Wu, Y.-T., Chang, M., Li, B., Chan, T.-W., Kong, S. C., Lin, H.-C.-K., Chu, H.-C., Jan, M., Lee, M.-H., Dong, Y., Tse, K. H., Wong, T. L., & Li, P. (Eds.). (2016). *Conference Proceedings of the 20th Global Chinese Conference on Computers in Education 2016*. Hong Kong: The Hong Kong Institute of Education.

A Case Study of Student Learning Engagement in a Playful Environment

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Abstract: *In this paper, we present some lessons from a study that aims to integrate play and learning as a means to engage students in a reconfiguration of a conventional learning environment. Students worked on an open source platform, OpenSim, to design a full scale model of the school's campus, investigating areas of their own choice, learning through design and construction through a learner-centred, project-based approach. It also outlines how the playful quality of this initiative provides a counterpoint to the perception that school is too rigid and formulaic. We also identify some of the practices of playful learning and making and how it is aligned with research on beneficial learning environments and intrinsic motivation.*

Keywords: Makerspace, Playful learning, intrinsic motivation, interest-driven, student-centred learning

1. Introduction

This paper proposes how joyful learning can be cultivated in classrooms through an informal, playful environment. While school is traditionally seen as a place of learning and not of play, we wish to investigate how it may be possible to integrate play and learning in a making-orientated environment and, doing so, make room for creativity, collaboration, self-initiated learning and intrinsic motivation, inspired by joyful learning. It also means being aware of the activities to develop and unify the students' understanding of various aspects of the surrounding world in the classroom (Pramling Samuelsson, 2005).

In this paper we also consider if there exists a sustainable pedagogical approach —an approach that does not distinguish play from learning but draws upon the parallels to support a creative and joyful learning environment that will stimulate and enhance students' motivation for learning.

Thereafter, we will illustrate this paper with preliminary findings from a case study on the processes and effectiveness of playful learning in a specialised school in Singapore. While it is beyond the scope of this paper to present a final, definitive assessment of the whole study, we will instead offer examples to show how the combination of making in a student-centred, collaborative learning environment results in joyful learning.

2. Supporting Joyful Learning through a Playful Environment

2.1. Learning through Experimental Play and Making

It has been argued that interest and motivation levels could be increased if learning tasks were more like play and recreational activities (Shernoff, et al 1999).

The idea of making is founded on experimental play, whose central notion is that making through experimentation and play helps learners better understand the functions of the subject (Dougherty, 2013). The driving philosophy of the Makerspace movement is one that is self-directed, hands-on, with flexible goals (Gauntlett, 2013), that is a result from a shared interest in making, generally employing democratic means rather than a top down approach.

The concept of play is considered to be an activity initiated by the learner independently, while learning is seen as a result of an activity initiated by an adult (Samuelsson & Carlsson, 2008). Moreover, play, according to Levin (1996), gives children opportunities to be in control of what interests them and what they are familiar with. Vansteenkiste (2004)

and colleagues have examined how activities that involve play are intrinsically motivating and has beneficial effects on learners, including encouraging persistence when faced with challenges (Vansteenkiste, Simons, Lens, Sheldon & Deci, 2004).

In the subsequent sections of this paper, we will examine how our case school has adapted and built on the ideas of the maker culture to create a learning environment centred on experimentation and play.

3. The Classroom as a Community of Engaged Learners

3.1. Case study of Practical High School

The Singapore education system is well known for its academic rigour, with emphasis on repeated drills and practices. While the system has achieved academic success in international assessments, students are not known to be adequately engaged in the learning process. Faced with regularly administrated, standardised tests, students are often labelled passive learners, driven externally to perform, but not necessarily inspired (Ng, 2007).

Our case school, Practical High School (PHS) provides a customised, technical-based curriculum, with less emphasis on academic-focused methods as these students struggle to cope with the traditional academic demands of a regular classroom. The core of this case study is an examination of an intervention in the school's New Media Club (NMC), which is conducted in an informal learning environment, as part of the students' co-curricular activities (CCA). The researchers from the National Institute of Education (Singapore), in a joint effort with the teachers and students of the club, facilitated the design and building of a full-scale model and simulation of the school campus using an open-source platform, OpenSim. It was a two year project with the students (13-14 years old), who built a 3D virtual model of the campus as their vision of it in five years' time.

The first stage of the project consisted of mapping and identifying the development potentials the students could imagine in their school in five years'. Thereafter, the students brainstormed and developed a range of ideas for solutions to the identified problems that were raised and executed them in OpenSim. The whole context of the learning experience was centred on an ethos of 'making and doing', instead of a 'sit back and be told' school culture, in which students exercised self-efficacy by solving set challenges in a student-led environment (Gaunlett, 2013).

3.2. Engaging by Building Student Authorship

The focus in this intervention goes well beyond traditional classroom teaching, emphasising the role of non-hierarchical participation. In this intervention it was pertinent to encourage a learning environment that was not didactic, but more towards an open-ended, learner-centered approach. Researchers tried to replicate the nature of learning that occurs in non-school contexts, in order to re-enact the social, decentralised patterns of learning the participants experience outside school. For that to occur, the manner in which knowledge and student-teacher relationships are structured in school had to be adjusted. In particular, both parties had to recognise the learner's role and responsibility in guiding the learning process; that the learning process is not abstract or static, nor does it reside in a single authority (i.e. the teacher). Instead, knowledge is distributed and the learning process is collaboratively constructed in negotiation with others (Brown, Ash, Rutherford, Nakagawa, Gordon & Campione, 1993).

The study tended towards open or minimally guided exploration with a focus on student authorship of ideas. The students analyse problem contexts, creatively generate prototype solutions to these problems, then iteratively improve on prototypes until a satisfactory solution is reached. The process is a deeply cognitive one, often requiring the students to continually evaluate during cycles of 'de-bugging', especially when their designs inevitably fail to work initially.

Learning becomes a recursive process as learners become familiar with the OpenSim tools, they become aware of new opportunities and utilities of those tools. This shapes the way that the learners think about their solution to the problem and the problem itself (Goldstein & Pratt, 2001). Likewise, we noticed that the students while exploring with the OpenSim software, had their own ways of expressing ideas and constructing meaning through testing the tools out

in a process of self-directed learning.

3.3. Students' Engagement and Enjoyment Levels Rise in a Collaborative Environment

The collaborative nature of the Maker culture comes from a willingness of sharing ideas and helping others, which was evident in the students who participated in the study. The researchers observed that because the students were involved in all the stages of the design process from idea to construction, there was a high level of student ownership generated. Throughout the one-year course of the intervention, students were encouraged to experiment freely on their own even when they encountered problems. In fact, the student's knowledge of the software soon surpassed that of their teachers. It was noted that when a new teacher had been assigned to head the NMC, she engaged the students in questions about the tools and the software, thus subverting the normal relationship that a student and teacher would normally have. As a result, the confidence levels of the students rose and showed more initiative and self-assurance in executing their ideas and designs.

The OpenSim environment is a multi-platform and multi-user 3D application server which enables information sharing, exchange and creation of 3D content in real time. This collaborative environment allowed students to respond to each other's design almost instantly. They would engage each other in feedback or suggestions that helped to further improve the designs and creations. There was also a strong sharing process between the students as they relied on their peers as important information sources. For instance, when a student had discovered a novel method of utilising a tool, he/she would share it with the rest of the group. The students highlighted that it was "fun" when the rest of their peers could design a similar object. If a student had created a motorcycle based on personal interests, it would not be "fun" if he/she was the only one with that object, so they would engage the rest of the students in building similar objects in the environment.

Thus, the learning environment as a site for engagement is likely to take on significance for students if it unifies the classroom and the outside life in a way that allows students to come together, to discuss and explore their interests, their cultures, and their communities as part of curricular activities (McDermott & Webber, 1998).

3.4. Intrinsic Motivation to Foster the Joy of Learning

To create as much possible ownership and at the same time the highest learning outcome, it was essential for students to be involved in all the stages of the design process from idea to construction. Initially, as the teachers were new to the project, they adopted a more task-oriented approach and were conservative in giving the students autonomy in building what they wanted. The students felt lost and pressured in meeting the tasks dictated by the teachers. It was only when they were able to freely express themselves that the students discovered their own capacities for creative and collective problem solving. When given full autonomy to build objects in the Virtual campus, the students started doing their own research, questioning and exploring and even learning coding on their own, without being prompted by the teachers.

For instance, a student was adamant on building a rock climbing wall in the sports complex, but found it hard at first as he could not find a suitable location for it. He had to research on how the wall would look like and how he would integrate it into the existing infrastructure of the school, and then figure out how to build it using OpenSim. Because the student personally enjoyed rock climbing, he was intrinsically motivated to build the wall and showed persistence in solving problems that he had encountered along the way. The teachers and researchers, without overly controlling the process, encouraged them to solve the problems they encountered, supporting their self-initiation and experimentation.

Here we see that these student accounts resonate with the research done by Vansteenkiste (2004) and colleagues that fostering intrinsic learning goals will lead to positive effects on student motivation learning, and achievement, as opposed to promoting the goals in a controlling manner. If students feel pressured or controlled in the learning process, or if the goal conditions are rigid and narrow, learning is less likely to be enjoyable and meaningful to them and their

persistence at the learning activities are likely to be forestalled.

4. Conclusion

In this paper, we describe how playful learning can be approached in a classroom in stimulating intrinsic motivations and natural curiosity of learners. As this is not a typical setting for a school in Singapore, the researchers had to experiment with alternative pedagogical approaches (such as concepts underlying the making culture) to uncover how best the site could be used to nurture interest-driven creation and learning.

As the students observed their accomplishments in tasks they thought to be challenging for them, many changed their views of themselves as learners. They became more daring and experimental, demonstrating persistence and resilience in a self-reinforcing virtuous circle, even when faced with challenges in their work. For students in school, finding and joining such communities could very well help learning to be a joyful process.

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