t*-test to analyze which aspects contributed to the large effect of the teacher development project, as reported in Section 3.1.

Results of the parted-samples *t*-test of the pre-test and post-test by the three aspects and overall ratings were presented in Table 2.

The results indicated that the teacher development project produced a strong effect on the development of participants' AL in terms of the design of assessment tasks, a moderate effect in terms of instruction based on assessment data, and nearly a moderate effect in terms of providing students with feedback.

Table 2. Results of the parted-samples *t* test of the pre-test (T1) and post-test (T2) by the three aspects and overall ratings.

Pair	Mean	SD	95% Confidence interval of the difference		<i>t</i>	<i>df</i>	Significance		<i>d</i>
			Lower	Upper			One-sided <i>p</i>	Two-sided <i>p</i>	
T2_Design – T1_Design	6.28	6.22	3.18	9.37	4.28	17	<.001	<.001	1.01
T2_Feedback – T1_Feedback	1.67	3.53	-.09	3.42	2.00	17	.031	.061	.47
T2_Instruction – T1_Instruction	2.28	3.69	.44	4.11	2.62	17	.009	.018	.62
T2_Overall – T1_Overall	10.22	11.59	4.46	15.99	3.74	17	<.001	.002	.88

4. Conclusion

4.1. Possible Reasons for the Results

The results are encouraging and rewarding to the project participants and team members. The three-staged project generally provided participants with holistic and comprehensive learning experiences for active engagement.

Second, participants were intensively shadowed by the team members in developing high-quality MCQs and feedback in stage 2 of the project. Participants' active engagement in the learning process may be the reason to explain why they rated the design aspect significantly higher in T2 than in T1.

Meanwhile, modifying instruction and providing students with feedback based on assessment data may require an authentic teaching context. On the other hand, developing MCQs and related materials may not fully develop these two aspects. Consequently, participants rated their AL in these two aspects with a medium effect.

4.2. Implications of the Project

We analyzed the effectiveness of a teacher development project on developing pre-service science teachers' AL. We found that the participating teachers' AL were developed with moderate to strong effects. The findings suggest that in designing similar teacher development programmes of AL, it is essential to nurture their competencies to design valid assessment tasks to facilitate students' learning and align with the objectives. Furthermore, developing teachers' AL requires developing their competencies to provide constructive feedback for student's conceptual change and metacognition. Additionally, it is essential to develop teachers' AL regarding using assessment data to enhance teaching. Findings from our project further support the idea that assessment is indivisible from student learning and teacher instruction.

4.3. Limitations of this Study

This study has three significant limitations. First, all the participants were recruited and joined this teacher development project on a volunteer basis. It is very likely that all the participants were highly motivated and had confidence in designing MCQs and writing feedback for chemistry learning and teaching. Consequently, they self-perceived their AL quite well, which created a generalizability problem.

Second, there were 31 participants joined the project. We were able to collect 30 questionnaires from the participants in the pre-test because one participant was absent from the briefing session. However, we only received 18 questionnaires from the participants in the post-test because 13 participants did not return the questionnaires after they had graduated from their studies. Although we have used statistical tools to ensure the assumption of homogeneous variance was not violated, the small sample size may create a generalizability problem.

Finally, we did not employ an experimental design using a control group. We noted this limitation at the beginning. However, the small class size of the chemistry pedagogy course involved limited the recruitment of participants. Indeed, almost all the students in the course had joined the project. Then, it might not be appropriate to assign half of the participants. The reason is that there would be a reduction in sample size if the current group of participants ($N=31$) were split into an experimental and a control group. A possible modification in future studies is to recruit some teachers as the control to explore whether there are confounding variables (e.g., accumulation of teaching experiences) on the development of AL independent of the teachers' intervention.

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Enhancing Visual Health Management for Children with Special Educational Needs: An Interprofessional Education Framework Between Optometry and Education Students

Kin WAN¹, Tsz Wing LEUNG^{2*}, Kin Hei LAU³, Allen Ming Yan CHEONG⁴, Chun Wai LUM⁵, Kuen Fung SIN⁶

^{1,2,3,4}School of Optometry, The Hong Kong Polytechnic University, Hong Kong SAR, China

^{2,4}Centre for Myopia Research, School of Optometry, The Hong Kong Polytechnic University, Hong Kong SAR, China

^{2,4}Research Centre for SHARP Vision (RCSV), The Hong Kong Polytechnic University, Hong Kong SAR, China

^{5,6}Institute of Special Needs and Inclusive Education, The Education University of Hong Kong, Hong Kong SAR, China
kkinwan@polyu.edu.hk, jeffrey.TW.leung@polyu.edu.hk

Abstract: *This study outlines an interprofessional education (IPE) program tailored for optometry and education students. The program aimed to foster interdisciplinary collaboration and improve the management of eye health in children with special educational needs (SEN) – a vulnerable and underserved population. Through a combination of lectures and workshops, participants gained essential knowledge about SEN and developed necessary skills for conducting eye examinations for these children. The program concluded with vision screenings at two special education schools, where 43 optometry students and 39 education students collaborated to serve 170 children with SEN. Survey conducted before and after the program revealed significant improvements in students' understanding of SEN characteristics ($p \leq 0.013$) and their confidence in conducting eye examinations to these children ($p < 0.007$). Overall, this IPE program effectively enhanced students' knowledge and confidence in managing eye health needs of children with SEN.*

Keywords: Interprofessional Education, Special Educational Needs, Eye Care, Optometry Education, Collaborative Learning

1. Introduction

Children with special educational needs (SEN) experience a substantially higher risk of visual impairment and other ocular disorders compared to their typically developing peers (Kaur et al., 2016). Despite this increased prevalence, these children often encountered barriers to accessing appropriate eye care, leading to frequent under-diagnosis (Salt & Sargent, 2014). Integration of interprofessional education (IPE) offers a promising approach to address these challenges by fostering collaboration between healthcare professionals, such as optometrists, and educators (Reeves et al., 2016). Grounded in Situated Learning Theory (SLT), which emphasizes the importance of authentic learning experiences (Lave & Wenger, 2019), this study implemented an IPE program designed to enhance the management of eye health in children with SEN. This approach, supported by research demonstrating the positive impact of interprofessional collaboration in special education (Anaby et al., 2019), integrates theoretical knowledge with practical experience, enabling students to develop the skills and collaborative practices necessary for effective interprofessional teamwork (Holmqvist & Ferm, 2021).

2. Methods

The program employed a mixed-methods design using a simultaneous triangulation approach for comprehensive data collection and analysis. The study included 43 final-year optometry students and 39 special education students who collaborated to serve 170 children with SEN from two special education schools.

The IPE program consisted of both theoretical and practical components. The theoretical component included lectures on SEN characteristics and eye examination techniques, while the practical component involved supervised vision screening sessions. Additionally, reflective exercises and peer feedback sessions were integral to the program structure. Quantitative data was collected through pre- and post-program surveys using a five-level Likert scale, while qualitative data was gathered through reflective writing assignments. The analysis incorporated both statistical evaluation of survey responses and thematic analysis of written reflections.

3. Results

3.1 Quantitative Analysis

Our pre- and post-program surveys achieved a response rate of 70.7%, with 58 students (37 optometry and 21 education students) completing both surveys. The initial assessment revealed a significant knowledge gap regarding SEN characteristics, particularly among optometry students. Prior to the program, only 5% of optometry students reported sufficient understanding

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of SEN characteristics, and notably, none had received prior training in managing children with SEN. The post-program survey demonstrated remarkable improvements across multiple domains. Optometry students showed increased confidence in key areas: gaining trust from children with SEN (54.05%), streamlining vision assessments (59.46%), and managing examination challenges (51.34%). Statistical analysis confirmed these improvements were significant (Wilcoxon signed-rank test, $p < 0.007$).

Education students similarly demonstrated substantial growth, with their comprehension of SEN doubling to 67% post-program. Their understanding of optometrists' roles, particularly in eye disease detection and visual training provision, increased significantly to 80.95% and 71.43%, respectively (Wilcoxon signed-rank test, $p < 0.023$).

Our vision screening program and a questionnaire revealed significant visual health concerns among children with SEN. Of the 170 children screened, approximately 70% demonstrated some form of ocular problems. While visual acuity tests identified visual impairment (visual acuity ≥ 0.50 logMAR) in 32% of the children, highlighting the importance of comprehensive eye assessment in this population. The screening identified several key visual issues among the participants, with refractive errors found in 37% of the children. The assessment of visual capacities revealed that between 51% to 72% of children showed deficits in saccades, pursuit, figure-ground discrimination, and size perception. A particularly concerning finding from the questionnaire was that 56.96% of parents were unaware of their children's existing vision problems, emphasizing the critical need for regular vision screening programs and improved communication between healthcare providers and families.

3.2 Qualitative Analysis

The analysis of 60 reflective essays (41 from optometry and 19 from education students) revealed four distinct learning themes:

Professional Interactions

Students reported enhanced understanding of interprofessional dynamics and team-based care. Education students acknowledged the critical role of eye care in their professional perspective, with one student (E14) noting, "After doing the service, I have gained precious experience... I understand that it is very crucial to protect our eyes well in our young age."

Theory-Practice Integration

Students demonstrated improved ability to apply theoretical knowledge in practical settings. Optometry students particularly noted the value of hands-on experience with SEN children, enhancing their clinical competence and decision-making abilities.

Social Responsibility

Many students expressed deepened understanding of their social responsibilities. One education student (E18) reflected on challenging societal stereotypes: "I have learned more about these children and realized they are not as scary as society often portrays them."

Professional Identity Development

Optometry students reported strengthened professional identity as healthcare practitioners. One student (O26) noted, "As a primary healthcare provider, we should be equipped with the ability to carry out eye examination not only to the general public but also special patient groups."

4. Discussion

The successful integration of the SLT framework into this interprofessional education program demonstrates its effectiveness in bridging healthcare and education disciplines at the undergraduate level (Holmqvist & Ferm, 2021). Through authentic environments created by hands-on vision screenings, combined with peer relationships and mentor guidance, the program provided essential components for effective professional development (Black et al., 2010). The practical application of situated learning principles proved particularly valuable in fostering collaboration between optometry and education students (Lave & Wenger, 2019). The program's impact extends significantly beyond conventional healthcare-oriented interprofessional education by engaging educational professionals in a comprehensive learning experience (Reeves et al., 2016). The marked improvement in optometry students' understanding of SEN characteristics, increasing from 5% to approximately 50%, demonstrates the program's effectiveness in addressing knowledge gaps. Similarly, education students showed enhanced understanding of optometrists' roles, particularly in eye disease detection (80.95%) and visual training provision (71.43%), indicating successful cross-disciplinary learning outcomes (Anaby et al., 2019). Our initiative effectively addresses several traditional barriers in interprofessional practice, including the tendency for professionals to work within isolated departmental boundaries, the complexity of cases encountered by each professional, inconsistent availability of professionals, and disagreements regarding optimal student support strategies (D'Amour et al., 2015). By fostering early interprofessional engagement at the undergraduate level, the program helps mitigate potential conflicts in future professional practice while establishing foundations for collaborative care (Goldman et al., 2016).

The findings have significant clinical implications, particularly in serving children with SEN. The high failure rate in vision screenings (approximately 50%) and the fact that 56.96% of parents were unaware of their children's existing vision problems highlights the critical need for improved eye care services for this vulnerable population (Salt & Sargent, 2014; Kaur et al., 2016). The program's success in enhancing students' ability to manage these cases effectively suggests a promising

approach to addressing this healthcare gap, while simultaneously preparing future professionals for the challenges they will face (Woodhouse et al., 2014).

The pedagogical approach adopted in this program, emphasizing experiential learning, reflective practice, and interprofessional engagement, aligns with contemporary educational practices (Thistlethwaite, 2012). The integration of workshops, laboratory sessions, and real-world vision screenings provided a comprehensive learning experience that enhanced both technical competence and professional confidence (Barr et al., 2017). Through direct interaction with children with SEN, students developed enhanced empathy and understanding of vulnerable populations' needs (Bridges et al., 2011). This increased awareness is particularly crucial given the rising ocular health concerns among Asian Chinese children and the specific challenges faced by children with SEN (McKenna et al., 2018).

Several limitations warrant consideration in evaluating the program's effectiveness. The pilot nature and limited sample size restrict generalizability to other healthcare disciplines and contexts (Paradis & Whitehead, 2018). While the mixed-methods approach provided comprehensive insights, the reliance on self-reported data introduces potential response bias. The absence of longitudinal follow-up makes it challenging to verify the sustainability of observed improvements in awareness and confidence (Reeves et al., 2016).

Looking forward, several key areas deserve attention for future development. Implementation of longitudinal studies will be crucial to assess the long-term impact on professional practice and patient care outcomes (Zwarenstein et al., 2009). The program should consider including other healthcare disciplines to create more comprehensive interprofessional education opportunities. Furthermore, strengthening partnerships with local special education schools and healthcare facilities will provide sustained support for children with SEN. These findings strongly support the continued development of interprofessional education initiatives that bridge healthcare and education disciplines, particularly in serving vulnerable populations like children with SEN (Thistlethwaite & Moran, 2010).

5. Conclusion

The IPE program proved effective in enhancing students' professional competencies and confidence in managing eye health needs of children with SEN. The success of this initiative supports the continued development of interprofessional education programs that bridge healthcare and education disciplines. Future research should focus on longitudinal outcomes and scaling these programs to reach broader student populations.

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Exploring the Effects of Writing Self-concept and Anxiety on English Writing Performance and the Countermeasures—A Case Study of English Teaching at a Middle School in Shaoguan

Zhijian ZHOU¹, Xiang LI²

^{1,2}The University of Melbourne, Australia

z1793500580@outlook.com, shawn0822ggg@gmail.com

Abstract: This study took 42 students in a junior class in a middle school in Shaoguan as the participants, and explores the effects of writing self-concept and writing anxiety on English writing performance through data analysis. Based on the existing research, the paired samples T-test was used to test the effect of teaching strategies such as “Production-oriented Approach” on improving English writing performance. The results show that writing self-concept is positively correlated with English writing performance and has a positive influence on it; Writing anxiety is significantly negatively correlated with English writing performance and has a negative influence on it; The Production-oriented Approach and other countermeasures have positive significance for improving English writing performance. It is found that teachers using effective teaching methods in English writing teaching can improve their writing self-concept, reduce writing anxiety, break the vicious cycle, and thus improve their English writing performance.

Keywords: affective factors, writing self-concept, writing performance, product-oriented approach, teacher-student collaborative assessment

1. Introduction

This is a quantitative study aiming at revealing the effects of writing self-concept and writing anxiety on English writing performance and the countermeasures. There are three main variables involved in this study: writing self-concept, writing anxiety and writing performance. Writing self-concept is a branch of self-concept, specifically ASC. Writing anxiety is an offshoot of language anxiety. While existing research on self-concept and language anxiety is extensive, their application to English writing instruction remains underexplored. In the context of English education in China, writing often receives less attention compared to listening, speaking, and reading.

However, with the increasing emphasis on writing in the College Entrance Examination, the need to develop students' writing skills has become more urgent. Many students lack confidence and suffer from significant writing anxiety, which negatively affects their performance and creates a cycle of resistance and poor results. This study examines the relationships among writing self-concept, anxiety, and performance, providing insights into how these factors influence English writing. In addition, this study will summarize beneficial countermeasures from related literature and test them in a four-week teaching activity aimed at improving students' self-concept and reducing writing anxiety, fostering students' writing interests and developing their writing competency, and thus improving their writing performance.

In this study, data on writing self-concept and writing anxiety will be obtained through questionnaires and writing performance data will be obtained through tests for junior students at a middle school. SPSS is used to analyze the data of variables, and the following conclusions are drawn: (1) Writing self-concept is positively correlated with writing performance; (2) Writing anxiety is negatively related to writing performance; (3) Countermeasures like product-oriented approach might improve students' writing performance.

2. Theoretical Framework

2.1. Introduction of Key Concepts

2.1.1. Self-concept

The study of self-concept (SC) began with William James in 1890 but gained attention only after Shavelson et al. (1976) proposed the Shavelson Model in 1976. This model defined SC as a multidimensional hierarchical structure, dividing “General SC” into “Academic SC” (ASC) and “Non-academic SC”, laying the foundation for future research. Later, Song and Hattie (1984) refined this by introducing the Song-Hattie Model, further subdividing ASC.

Research has also focused on measuring SC and its role in education. Marsh and Shavelson (1985) developed the widely used SDQ (Self-Description Questionnaire) series based on the Shavelson Model. Studies have shown a link between ASC and specific abilities, such as reading SC (an ASC) influencing reading behavior and performance (Locher et al., 2021). ASC plays a critical role in academic achievement. Decades of research have proposed four models explaining this relationship: (1) the Self-enhancement Model, where ASC determines performance (Calsyn & Kenny, 1977); (2) the Skill-development Model, where achievement influences ASC (Calsyn & Kenny, 1977); (3) the Reciprocal-effect Model, where they mutually

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influence each other (Marsh, 1990); and (4) the Developmental Perspective, where their relationship changes with age (Skaalvik & Hagtvet, 1990). This study focuses on the Self-enhancement Model to explore the relationship between WSC and EWP, emphasizing WSC's role as an individual's perception of their writing abilities and its impact on their performance.

2.1.2. Writing Anxiety

Research on Second Language Learning Anxiety (SLLA) originated from generalized anxiety studies, later shifting to the relationship between specific learning tasks and anxiety. Daly and Miller (1975) introduced the concept of Writing Anxiety (WA) and developed the Writing Apprehension Test (WAT) to measure it. Since then, WA has been widely studied by foreign scholars across three areas: (1) WA's impact: WA disrupts the writing process and reduces learning motivation (Mohseniasl, 2014); (2) Development of WA scales: Bline et al. (2001) examined item structures and developed reliable measurement tools; (3) Countermeasures for WA: Qashoa (2014) found peer correction and time-limited training effective in reducing WA and boosting confidence.

Writing anxiety (WA), a subset of language anxiety, arises from various sources that impact writers' confidence and performance. Young (1991) identified six key factors contributing to WA: competition and self-esteem, where comparing work or fearing judgment increases anxiety; low tolerance for mistakes, leading to frustration when unrealistic expectations aren't met; teachers' attitudes, with a focus on form over content or rigid classrooms adding pressure; teacher-student interactions, where excessive corrections or harsh feedback worsen anxiety; lesson procedures, like public criticism of poor work; and high-pressure tests or unfamiliar formats.

2.2. Influence Path and Countermeasure Selection

Numerous studies have shown that self-concept and anxiety are linked to academic performance. For instance, Corbière et al. (2006) found a positive correlation between ASC and academic achievement, while Zhang (2019) revealed a negative impact of language anxiety on performance. Based on these findings, it is hypothesized that WSC positively impacts English writing performance, whereas WA has a negative influence.

The proposed influence path suggests that higher WSC enhances students' confidence, encouraging effort and improving writing outcomes. Conversely, increased WA triggers negative emotions, leading to resistance and poor performance. To address these challenges, a teaching strategy combining the Product-Oriented Approach (POA), Cooperative Learning Method (CLM), and Teacher-Student Collaborative Assessment (TSCA) is proposed.

POA mitigates the gap between learning and application, involving three main teaching steps: Motivating, Enabling, and Assessing (Wen, 2018). Research by Zhang (2020) confirms POA's effectiveness in enhancing writing performance, particularly as it aligns with China's educational context better than imported methods. Effective feedback is crucial in POA. TSCA complements traditional evaluation methods by encouraging student participation and engagement, which could mobilize students' initiative and subjectivity to the greatest extent, and proved its positive significance to teaching (Sun, 2020). Integrating CLM into POA further enriches teaching activities and supports improved writing performance (Yusuf et al., 2019).

3. Research Methodology

In order to obtain accurate research results, this study mainly adopts four research methods: quantitative analysis, case study, survey method and data study.

4. Effects and Countermeasures—A Case Study of English Teaching at a middle school

As mentioned in theoretical framework, ASC is widely believed to be positively correlated with academic achievement. However, some scholars proposed different opinions (Arnaiz & Guillen, 2012). In order to verify the relationship between WSC and EWP, the research question 1 is proposed:

Research Question 1: Is there a positive relationship between writing self-concept and writing performance?

WA is learners' special anxious behavior in the process of writing, which is related to writing performance. Some scholars believed that there was a negative correlation between WA and writing performance, which hindered the improvement of writing performance to a certain extent, which was also a common view of relevant studies on WA. Is it meaningful for this study to explore the relationship between WA and English writing performance? Through literature review and theoretical framework, it turns out there are various factors affecting WA, and there are differences between different participants in the level of WA and English writing performance. Therefore, due to different participants and research conditions, it remains to be tested whether there is still a negative correlation between participants' WA and English writing performance. Therefore, researcher proposed the second hypothesis:

Research Question 2: Is there a negative relationship between writing anxiety and writing performance?

This question is essentially an assumption about the results of the study, and the researcher assumes that there is a positive correlation between them. Considering that WSC and EWP (pre) are measured in the same batch, their data are mainly analyzed here. First of all, the reliability and validity of the questionnaire used in this study need verifying after adjustment

and selection. The questionnaire includes two sections intending to collect the data of WSC and WA. After analysis, the data are authentic (*Cronbach α* =0.852), and valid (*KMO*=0.738 & 0.798), which can be further studied.

As shown in *Table 1*, descriptive analysis shows that: in the scale with a full score of 72, the lowest score of WSC of the samples is 16, the highest score is 58, and the average score is 42.429, showing that the level of WSC and WA of the participants is above average, and there are differences.

Then, Pearson Correlation analysis was used to study the relationship among WSC, WA and EWP (pre-test). The data shows that the correlation coefficient between WSC and EWP (pre) is 0.497 and that between WA and EWP (pre) is -0.465, showing a level of significance of 0.01 ($p=0.001<0.01$), indicating that WSC and EWP have a significant positive correlation while WA has a significant negative correlation on EWP. The data have proved the correlation among three variables, but can WSC and WA affect EWP? To answer these questions, the researcher carried on the linear regression model analysis. The correlation among WSC, WA and EWP provide a prerequisite for the subsequent analysis of linear regression model.

Table 1. The Mean Value, Standard Deviation Value and Pearson Correlation Coefficient of Writing Self-concept, Writing Anxiety and English Writing Performance (N=42)

	M	SD	WSC	WA	EWP (pre)
WSC	42.429	8.190	1.000	-0.641**	0.497**
WA	33.524	6.590	-0.641**	1.000	-0.465**
EWP (pre-test)	8.548	3.078	0.497**	-0.465**	1.000

** $p<0.01$

According to *Table 2*, the formula of the model is: $EWP (pre-test) = 0.616 + 0.187 * WSC$, and the R^2 value of the model is 0.247, which means that WSC can explain 24.7% of the change of EWP (pre-test). It is found that the model passed the F-test ($F=13.153$, $p=0.001<0.05$), that is to say, the WSC must have an impact on the EWP and the constructed model makes sense. It is worth noting that the regression coefficient of WSC is 0.187($t=3.627$, $p=0.001<0.01$), which means that WSC has a significant positive influence on EWP. That is to say, with the improvement of WSC, EWP will be correspondingly improved.

Table 2. Parameter Estimates of Linear Regression of Writing Self-concept and English Writing Performance (N=42)

	Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	<i>p</i>	VIF
	<i>B</i>	Std. Error	<i>Beta</i>			
(Constant)	0.616	2.226	-	0.277	0.783	-
WSC	0.187	0.052	0.497	3.627	0.001**	1.000
R^2			0.247			
Adj R^2			0.229			
<i>F</i>			$F (1,40) = 13.153, p=0.001$			

** $p<0.01$

During analyzing the data about WA and EWP, the researcher found that some students with higher EWP also had higher WA. Is the result contrary to the proposed the second hypothesis? Seen from *Table 3*, the formula of the model is: $EWP (pre-test) = 15.835 - 0.217 * WA$, and the R^2 value of the model is 0.217, which means that WA can explain 21.7% of the change in EWP (pre-test) before the experiment. It is found that the model passes the F-test ($F=11.061$, $p=0.002<0.01$), which shows that WA must have an impact on writing performance. In addition, the regression coefficient of WA is -0.217($t=-3.326$, $p=0.002<0.01$), which means that WA has a significant negative impact on EWP.

Since there is a negative correlation between WA and EWP, why do some participants with better writing performance have higher WA? According to the researcher, the actual situation of participants should be fully considered. The participants are in the third grade of junior high school, facing intensive pressure of enrollment. Meanwhile, the research of Li et al. (2021) also gave a reasonable explanation. His research found that moderate anxiety may help with learning. The WA of the participants is still within the acceptable range.

Table 3. Parameter Estimates of Linear Regression of Writing Anxiety and English Writing Performance (N=42)

	Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	<i>p</i>	VIF
	<i>B</i>	Std. Error	<i>Beta</i>			
(Constant)	15.835	2.232	-	7.094	0.000**	-
WA	-0.217	0.065	-0.465	-3.326	0.002**	1.000
R^2			0.217			
Adj R^2			0.197			
<i>F</i>			$F (1,40) = 11.061, p=0.002$			

** $p<0.01$

In conclusion, Both WSC and WA have a significant correlation with EWP, but their influences on EWP are different. WSC has a significant positive impact on EWP while has a negative influence on it. Knowing the relationships among WSC, WA and EWP, the research question 3 can be presented:

Research Question 3: What useful countermeasures can be applied to develop participants' writing ability?

According to the formation factors of WSC and WA, as shown in the theoretical framework, the teaching method with POA as the core, CLM as the assistant and TSCA as the feedback is theoretically conducive to the improvement of EWP, but the data still need testing. Therefore, the researcher applied the aforementioned strategies to practice and conducted a 4-week teaching study. Under the guidance of POA theoretical system, the researcher combined CLM and TSCA to redesign the Reading for Writing lesson.

After a 4-week study, the English writing performance of the participants was measured again, and the effectiveness of the countermeasures adopted was analyzed in the form of data. First of all, the two English writing performances and their difference meet the normal distribution, and the paired samples T-test can be conducted. As shown in *Table 4*, there is a 0.01 level of significance between the two English writing performances ($t=-5.034$, $p=0.000$), and the specific comparison difference shows that the average of English writing performance before experiment (8.55) is significantly lower than the average English writing performance after the experiment (9.45). And *Cohen's d*=0.777, which indicates that the difference is large. In other words, the countermeasures with POA as the core, CLM as the auxiliary and TSCA as the feedback have positive significance for the improvement of English writing performance.

Table 4. Paired Samples T-Test of the Two English Writing Performance (N=42)

Items	Paired (M±SD)		Mean Difference	<i>t</i>	<i>p</i>	<i>Cohen's d</i>
	Paired 1	Paired 2				
EWP (pre)-EWP (post)	8.55±3.078	9.45±2.948	-0.905	-5.034	.000**	0.777

** $p<0.01$

5. Conclusion

This study used various data analysis methods, including correlation analysis, linear regression, normality analysis, and paired samples T-tests, to explore the relationship between writing self-concept, writing anxiety, and English writing performance. The findings reveal that WSC positively correlates with and improves writing performance, while WA has a significant negative correlation and impact. Teaching strategies combining Production-Oriented Approach, Collaborative Learning Method, and Teacher-Student Collaborative Assessment significantly enhance writing performance by fostering positive emotional and physiological responses to writing, clarifying the value of writing, and building scaffolding to support skill development. Teachers should prioritize developing students' WSC and reducing WA through guided scaffolding, cooperative learning, and fostering a positive writing attitude. While the POA shows promise, its effectiveness relies on teacher expertise, emphasizing the need for professional development. Limitations of the study include insufficient offline research time, limited data, and challenges in supervising participants, suggesting areas for further research, such as the quasi-causal relationship between WSC and writing performance, WA's role in second language writing, and its interplay with native language use.

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Examining the Effects of Urbanization and Pedagogy on Instructional Quality in an economically disadvantaged inland province of China: A Classroom Observation Approach

Jieyan LEI¹, James KO^{2*}

^{1,2}The Education University of Hong Kong, Hong Kong SAR, China
leijieyhk@163.com, jamesko@eduhk.hk

ABSTRACT

To realise better classroom teaching quality and educational outcomes, this study aimed to compare the instructional quality from a dialogic teaching perspective and explore teacher-student interactions in the observed teaching practices when a Western pedagogy was introduced to primary schools in two contrastive districts (city vs county) of an economically disadvantaged inland province in China. The sample of this study consisted of seventy-eight elementary school English teachers/lessons (one teacher per lesson) from thirty-six schools in two different districts. A validated classroom observation instrument, TEACH, was utilised for data collection. High-quality lessons were selected for in-depth qualitative dialogue analyses to identify how teacher-student interactions may contribute to teaching quality. Statistically, both pedagogies showed similar strengths in creating supportive learning environments, but traditional pedagogy outperformed Western pedagogy in the instruction domain, particularly in whole-class teaching methods. Western pedagogy promoted social and collaborative skills, highlighting the importance of student-centred approaches. However, both pedagogies struggled with providing effective feedback. Differences between city and county classrooms were evident, with county areas suffering from lower instructional quality due to disparities in teacher quality and educational resources. This study contributes to understanding the instructional quality of contrastive teaching practices and teacher-student interactions between city and county learning environments. Integrating aspects of both pedagogies, rather than fully replacing one, could address regional teaching quality variation.

KEYWORDS

instructional quality, teacher-student interactions, classroom observation, city-vs-county, China

Transformative Education: The Impact of Artificial Intelligence on Translation

Pedagogy and Practice

Moza AL TENAIJY
United Arab Emirates University, Al Ain
mozah.o@uaeu.ac.ae

ABSTRACT

This study investigates the transformative impact of artificial intelligence (AI) on translation pedagogy and practice, specifically focusing on English and Arabic translations. By examining AI technologies such as machine translation, adaptive learning platforms, and AI-enhanced linguistic resources, we analyze their implications for curriculum design, teaching methodologies, and assessment techniques in translation education. Employing a mixed-methods approach, which includes surveys of educators and students alongside semi-structured interviews, we identify critical shifts in pedagogical frameworks that emphasize collaborative learning, technology integration, and skill enhancement for translating between English and Arabic and vice versa. Our findings indicate that while AI can significantly enhance the training of translators, it also necessitates a critical assessment of ethical considerations, including the reliance on machine-generated translations and the indispensable role of human expertise in ensuring translation accuracy and cultural nuance. This paper advocates for a flexible educational framework that not only incorporates AI tools but also prepares students to navigate the complexities of an AI-driven translation landscape. By equipping learners with the necessary competencies and ethical awareness, we aim to prepare them to meet the challenges of the future as skilled and responsible translation professionals. This research contributes to a nuanced understanding of AI's role in shaping translation education.

KEYWORDS

Artificial intelligence (AI), translation pedagogy, machine translation, curriculum development, ethical considerations.

Can we survive without AI literacy? --Chinese Students' Perceptions of Chatbots as Teaching Assistants

Qiyi XIONG

The University of Hong Kong, Hong Kong SAR, China
u3597196@connect.hku.hk

ABSTRACT

As a more cutting-edge technology, artificial intelligence has been widely used internationally. Its practical application in higher education in many countries has demonstrated its usefulness. Yet, there are significant differences in its application in different countries, regions, and contexts. Chinese higher education suffers from many problems, for instance, large population, shortage of teaching resources, and low innovation in education. Whether the practical application of AI is appropriate to China's current situation has become a topic for discussion. Furthermore, whether many students with poor knowledge of AI will be able to embrace such a change and whether they need help developing AI literacy. This paper also analyzes the “Artificial Intelligence+ Education” policies enacted in China and uses qualitative research method to explore the level of AI literacy among Chinese students and whether it affects their acceptance of the use of AI in the teaching and learning process. The study focuses on the most direct beneficiaries of its impact, 14 Chinese students from different learning background, half have a background in computer science studies, half do not. A detailed analysis of the data obtained through semi-structured interviews reveal that even though students were in different professional disciplines, with different professional perceptions of AI, they were generally positive about the adoption of AI in university teaching. In addition, they are subconsciously more satisfied with the established teaching model and recognize the irreplaceability of human teachers.

KEYWORDS

Artificial Intelligence, higher education, Chinese universities, AI literacy

Empower the future: An evaluation of digital competence in Chinese higher education students using mixed methods research

Ao YANG^{1*}, Jing YU²

The Education University of Hong Kong, Hong Kong SAR, China
s1157452@s.eduhk.hk, yuj@eduhk.hk

ABSTRACT

The 21st century marks an era characterized by swift advancements in digitization and informatization, witnessed by the rapid development of the internet and artificial intelligence. Education is also undergoing a rapid transformation towards digitization, with digital competence emerging as a crucial skill for contemporary university students. At present, research on digital competence has already demonstrated that students pursuing higher education possess the ability (e.g., digital communication and collaboration) to utilize digital technologies in their learning endeavors; however, research continues to be an urgent requirement for additional improvements in this domain (e.g., data and information literacy, safety). This research is designed to address this deficiency by utilizing the mixed methodology for data collection and interview. The instrument will be advanced in accordance with the DigComp2.2 framework and will be scheduled for distribution to approximately 300 university students in China and subsequently followed by a qualitative analysis. For the collected quantitative data, descriptive and inferential data analysis will be utilized to comprehend the viewpoints and methodologies of undergraduates regarding digital competence, particularly in the context of their academic life. For the qualitative data, thematic analysis will be utilized to gain a profound understanding of specific situations and real challenges. By combining the results of the questionnaire and interview, for educational level, this research facilitates the advancement of educational reform and innovation, as well as enhances the quality of education and interdisciplinary integration; for personal development level, the results of this research have significant implications for enhancing individual competitiveness and fostering lifelong learning; for social level, this research contributes to the progression of social digitization and can further facilitate the innovation and application of digital technology.

KEYWORDS

digital competence, digital competency evaluation, university students, learning outcomes

The Impact of Computer-Supported Collaborative Writing on Individual Scientific Writing Performance

Mik FANGUY

Department of English Language Education, The Education University of Hong Kong, Hong Kong SAR, China
mfanguy@eduhk.hk

ABSTRACT

Collaborative learning is a widely adopted and generally viewed as a beneficial instructional method. Despite this, few studies have explored the impact of collaborative writing on subsequent individual writing performance. This study examines the influence of online collaborative writing on the individual writing performance of STEM postgraduate students (n=591) in a scientific writing course at a major Korean university. Over a 10-week period, students worked collaboratively in groups of three to five to compose four sections of an academic paper (Introduction, Methodology, Results, and Discussion & Conclusion), each of which was followed by a corresponding individual task. The results reveal a significant positive correlation between students' collaborative and individual writing performance for the Results section of the scientific manuscript. Only group scores for the Results section exhibit a positive effect on students' individual post-test scores, with no such effects observed for other sections. Consequently, collaborative writing with an emphasis on new and original findings appears to enhance learners' generalizable research writing skills more than collaborative writing with a broader and more interpretive focus on a research topic. These findings offer practical recommendations for educators incorporating collaborative writing into scientific writing courses.

KEYWORDS

Collaborative writing, computer-mediated communication, Second language writing, Scientific Writing

Assessing Academic and Career Self-Concepts and Their Relationship with Career

Adaptability in Students with Special Educational Needs

Fengzhan GAO¹, Lan YANG^{2*}, Kuen Fung SIN^{3*}

^{1,2,3}Institute of Special Needs and Inclusive Education, The Education University of Hong Kong, Hong Kong SAR, China

²Department of Curriculum and Instruction, The Education University of Hong Kong, Hong Kong SAR, China

^{1,3}Department of Special Education & Counselling, The Education University of Hong Kong, Hong Kong SAR, China

fzgao@eduhk.hk, yanglan@eduhk.hk, kfsin@eduhk.hk

ABSTRACT

While previous research highlights the importance of self-concept in career development, its specific dynamics within students with special educational needs remain underexplored. This study investigated how academic competence (AC) and career competence (CC)—both key aspects of students' self-concept—relate to career adaptability (CA) among secondary students with SEN with a focus on Autism Spectrum Disorder, Attention Deficit Hyperactivity Disorder, and Specific Learning Difficulties. The sample comprised 94 secondary students, categorized as ASD (32%), ADHD (27%), or SPLD (42%). The findings revealed a significant positive relationship between AC and CC ($r = .26, p < .05$), indicating that students who perceive themselves as academically capable are more likely to view themselves as competent in career-related skills. However, the distinct features of these competencies also warrant attention. A follow-up path analysis found CC was a stronger predictor of CA ($\beta = .51, p < .001$) than AC ($\beta = .38, p < .001$), with both competencies explaining 51% of the variance in CA. Additionally, the relative influence of AC and CC on CA varied by SEN type, calling the need for nuanced interventions. These results underscore the importance of fostering academic and career self-concepts to enhance career adaptability in students with SEN. Tailored interventions are recommended to address the distinct needs of students with ASD, ADHD, and SPLD. This study contributes to the literature in terms of the role of self-concept in affecting career adaptability of SEN students, offering insights for educators and policymakers.

KEYWORDS

Academic competence, career competence, career adaptability, self-concept, special educational needs

Language and Lexical Ambiguity in Probability

Adam MOLNAR
University of Arizona, U.S.
adammolnar@arizona.edu

ABSTRACT

Because objects in probability such as variables and sample spaces are generally not physically visible, humans must describe them through language. In linguistics, the term register describes a variant of language applied to a specific setting. In probability, the probability register consists of descriptive words and symbols taken from everyday life, mathematics, and other sources. Many terms do not have precisely the same meaning in probability as in other registers such as algebra and everyday life, creating confusion called lexical ambiguity. For instance, range of a variable in probability is not the same as range of an algebra function or range of an automobile. This presentation discusses problems students have while negotiating ambiguities while learning the probability register, starting from its basis in mathematics. Specific terms examined include random, independence, range, and scale words such as likely and unlikely. Sources for examples include transcribed interviews with secondary school teachers in the USA, undergraduate student surveys, and student anecdotes. Learning probability in a non-native language adds complications, as translations across languages such as la independencia in Spanish do not always preserve meaning. Available solutions are described, including teachers' explicit attention to vocabulary and the attachment of qualifying words to indicate application of the probability register.

KEYWORDS

Probability, Statistics Education, Lexical Ambiguity, Register, Independence

基于双向细目表的香港中学文凭考试中国语文阅读卷与评核大纲一致性研究

A study on the consistency between the Chinese Language Reading Paper and

the Assessment Syllabus of the Hong Kong Diploma of Secondary Education

Examination based on a two-way detailed table

刘上

香港都会大学，香港，中国

s1277598@live.hkmu.edu.hk

摘要

测试试题是否具有教学目标与教材代表性或适当性程度的一种指标，是确立测验是否具有内容效度的关键。评核大纲与试题在语文阅读卷中可能存在不一致的情况，而这种不一致性会影响考试的内容效度，从而影响学生的成绩和教学的有效性，今次研究指在利用双向细目表来分析这种不一致性对内容效度的影响。研究问题：阅读卷与评核大纲之间的考核能力是否一致？阅读卷与评核大纲的一致性对内容效度的影响？研究过程：收集近五年香港中学文凭考试中国语文阅读卷的试题，然后将评核大纲代入到双向细目表中，得出基于双向细目表的框架；接着将试题代入到框架中，分析试题分布与考核能力之间的配对情况，以评估一致性；最后结合分析提出改进建议。预期的研究成果是找出阅读卷与评核大纲的不一致的情况，并针对不一致情况提出具体的改进建议，以提高考试的内容效度。

关键词

评核大纲；一致性；内容效度；双向细目表

教師自我研究的視角：中學繪本教學課程開發之困難及因應策略

A Teacher's Self-Study Perspective: Challenges and Coping Strategies in Developing Picture Book Teaching Curriculum for Secondary Schools

吳善揮¹，陳玉群²，黎建文³
^{1,2,3} 明愛元朗陳震夏中學，香港，中國
nsf@cys.edu.hk, cykw@cys.edu.hk, lkm@cys.edu.hk

【摘要】 繪本教學課程大多於小學或幼兒教育階段實施，很少教師會於中學階段以繪本施教。然而，只要選材和設計得宜，繪本教學也可為中學生提供深度的學習歷程，特別是價值觀教育。為此，研究者嘗試開發以初中學生為本的繪本教學課程，並以自我研究的方式，透過收集不同的質性資料，以探究教師在開發繪本課程時遇到什麼困難。本文旨在分析開發中學繪本課程的困難，並提出相應的因應策略，以供關心繪本教學的教育工作者作參考。
【關鍵字】 中國語文教育；價值觀教育；課程設計；課程開發；繪本教學

Abstract: Picture book teaching curricula are primarily implemented at the primary or early childhood education levels, with few teachers applying picture books in secondary education. However, with appropriate material selection and course design, picture book teaching can provide secondary school students with a deep learning experience, particularly in values education. In response, the researcher has attempted to develop a picture book teaching curriculum tailored for junior secondary students. Using a self-study approach, the researcher collected qualitative data to explore teachers' challenges in developing picture book curricula. This paper aims to analyze the difficulties encountered in developing picture book curricula for secondary schools and to propose corresponding coping strategies, providing a reference for educators interested in picture book teaching.

Keywords: Chinese language education; Values education; Curriculum design; Curriculum development; Picture book teaching

5. 前言

由於繪本篇幅簡短、內容簡單，所以大多被用作小學及幼兒教育階段之教學材料，然而，研究發現繪本不但能提升高中學生對課堂活動之參與度，而且更能有效改善他們的學習表現(Reiker, 2011)。Restanto(2016)以初中學生為研究對象，嘗試以繪本教授他們閱讀能力，結果發現此舉能有效提升學生的閱讀理解能力和學習興趣。繪本逐漸被中學教師採用為教學材料，這是因為教師可善用繪本教學的特質（圖文並茂、插圖精美）來照顧學習差異，讓不同能力及背景的學生都可達至閱讀學習目標(Costello & Kolodziej, 2006)。事實上，在接受繪本教學後，連已成年的大學生也認為繪本能提升他們的學習興趣、滋養他們的心靈，讓他們更容易接受課堂所帶出的知識和道理（王千倬，2004）。由此可見，繪本教學不再是小學及幼兒教育階段的專利，而是適合各年齡層的學生，只要教師能選擇適切的繪本作教學，並善用繪本的特點來設計教學活動及學習任務，任何年紀的學生都可從中得益。

在這樣的背景下，擔任中學教師的研究者盼望能開發校本繪本課程，一方面讓學生從中培養應有的品德情意，建立正確的價值觀，另一方面也可照顧學習多樣性，使所有學生都能建構成功的學習經驗。本文旨在分享研究者運用「自我研究法」，探究在開發繪本課程時所遭遇的挑戰，並在此基礎上提出因應策略，以供關心繪本教學的同仁作參考。

6. 繪本教學之功能

繪本是生命教育的良好載體，其能協助學生認識自我、開發潛能、發展和諧的人際關係、理解大自然與我們的關係，讓他們充分感受生命的美好（吳庶深、魏純真，2010）。楊偉鵬等（2014）指出繪本教學能引導孩子正向成長，建構他們應有的品德情意能力，引導他們做出親社會行為。有研究發現繪本的插圖精美且具意義，只要教師運用之來引發學生的寫作靈感，他

們便能完整地完出一篇寫作(Yeom, 2018)。另外，有學者的研究指出，只要教師善用繪本為教材，學生的閱讀動機及寫作能力都能得到顯著提升(Birketveit & Rimmereide, 2017)。此外，有學者也指出繪本能有效發展孩子的語言創造能力，使他們能掌握更複雜的句子結構，並使之更能有效地運用語言來表達自己的看法(Hui et al., 2020)。另外，繪本教學能營造良好的課堂學習氣氛，使學生更願意完成學習任務，並讓教師更容易達成預設的教學目標(Sun, 2020)。此外，繪本更能用作美感教育，培養學生的藝術鑒賞、分析、評論及創作能力，使他們能建構審美標準和審美能力(黃秀雯、徐秀菊, 2004)。由此觀之，繪本教學具有多項功能，包括提升感受生命的能力、建立正確的價值觀、培養基礎的語文能力、營造良好課堂氣氛、培養學生欣賞及創造美的能力，是教師不可多忽視的教學策略。

7. 課程發展之意涵

所謂課程發展，是指教師按照學生之學習需求設定目標，並組織相關且具系統性的教學活動，而一切的學與教活動都與學校辦學理念具一致性(Munna & Kalam, 2021)。課程發展必須針對學生的學習背景、學習問題及不足之處而設計，以使學生能從課程教學之中受益，即改善自己的學習表現(Wahyuningsih & Afandi, 2020)。在進行課程開發時，課程領導應經歷以下七個階段：1. 探究可行性及需求性；2. 提出建構課程之初步構想；3. 制定並規劃課程實施的實際內容；4. 試行課程內容；5. 正式實施課程；6. 持續監察及評估課程的實施成效；7. 按照實施成果及反思內容，修訂課程內容，以使之更切合學生的需要及特性(Nurzen et al., 2022)。有研究顯示，在設計教學課程時，教師一般都會受到自己的已有知識及信念所影響，然而，最影響他們的決定的是教學現場的實際環境(Boschman et al., 2014)。另外，全球發展一日千里，不同課程的內容也需持續更新，以使我們的學生更能應對未來的挑戰(Kumar & Rewari, 2022)。此外，在設計課程時，教育領導者需進行需求評估，包括知識之學習價值、學生之學習需要、社會之發展需求(Karimi et al., 2012)。簡言之，課程發展即是教師按照學生學習需要、社會發展需要、所學知識之意義，發展一系列相關的教學材料及學習活動，讓學生能循序漸進地掌握知識，並達至課程預設之學習目標。

8. 研究問題及方法

本研究採用「自我研究法」(Self-study research approach)，探究本次研究的核心問題：教師在開發中學繪本教學課程時有何困難？所謂自我研究法，就是運用不同的質性方法，有目標地解決實際環境中存在的問題，其不但能真實解決實務問題，而且更能檢驗並拉近理論與現實環境之間的距離(邱憶惠, 2016)。另外，自我研究作為教育研究方法，鼓勵教育工作者在實際環境中，如與學生互動、與其他教師之對話、會議研討等，反思自身的教育工作，並探求解決問題之道，之後再以自我故事的形式呈現於讀者眼前，讓關心相關議題者提升相關實務情境的理解(Kroll, 2012)。自我研究之方式應包含以下部分：1. 選擇希望探究的問題；2. 收集不同的實務資料(如觀察紀要、訪談文字稿、反思日誌等)並加以分析；3. 歸納不同資料並進行分析，以回答研究問題；4. 透過反思結果對實際問題進行具針對性的修正(章五奇, 2015)。經歷以「我」作為資料來源的分析、歸納、修正之過程，教師便能建構探究問題及反思教學之習慣及能力，在經年累月下，教師便能逐漸形成獨有的教學理論，並持續不斷且正向地影響未來教學(章五奇, 2015)。

本研究採用自我研究法，以研究者任教中學為真實場景，並以研究者也參與其中的「中文科繪本課程開發小組」為研究對象，透過不同的質性資料，包括對談、觀察、學科文件、會議紀錄、教材分析，探究教師在開發中學繪本教學課程時遭遇什麼困難。雖然「自我研究」常被質疑欠缺信度，可是本研究旨在全方位展示開發中學繪本課程的歷程及困難，為中學繪本課程開發者提供實際場景的深度理解，而非推論因果關係或成效，因此，本研究仍具有一定的實務價值及意義。

以下為本次繪本課程開發之歷程，如下表：

表 1 繪本課程開發之歷程表

次序	歷程
1	召開繪本教材開發會議
2	選取適切的教學繪本
3	擬定課程大綱及教學目標
4	製作繪本教材
5	供課任教師作教學

9. 研究發現：中學繪本教學課程開發之挑戰

5.1. 繪本內容未必能融入原來的學校課程

在展開設計繪本課程時，我們發現參與設計的小組教師表示他們未必有全盤思考繪本主題及內容是否能與原有中文科課程互相配合，結果發現在完成繪本教材設計後，他們未必能將之編入原來的教學單元之中，最終或只能以獨立單元的形式施教，這必然影響到學生學習的系統性。

5.2. 多樣化的繪本主題使設計者難以定立課程目標

由於繪本作品極多，所以在起初時，當我們面對浩瀚的書海時，均感到束手無策，不知如何從入手，即不知道應選擇哪些繪本作教材，也不知道是否適合學生學習。另外，基於繪本的主題、內容及文學形式皆有不同，協助開發繪本課程的研究群成員都不知道如何為該繪本的教學訂立明確的教學目標，以及如何才能使繪本課程的教學設計不會偏離原來中文科的課程宗旨及教學目標。

5.3. 未能挖掘繪本作品的深層內涵

既然繪本能適合任何年齡層的讀者閱讀，他們自然會對繪本內容有不同的反應及體悟。正因如此，參與課程開發而教學年資較淺的小組教師表示，他們未必對每本繪本都有深層次的體悟，又或他們只能掌握繪本故事的表面訊息，而未能透過繪本所呈現的藝術形式深入掌握繪本之深層意義。這難免會影響他們的教材設計，以及後續教學的深度及成效。

5.4. 教師專業知能不足

在審閱已製作的教材時，我們發現小組成員未必能掌握所選取的繪本的要旨或深意，致使他們在設計時有所偏差或誤中副車。另外，部分小組成員也缺乏調整教材的專業知能，例如未能連結所屬教學單元的主要教學目標、教材設計未能引導學生進行深度思考、徒具教學材料而未能設計教學活動配合之、教學材料只集中於文字部分而未有顧及圖畫部分、教材資料之導引問題只集中於複述繪本故事內容而欠缺高階思考題目。

5.5. 繪本教材開發者的時間及空間不足

在開發繪本教學課程時，研究群成員除有設計教材之責外，還領有監審工作進度、審閱繪本教材之責。然而，我們發現不少小組教師因為行政工作繁重、花上海量時間輔導學生、處理學校臨時加派的工作等，所以未能如期完成教材設計，致使課任教師未能於課堂內施教繪本教學，甚或所屬教學單元結束後，相關小組成員仍未能完成相關的教材設計。事實上，繪本教材開發進度嚴重落後，難免會影響學生的有系統學習，同時，課任教師也未必能抽出額外時間完成相關教學。

10. 綜合討論：中學繪本教學課程開發挑戰之因應策略

6.1. 把繪本課程視為輔助原來學校課程之工具

Utami (2020)的研究指出，輔助性的閱讀材料能有助學生充分理解原來課程之學習內容，並發展出他們原來需要掌握的閱讀能力及思維。事實上，繪本課程也可被視作輔助原來學校課程之工具，即透過具趣味性、視覺畫面豐富的材料，幫助學生在輕鬆的學習過程中更加深入理解學校原有課程教授的複雜概念。因此，研究者建議除非所選繪本具有「深入淺出」的功能，即有助學生理解原來課程教授的複雜理念，否則課程設計者不必追求每一個原有的教學單元也設有繪本教學，以免徒增教師及學生的負擔。

6.2. 認識並配合原來的學校課程目標

教師需實施由教育當局及任職學校所制定的課程，以使學生能達至相應的學習目標，並培養出相關的素養，故此教師在施教時不能偏離原有中央課程的目標(Chaudhary, 2015)。故此研究者認為在設計繪本課程時，課程領導者應提升教師對原有課程目標的深入認識，之後才一起挑選適切的繪本，以免所選繪本或教學設計未能配合原有課程而需重新規劃。

6.3. 加強教師專業培訓

有學者的研究指出，缺乏足夠的知識及經驗，難免打擊了教師運用繪本作為教材的信心，使他們對採用繪本為教材感到卻步(Zhang et al., 2023)。教師發展繪本課程時，可運用「評估—策劃—推行—再評估」(E-PIE)模式以完善課程，並在會議、共同備課及互相觀摩時就課程設計、教學活動及學生回饋等方面作探討，集思廣益，營造校內專業交流氛圍。課程設計者可藉開放課堂確保課程的一致性，傳承經驗；經驗不足者可藉觀摩同事的教學以掌握課程重點，提高教學效能。由此，繪本課程可跳出單元教學的框限，從繪本內容的主題出發，縱向發展可銜接初、高中的課程，橫向發展可實現跨課程閱讀。繪本課程能作為跨課程學習的媒介，促進不同科組的教師合作交流，提升教學質量和專業水平。

6.4. 為繪本課程開發者提供行政支援

Zhang 等人(2023)指出，欠缺充裕的時間和資源，也自然使到教師不願意設計繪本教學課程。作為課程領導人，有責任支援開發者的日常行政需要。開展工作前，領導人宜訂立工作規劃，給開發課程者提供培訓，向他們提出具體要求，優化職務清單。同時，在財務穩健的情況下，宜增聘額外老師，為開發者提供更多工作時間和空間，減低日常工作的壓力。此外，行政主導固然重要，但作為領導人，最重要的是能與開發者共同創工作成效，積極地為開發者提供行政支援外，還要讓開發者感受成功開創課程的喜悅，共榮共辱，給予具體和正面心靈獎勵，讓開發者更積極投入開創課程。

11. 總結

最後，本文研究發現，在開發中學繪本課程時，教師面臨多方面的困難，包括繪本內容難以融入學校原有課程、多樣化的繪本主題使課程目標難以確定、教師未能掌握繪本深層的意義及內涵、教師欠缺專業知能、教師時間及資源不足。為應對以上挑戰，研究者嘗試總結經驗並提出一些因應策略，包括把繪本課程視作為輔助教學工具、強化教師對原有課程目標的認識、加強專業培訓，以及提供行政支援。研究者深信這些策略有助教師能更好地開發和實施繪本教學課程，從而提升學生的學習效果並減輕教師負擔。

本研究為初探性的自我研究，其中存有不同的研究限制，包括本次自我研究只為一家之言、研究結果未能推論至全香港中學教師的身上、研究只限於教材設計階段而未能延展至實施階段、未有把施教者也納入研究對象，凡此種種都使本研究的可推論性受到限制。雖然如此，本次研究仍具有一定的實務價值，能供關心繪本教學者作為參考。

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利用馬斯洛的需求層次理論建構個性化的財務教育和金融素養：政策、市場、實證研究

Using Maslow's hierarchy of needs theory to construct personalised financial education and financial literacy: Policy, market, empirical research

高裕安，周新蕾

摘要

馬斯洛的需求層次理論 (Maslow, 1943) 假設人的需求分為生理、安全、社會、尊重和自我實現等層次；不同人生階段的財富追求目標與需求是相關聯的。因此，利用馬氏的理論去制定財務計劃已有實際的現實優勢 (Liu, 2019)。2018 年推出的資管新規 (即《公開募集證券投資基金運作管理辦法 (試行)》)，規定財富管理機構要為投資者提供個性化的投資規劃，所以金融政策事實上鼓行業要為客戶提供適切的個人財務計劃。2022 年的《義務教育道德與法治課程標準》將 “金融素養教育” 納入義務教育階段課程是初步回應 2013 年的《中國金融教育國家戰略 (初稿)》。普及財務教育和金融素養培育既有國家戰略的需要，但在課程設上終極要走上個人化差異的路。有見金融素養教育實證研究至今十分匱乏，筆者曾試圖利用馬斯洛需求層次理論探討金融素養與其投資需求和行為的匹配程度。基於 200 名投資者的問卷調查，結果發現投資者的金融風險評級能有效判別出他們的各種心理需要，但其金融素養與其財務計畫的匹配尚待優化。

關鍵字

馬斯洛的需求層次理論；財務教育；金融素養；金融風險評級

基於服務學習的香港小學資優學生領導才能培養的行動研究：新冠疫情前後的表現比較

Action Research on Leadership Development of Gifted Primary Students in Hong Kong Based on Service-Learning: A Comparative Analysis of Performance Before and After the COVID-19 Pandemic

方玉芝
華中師範大學，中國
fong.miss@gmail.com

【摘要】本行動研究旨在探討香港小學資優學生通過服務學習培養領導才能的效果，特別在承擔感與責任感方面的表現，並比較「新冠肺炎」疫情前後資優學生與一般學生的變化。雖然香港在創意思維和 STEM 教育方面對資優生的培養取得進展，但資優生的領導才能培養仍滯後，缺乏系統性，未受到重視。本研究以 A 小學的「明日領袖」課程為案例，採用香港教育局情意及社交表現評估套件（修訂版）收集數據，分析服務學習對資優學生在承擔感及責任感的影響。結果顯示，資優學生在這些方面表現顯著優於一般學生，特別在新冠疫情期間，由於缺乏面對面服務學習機會，承擔感和責任感顯著下降，強調面對面互動的重要性。此外恢復面對面服務對資優學生的承擔感和責任感提升具有正面影響。本研究強調服務學習與領導才能結合的重要性，為未來資優教育課程設計提供實證支持，未來可探討如何在特殊情況下設計有效的服務學習項目以增強學生的社會責任感。

【關鍵字】小學資優學生；領導才能；服務學習；責任感；承擔感

Abstract: This action research investigates the impact of service-learning on leadership development among gifted primary students in Hong Kong, particularly their commitment and responsibility before and after the COVID-19 pandemic. While there have been advancements in creativity and STEM education for gifted students, the cultivation of leadership skills remains insufficient. Using the "Tomorrow's Leaders" curriculum at A Primary School as a case study and employing Re-APASO for data collection, the findings reveal that gifted students excel compared to their peers. However, during the pandemic, the absence of direct service-learning opportunities resulted in decreased commitment and responsibility. These results highlight the need to integrate service-learning with leadership development in education and recommend future research on effective service-learning designs during challenging situations.

Keywords: Gifted primary students; leadership skills; service learning; sense of responsibility; sense of commitment

1. 前言

1.1. 研究背景

美國發布的馬蘭德報告被視為資優教育的分水嶺，確立了對資優學生的聯邦定義，並概述他們的學習需求與挑戰，資優教育成為提升學生素質的重要領域。儘管資優學生具備智力與潛在創造力，但其領導才能的研究相對匱乏，尤其在香港（Gentry, 2006）。目前的研究主要集中在智力與學業成績，忽視社交和情感發展，導致領導能力培養系統性不足。

服務學習作為一種有效的教育策略，能提升學生學習體驗並促進領導力發展（Eyler & Giles, 1999）。該模式結合學術學習與社區服務，使學生在實踐中獲得經驗，幫助他們成為未來領導者。雖然 2010 年香港大學的“Service-Learning In Asia”整理了相關研究，但多集中於高等教育。此外儘管香港在創意思維和 STEM 教育方面有所進展，領導才能的培養依舊滯後。2014 年「優質教育基金資優網絡學校計劃」，以「領導才能」為其中一個教育核心主題，但該計劃結束後，缺乏系統性訓練方案。

在服務學習與領導才能結合的背景下，資優學生的綜合素質培養至關重要。目前對小學資優學生的領導才能及服務學習的研究仍然不足，尤其在「新冠肺炎」疫情影響下，面對面互動與服務參與大幅減少。本研究旨在探討香港小學資優學生如何通過服務學習培養領導才能，並比較疫情前後資優生與普通學生在承擔感和責任感的表現，以期為教育工作者提供資料數據，強調服務學習在培養未來領導者中的重要性。

1.2. 研究目的與研究問題

本研究旨在探討資優學生如何通過服務學習提升其領導才能，並比較新冠疫情前後資優學生與普通學生在承擔感和責任感方面的變化。研究將關注疫情對資優學生的情感與社交素養的影響，特別是在服務學習受到限制的背景下，資優學生與普通學生在承擔感及責任感上的差異。

通過數據對比，分析疫情對這兩類學生的心理狀態和社交技能發展的影響，並探討可能的原因及其後果。最終，希望為未來資優教育課程的設計和實施提供實證支持，特別是在有效結合服務學習以培養學生的領導才能與社會責任感方面。

2. 理論框架

2.1. 資優學生的領導才能培養

根據馬蘭德報告，資優學生在智力、學術、創造性、領導能力等方面表現突出（U. S. Department of Education, 1993）。研究指出，領導才能是可培訓的（Parise, 1987，引自王振德，2001）。儘管資優學生在創造力與學術專長上已取得成就，但在領導才能的培養上仍面臨資源不足的挑戰（Gentry, 2006）。多元智能理論（Gardner, 1983）強調社交智能和情感智能在領導才能培養中的重要性，而三環理論（Renzulli, 2005）則提供了一種系統化培養資優學生領導才能的方法，融合高層思維技巧、創造力和社交能力。

2.2. 多元智能理論

多元智能理論由Howard Gardner於1983年提出，強調智力的多樣性，認為傳統智力評估過於狹隘，無法全面反映個體能力（Gardner, 1983）。該理論指出，個體在邏輯-數學、語言、空間、音樂、肢體動覺、人際關係、自省及自然博物等智能上表現各異。在資優教育中，邏輯數學與語言智能較為重視，而服務學習則能增強學生的社會智能。透過互動，服務學習改善學生的社交技能，提升其解決社交問題的能力，進而促進邏輯-數學與社會智能的共同發展。

2.3. 資優三環理論的應用

Renzulli的三環理論為資優學生的領導才能培養提供了系統框架（Renzulli, 2005）。該理論分析領導能力的三個維度：認知、情感和行為（Northouse, 2018）。認知能力涉及高層次思維與創造力，情感能力包涵同理心和情緒管理，而行為能力則是將知識與技能應用於實際的能力。透過服務學習，資優學生不僅在學業上表現優異，還能提升情感和行為能力，為未來的領導角色奠定基礎。

2.4. 服務學習

服務學習（Service-Learning）是一種把學術學習與社區服務結合的教育模式，強調在真實的服務環境中實踐知識和技能（Eyler & Giles, 1999）。該概念於1967年在美國南部的教育會議上首次提出，並於1980年代迅速成為教育改革的重要運動，逐漸擴展至中小學，成為全球教育改革的關鍵組成部分（Billig, 2000）。目前，教育工作者已經相對成熟地實施服務學習，以培養學生的學習興趣、社會責任感和領導才能。

2.5. 社會情感素養與領導才能的關係

社會情感素養對領導才能的培養至關重要，尤其是關愛、承擔感和責任感（Renzulli, 2005）。這些素養影響個體的社交技能與情感反應，是有效領導的基礎。服務學習被視為促進社會情感素養的有效途徑，通過參與社區服務，學生在實踐中培養關愛和責任感，提升對他人需求的敏感性，為未來的領導角色做好準備。

總結而言，服務學習在資優教育和領導才能的培養中具有重要的理論與實踐意義，未來的

研究應進一步探索如何有效結合服務學習與領導才能發展，以滿足教育領域的多樣化需求。

3. 研究方法

3.1. 行動研究設計

本行動研究旨在通過探索與反思提升資優學生的領導才能，以香港 A 小學的「明日領袖」課程（2007-2022 年）為案例，研究對象為資優學生。該課程結合服務學習，為研究提供了豐富的實踐基礎。

課程採用多種數據收集方法，如教師觀察、教學檔案、錄像、問卷和訪談。本研究教師觀察記錄學生表現，教學檔案包括作業反饋，錄像詳述互動情況。由於資優學生僅參與特定課程，且沒有對照組，因此筆者使用 Re-APASO 問卷量化評估資優學生與普通學生在承擔感和責任感方面的表現，確保數據的可靠性。研究將分析服務學習對資優學生領導才能培養的影響，並為教育實踐和理論發展提供建議。

香港教育局的情意及社交表現評估套件（APASO）旨在支持學校自評，評估學生在情意和社交領域的發展及需求，以及相關措施的成效，以促進全面發展。全港官立和資助學校每年需在「學校發展與問責」數據電子平台上進行學生問卷調查。本研究數據來自 2011 至 2022 年，因此採用第二版的 Re-APASO 評估套件。

3.2. 數據的效度與可靠性

本研究由筆者負責 A 小學的 Re-APASO 評估，通常在每年三至四月安排三至六年級學生通過電子平台進行調查。過程中，筆者逐題朗讀並解釋問題，對有特殊學習需求的學生，教學助理會協助解釋，以確保理解。缺課的學生在一週內補交問卷，參與率通常超過 95%，確保數據的良好效度。筆者從數據中提取參加資優課程「明日領袖」的學生在承擔感和責任感兩個量表的表現。

4. 資優抽離式課程「明日領袖」的課程實施

4.1. 課程宗旨與目標

本課程幫助資優學生瞭解不同領導者的特質，培養創造力、批判性思維、關愛、承擔感和責任感等領導素質。通過團體活動，學生體驗團隊精神的重要性。此外利用服務學習模式，學生能夠提升策劃、決策、分工、實施和檢討服務計劃的能力，關懷弱勢群體並發揮自己的優勢，培養服務精神。

4.2. 課程時期與參加學生情況

課程共分三階段進行，第一階段為雛形期，學校未參與「優質教育基金資優網絡學校計劃」；第二階段學校參加該計劃，但筆者未使用 RE-APASO 進行數據比較；第三階段筆者使用 RE-APASO 把資優學生與同校的沒有參加的課程學生（下稱「普通學生」）進行數據比較。在 2016 年度開始，因學校重點發展學生領導才能的需要，課程接受三年級的學生申請。（資料見表 1）筆者是這課程的設計者及核心導師，對課程瞭如指掌。

參加課程的資優學生需經過教師和家長推薦、自願報名、甄別測驗及面試，且每年名額有限。入選學生需每年重新申請，若在校內服務不達標，導師可不接納其參加新年度課程。因此，部分學生可能參加該課程長達三至四年。

4.3. 服務學習內容

表 1 資優抽離式課程「明日領袖」參與人數統計

		參加人數	男	女	P3	P4	P5	P6
階段 I	2007-08	10	3	7	0	7	1	3
	2008-09	18	4	14	0	17	11	0
階段 II QTN	2009-10	15	7	8	0	1	6	8
	2010-11	16	3	13	0	4	2	10
	Sub-total=	49	14	35	0	22	19	18
階段 III	2011-12	12	5	7	0	6	6	0
	2012-13	15	2	13	0	6	4	5
	2013-14	14	2	12	0	3	5	6
	2014-15	15	2	13	0	6	6	3
	2015-16	15	4	10	0	3	5	6
	2016-17	18	5	13	4	5	2	7
	2017-18	14	4	10	2	2	6	4
	2018-19	28	3	25	6	6	8	8
	2019-20	30	5	25	5	11	7	7
	2020-21	24	5	19	0	5	12	7
	2021-22	18	5	13	0	1	5	12
	Sub-total=	203	42	160	17	54	66	65

4.3.1. 校內服務

a. 「小老師計劃」三至六年級的優秀學生輔導低年級有學習需要的同學，以培養責任感、關愛精神和照顧差異的能力。每週安排小老師提供至少兩次服務，以支援特殊學習需要的學生。五至六年級的「明日領袖」的學生擔任組長，指導和監督其他小老師，提供領導同儕的機會。

b. 其他活動：其他活動包括製作與社會現狀相關的廣播劇或話劇，並在校園電視台播放，助於推廣校園關愛文化。

4.3.2. 校外服務

「明日領袖」學生經討論確定對外服務的對象和形式，導師協助聯繫相關工作。他們服務過的團體包括醫院病童、唐氏綜合症患者、智障學童及社區成員等。

5. 數據分析與研究結果

5.1. 「明日領袖」與一般學生在「承擔」方面的比較

根據 Re-APASO 的副量表「承擔」的數據，全港常模的平均值為 3.3。以下是 A 小學的普通學生與資優抽離式課程「明日領袖」學生的年度表現：

表 3 基於「承擔」副量表的比較分析：A 小學學生與「明日領袖」資優學生

表3 基於「承擔」副量表的比較分析：A小學學生與「明日領袖」實踐學生 「情意及社交表現評估套件」修訂版 Re-APASO					
副量表 Subscale:		承擔		Commitment	
(Year 2010 Norm)		全港常模		填寫問卷人數=9850	
年度	A小學 填寫問卷人數	明日領袖 人數	全港常模 平均值 Mean	A小學 平均值	明日領袖 平均值
2011-12	468	12	3.17	3.23	3.24
2012-13	521	15	3.17	3.19	3.21
2013-14	504	14	3.17	3.18	3.22
2014-15	506	15	3.17	3.19	3.24
2015-16	511	15	3.17	3.25	3.28
2016-17	513	18	3.17	3.00	3.25
2017-18	519	14	3.17	3.20	3.24
2018-19	515	28	3.17	3.18	3.22
2019-20	384	30	3.17	3.16	3.17
2020-21	508	24	3.17	3.15	3.16
2021-22	285	18	3.17	3.12	3.15

圖 1 基於「承擔」副量表的比較：A 小學學生與「明日領袖」資優學生



從表 3 中可以看出，A 小學的普通學生與資優學生在承擔感方面均高於全港常模，尤其在 2015-16 學年度，資優學生平均得分達 3.28，顯示其責任感和參與度達到最高峰。然而，2016-17 學年度，A 小學的得分驟降至 3.00，成為最低點，而「明日領袖」的得分為 3.25，顯示資優學生面對面學習中的責任態度仍較強。隨著 2019-20 學年度新冠疫情影響的開始，A 小學和「明日領袖」的平均分數降至 3.16 和 3.17，接近全港常模，顯示面對面服務學習機會減少影響了學生的承擔感。疫情對學生的承擔感產生了顯著的負面影響，強調面對面互動在強化這些核心素質中的重要性。隨著疫情漸緩，2021-22 學年度數據顯示小幅回升，但仍未恢復到疫情前水平，這進一步強調了未來教育設計中有效結合線上與線下服務學習項目的重要性，以提升學生的社交能力與責任感。

5.2. 責任感

根據 Re-APASO 中的副量表「責任感」(Sense of Responsibility)的數據，全港常模的平均值為 3.3。以下是 A 小學的一般學生與資優抽離式課程「明日領袖」學生的年度表現：

表 4 基於「責任感」副量表的比較分析：A 小學學生與「明日領袖」資優學生

「情意及社交表現評估套件」修訂版 Re-APASO					
副量表 Subscale: 責任感			Sense of Responsibility		
(Year 2010 Norm) 全港常模人數			填寫問卷人數-9822		
年度	A 小學 填寫問卷人數	明日領袖 人數	全港常模 平均值 Mean	A 小學 平均值	明日領袖 平均值
2011-12	468	12	3.3	3.45	3.49
2012-13	521	15	3.3	3.40	3.48
2013-14	504	14	3.3	3.41	3.48
2014-15	506	15	3.3	3.45	3.48
2015-16	511	15	3.3	3.32	3.34
2016-17	513	18	3.3	3.44	3.49
2017-18	519	14	3.3	3.38	3.41
2018-19	515	28	3.3	3.36	3.40
2019-20	384	30	3.3	3.28	3.32
2020-21	508	24	3.3	3.00	3.16
2021-22	285	18	3.3	3.11	3.19

圖 2 基於「責任感」副量表的比較：A 小學學生與「明日領袖」資優學生



從表 4 中可以看出，A 小學的普通學生與資優學生在責任感方面普遍高於全港常模。在 2011-2012 年度，「明日領袖」的平均得分為 3.49，高於 A 小學的 3.45，顯示資優學生在責任感培養上相對優越。然而，自 2019 年起，特別在 2020-21 年，所有學生的責任感明顯下降，A 小學的平均得分降至 3.00，創下最低點，「明日領袖」得分也降至 3.16。這一變化與新冠疫情

密切相關，疫情期間面對面服務學習機會缺乏，顯著減少了學生在互動中鍛煉責任感的機會。總體來看，雖然疫情期間「明日領袖」學生的責任感仍高於普通學生，但社交隔離和在線學習的持續令資優學生的責任感水平有所回落。2021-22 年度的數據顯示，隨著部分面對面活動的恢復，「明日領袖」的責任感微幅回升至 3.19，但仍未達到疫情前的水平。因此，在未來教育中促進面對面互動與服務學習的結合至關重要，以進一步提升學生的責任感和社交能力。

5.3. 新冠疫情對學生表現的影響

新冠疫情對學生的整體表現產生深遠影響，特別是在承擔感和責任感方面。研究顯示，疫情前資優學生在這些維度上優於普通學生，但疫情期間出現了顯著衝擊。隨著學校停課和面對面服務學習的中斷，資優學生的社交及情感能力受到阻礙。2021 年度，他們的承擔感平均得分降至 3.00，顯示缺乏互動導致參與感減弱。普通學生的相應得分也有所下降，尤其在責任感方面。總結而言，疫情擴大了資優學生與普通學生在社交及情感素養上的差距，強調未來教育中面對面互動和服務學習的重要性。

6. 討論與結論

根據 Re-APASO 的數據，資優課程「明日領袖」的學生在「承擔」和「責任感」方面表現優於 A 小學的普通學生。然而，自 2019 年以來，尤其在 2020-21 年，因新冠疫情影響，所有學生的得分均下降。疫情和學校停課顯著降低了明日領袖學生的「承擔」與「責任感」，主要因為缺乏面對面互動，進而影響了人際交流與情感支持，妨礙了情感能力和社會責任感的發展。因此，參與服務學習變得尤為重要，以提升學生的領導才能與社會關愛。為改善現狀，筆者建議學校在未來課程中增設面對面互動機會，強化社交平台和推動線下服務學習。此外，應探索在特殊情況下保持教育連續性的方法，如利用虛擬服務學習，進一步促進學生的社會責任感和關愛精神。這些措施將有效支援學生在危機期間的情感與社交技能發展，確保他們在領導才能的培養上取得進展。

7. 研究總結

7.1. 缺乏面對面服務學習對資優學生領導才能發展的影響

新冠疫情期間，資優學生的領導才能發展受到顯著影響，尤其因缺乏面對面服務學習。具體表現為：

7.1.1. 面對面服務學習是一個重要的社區服務和領導能力鍛煉平台。當互動受限时，資優學生的領導能力減弱，其承擔感和責任感下降，影響團隊合作和問題解決能力。

7.1.2. 直接互動對提升關愛和責任感至關重要。服務學習可幫助學生理解社會需求並發揮領導能力，但疫情導致的互動中斷影響了其領導才能發展。雖然在線學習提供替代方案，卻無法完全替代面對面的實踐。

7.1.3. 研究指出，缺乏面對面服務學習使資優學生的領導才能發展停滯，未來教育需重視面對面互動。結合線上與線下的靈活服務學習項目，將有助於資優學生全面發展。

7.1.4. 服務學習對資優學生的領導才能培養至關重要。透過社區服務，資優學生能提升認知和社交技能，鍛煉領導及團隊合作能力。研究顯示，參與服務學習的資優學生在承擔和責任感上表現優於普通學生，雖疫情對所有學生造成影響，但資優學生的表現相對穩定。

7.2. 研究的局限性與未來展望

本研究聚焦於疫情期間的教育變化，未來應研究自然災害或公共衛生事件下的服務學習項目設計。此外，需評估虛擬服務學習的有效性，以確保學生在各種情況下持續提升領導才能和社會責任感。

7.3. 對未來資優教育設計的啟示

7.3.1. 加強服務學習與領導才能的結合。未來應重視服務學習與領導才能的結合，設計系統化課程，鼓勵學生參與社區服務以提升領導能力和社交技巧。

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7.3.2. 增加面對面互動的必要性。研究顯示，面對面交流對學生的社會情感素養至關重要，未來課程應增加互動機會，如線下學習小組，以強化情感交流能力和提升承擔感。

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