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# Self-Perception of Sustainability Consciousness of Hong Kong Secondary School Graduates from Compulsory New Senior Secondary Liberal Studies Curriculum Phase I Report

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March 2017



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## Executive Summary

This report presents preliminary findings of the Phase I study of sustainability consciousness of Hong Kong secondary school students conducted in 2015/16 academic years. This project collected quantitative data from the first year student cohort in eight local tertiary universities in Hong Kong to investigate students' perceptions of sustainability consciousness under the Compulsory New Senior Secondary Liberal Studies Curriculum (NSS LS) introduced in 2009. The purpose of this Phase I study was to describe and analyze environmental aspects of the sustainability consciousness of secondary school graduates who have entered the tertiary institutions. Quantitative data sources included 3251 questionnaires of secondary school graduates who are current students of the eight Hong Kong's University Grants' Committee (UGC) funded institutions.

The study was built upon our pilot study of over 700 secondary school graduates, which was conducted in 2013/4 by the research team at the Education University of Hong Kong under of Department of International Education and Lifelong Learning (Grant No. IELL\_MP2013). This report consists of four parts: a detailed description of the purpose of this study, methods of data collection, analysis procedures, results of data analysis and conclusions.

## 1. Introduction

The study stresses the importance of understanding and analyzing the self-perceived sustainability consciousness of secondary school graduates and exploring the aspects of NSS LS. Sustainability consciousness (O’Sullivan and Taylor, 2004) is a way of constructing one’s reality through a reflective process of formulating personal and group-related systems of values, beliefs, goals, and strategies (Capra, 2003) that lead to sustainable changes. Conceptually, sustainability consciousness is one of the five dimensions of what Hanvey (1976/2004) defined as global awareness: a state or the ability to perceive and appreciate the extraordinary complexity, diversity, and immensity of our planet and our society in relation to ourselves<sup>1</sup> (Kirkwood, 2001). As a dimension of global awareness, sustainability consciousness is fostered by education that promotes transformative learning, “a quality of learning that is deeply engaging and touches and changes deep levels of values and belief through a process of realization and re-cognition” (Sterling, 2003, p. 94).

The research objective (RO) of the study is to examine the self-perceptions of Hong Kong secondary school graduates about their sustainability consciousness resulting from the New Senior Secondary School Liberal Studies curriculum. When the LS curriculum was introduced, this was the first time that compulsory education involving environmental/sustainability issues was introduced.

Phase I of the study attempts to answer the following question: to what degree does the NSS LS curriculum affect the sustainability consciousness of Hong Kong secondary school graduates who are studying in a tertiary institution?

The study focuses on the specific aspects of environmental sustainability and environmentalism and advances the notion that sustainability consciousness is fostered by transformative learning. Value-based sustainability indicators are added (Burford et al., 2013) to its piloted research instrument in order to build on the previous international and Hong Kong-based research and apply the adapted value-based scale for investigating the Hong Kong students’ sustainability consciousness.



## 2. Research Methods

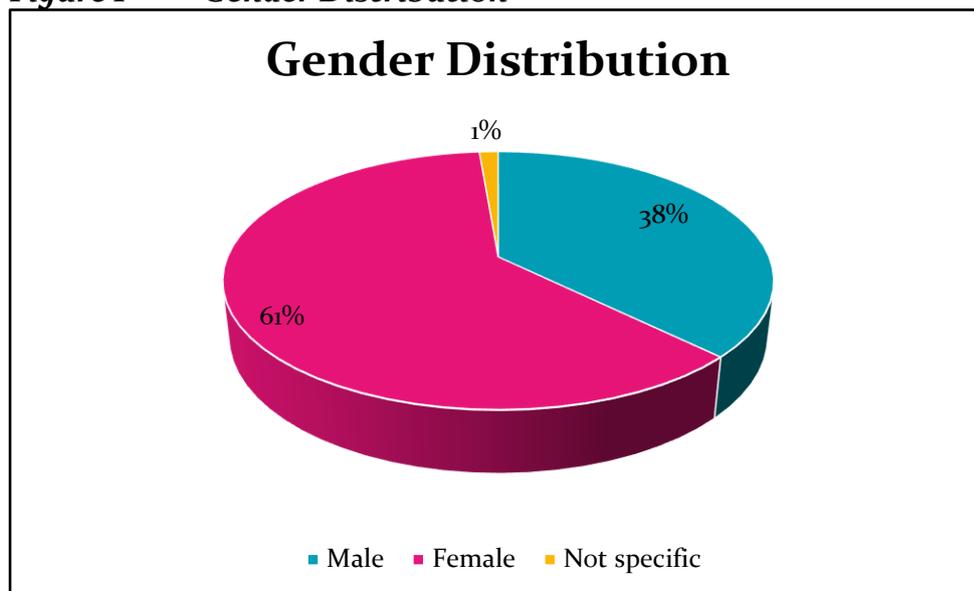
### 2.1 Procedures

The cohort enrolled in 2016 (first year students) from eight Hong Kong local tertiary universities who took the Hong Kong Diploma of Secondary Education (HKDSE) were invited to complete an anonymous questionnaire asking whether their environmental attitudes and actions had been influenced by what they learnt from the LS curriculum. Data were collected during August 2015 and February 2016. The questionnaires were collected on paper and online, with the data input manually with independent error checking. The paper-printed questionnaires were provided in both English and Chinese. Students could complete the questionnaire in less than ten minutes.

### 2.2 Sample

A total of 3,251 students answered the questionnaire. Data from 43 returns were excluded for gender analysis because the gender question was not answered. The sample distribution by gender is presented in Figure 1.

**Figure 1** Gender Distribution



### 2.3 Instruments

The questionnaire instrument included a five-part (knowledge, participation, understanding, awareness, and values-beliefs) Likert-scale questionnaire adapted from three highly reliable instruments: EAI, Children's Sustainability Attitudes and Knowledge Scale (CHEAKS), and Attitudes Towards the Environment Scale (ATES) (cited in Bogner and Wisman, 2002), and Sustainability Value-Based Scale (SVBS). A sample is presented in Table 1.



**Table 1**      **Sample of a Student Questionnaire**

Domain: Knowledge	Has your knowledge of the climate change increased as a result of the liberal Studies programme?  (1=No change, 2=Slightly More, 3=More, 4=Much More)  您關於氣候變化的知識有因為通識教育科而提高嗎?  (1=沒有變化, 2=有少許變化, 3=有變化, 4=有很大變化)
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The questionnaire included five scales and a background question on gender. Three scales were designed to measure (1) students' perceptions of the effect of the Liberal Studies programme on their environmental knowledge, (2) their perceptions of the effect of the Liberal Studies programme on their environmental behaviour and (3) their perceptions of the effect of the Liberal Studies programme on their active participation in environmental group activities. Another scale measured students' participation in environmental group activities and the last scale measured students' perceptions of other influences that might affect their understanding of environmental issues. The questionnaire is provided in Appendix 1.

#### 2.4 Data Analysis

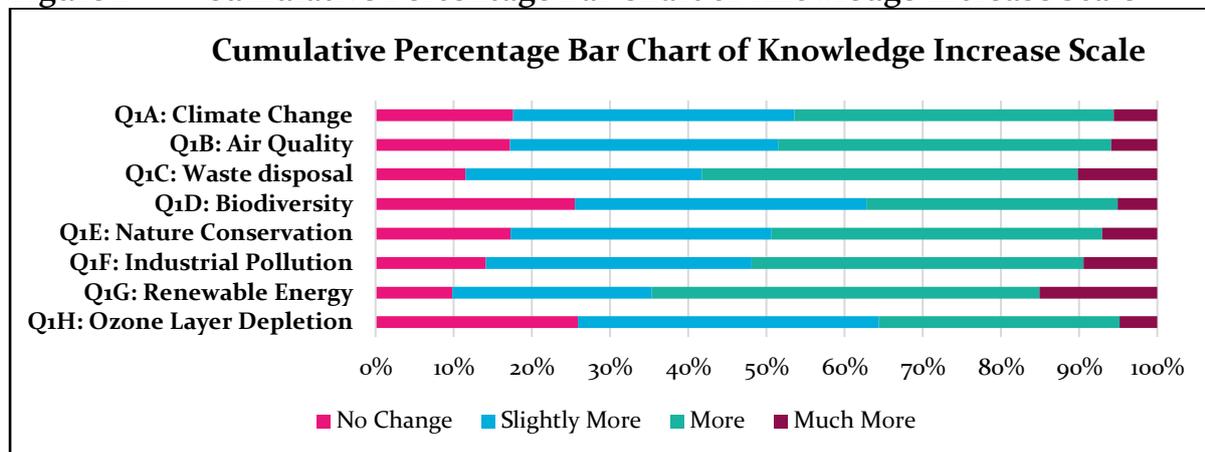
Descriptive analysis using SPSS (V21)<sup>®</sup> software was conducted. Confirmative factor analysis (CFA) was performed using a BASE feature of the MPLUS<sup>®</sup> software for

### 3. Results

#### 3.1 Students' Perceptions of the Effect of Liberal Studies Programme on Their Environmental Knowledge

Students' perceptions of the influence of the Liberal Studies programme on their environmental knowledge were measured using the Knowledge Increase Scale. This scale has eight items, with a common item statement: "Has your knowledge of the following issues increased as a result of the Liberal Studies programme". These items were "Climate Change", "Air Quality", "Waste Disposal", "Biodiversity", "Nature Conservation", "Industrial Pollution", "Renewable Energy" and "Ozone Layer Depletion". There were four response categories to indicate increase in knowledge: "No Change", "Slightly More", "More" and "Much More". The scale has a Cronbach's Alpha value of 0.918.

**Figure 2** Cumulative Percentage Bar Chart of Knowledge Increase Scale



**Table 2** Q1-Knowledge Increase

Question Statement: Has your knowledge of the following issues increased as a result of the Liberal Studies programme?	Mean	S.D.
Q1A: Climate Change	2.35	0.848
Q1B: Air Quality	2.37	0.844
Q1C: Waste Disposal	2.56	0.837
Q1D: Biodiversity	2.16	0.881
Q1E: Nature Conservation	2.40	0.906
Q1F: Industrial Pollution	2.47	0.858
Q1G: Renewable Energy	2.69	0.849
Q1H: Ozone Layer Depletion	2.14	0.864
Overall average (Average of 8 items)	2.39	0.655

Note: 4 point Likert Scale Questions with 1 = No change, 2 = Slightly more, 3 = More, and 4 = Much more

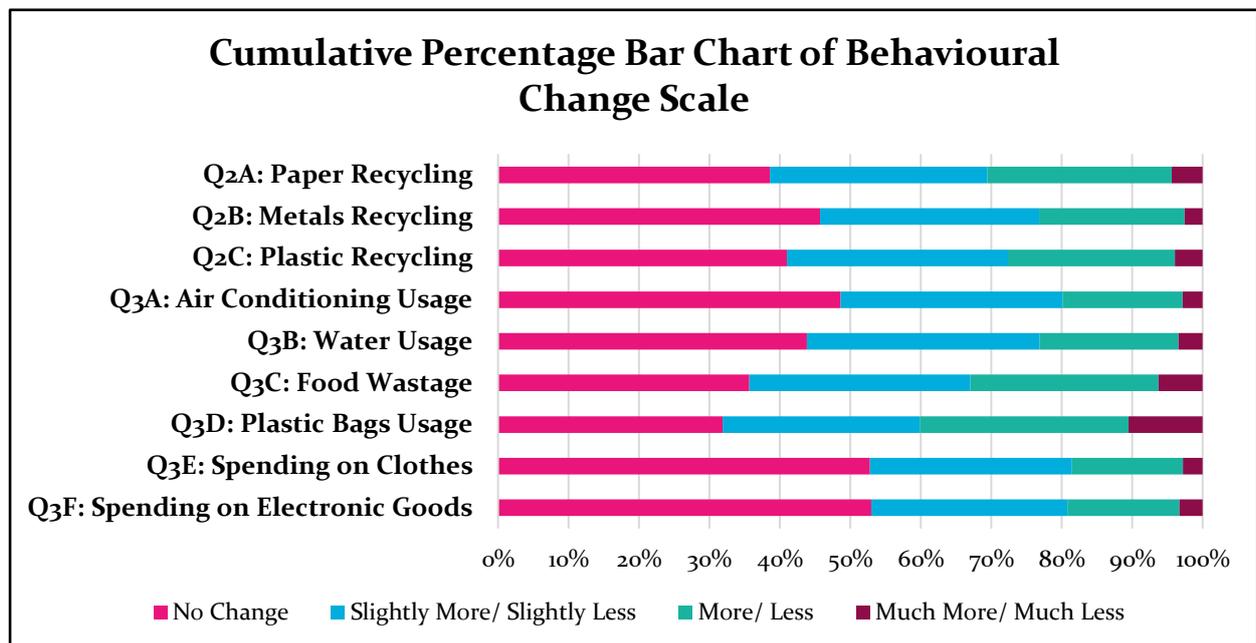
Results are presented in Figure 2 and Table 2. Results indicate a slight increase in environmental knowledge on all issues due to the LS programme (slightly more to more).



### 3.2 Students' Perceptions of the Effect of Liberal Studies Programme on Their Environmental Behaviour

Students' perceptions of the influence of the Liberal Studies programme on their environmental behaviour were measured using the Behaviour Change Scale. This scale contained two sets of items, that is, "Recycle" and "Reduce". The "Recycle" set had three items with a common theme of "As a result of what you learnt in the Liberal Studies Programme, do you recycle more". The items were "Paper", "Metals" and "Plastic". There were four response categories: "No change", "Slightly More", "More" and "Much More". The "Reduce" set had six items with a common theme of "As a result of what you learnt in the Liberal Studies Programme, do you do less of the following:". The items were "Air Conditioning Usage", "Water", "Food Wastage", "Plastic Bags Usage", "Spending on Clothes" and "Spending on Electronic Goods". The four response categories were: "No Change", "Slightly Less", "Less" and "Much Less". The same coding method was used for these two parts, "No Change" was coded as 1, "Slightly Less" or "Slightly More" as 2, "More" or "Less" as 3, and "Much Less" or "Much More" was coded as 4. The cumulative percentage bar chart is presented in Figure 3. The mean values are shown in Table 3 and Table 4. The scale has a Cronbach's Alpha value of 0.951.

**Figure 3** Cumulative Percentage Bar Chart of Behavioural Change Scale



**Table 3**      **Q2-Behavioural-Recycle**

Q2: As a result of what you learnt in the Liberal Studies Programme, do you do more of the followings?	Mean	S.D.
Q2A: Paper Recycling	1.96	0.940
Q2B: Metals Recycling	1.80	0.886
Q2C: Plastic Recycling	1.96	0.926
Overall average (Average of 3 items)	1.89	0.790

Note: 4 point Likert Scale Questions with 1= No Change, 2= Slightly More, 3= More, and 4= Much More

**Table 4**      **Q3 -Behavioural-Reduce**

Q3: As a result of what you learnt in the Liberal Studies Programme, do you do less of the followings?	Mean	S.D.
Q3A: Air Conditioning	1.74	0.847
Q3B: Water Usage	1.82	0.897
Q3C: Food Wastage	2.03	0.969
Q3D: Plastic Bags Usage	2.18	1.050
Q3E: Spending Money on Clothes	1.68	0.872
Q3F: Spending Money on Electronic Goods	1.69	0.891
Overall average (Average of 8 items)	1.85	0.710

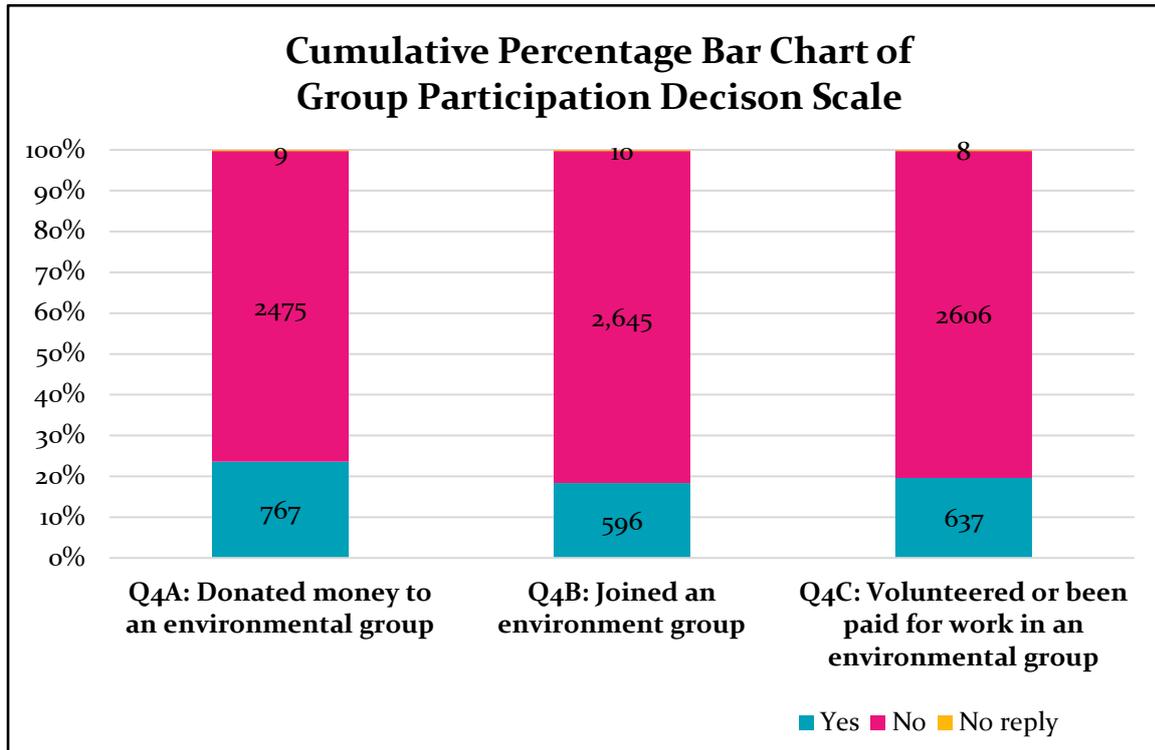
Note: 4 point Likert Scale Questions with 1= No Change, 2= Slightly Less, 3= Less, and 4= More Less

Students show no change to slightly more change in paper, metal and plastic recycling as the mean values were in the range from 1.80 to 1.96. Although students have slightly more to more environmental knowledge, there is not much change to environmental behaviour. The mean values ranged from 1.69 to 2.18.

### 3.3      **Students' Environmental Group Activity Participation**

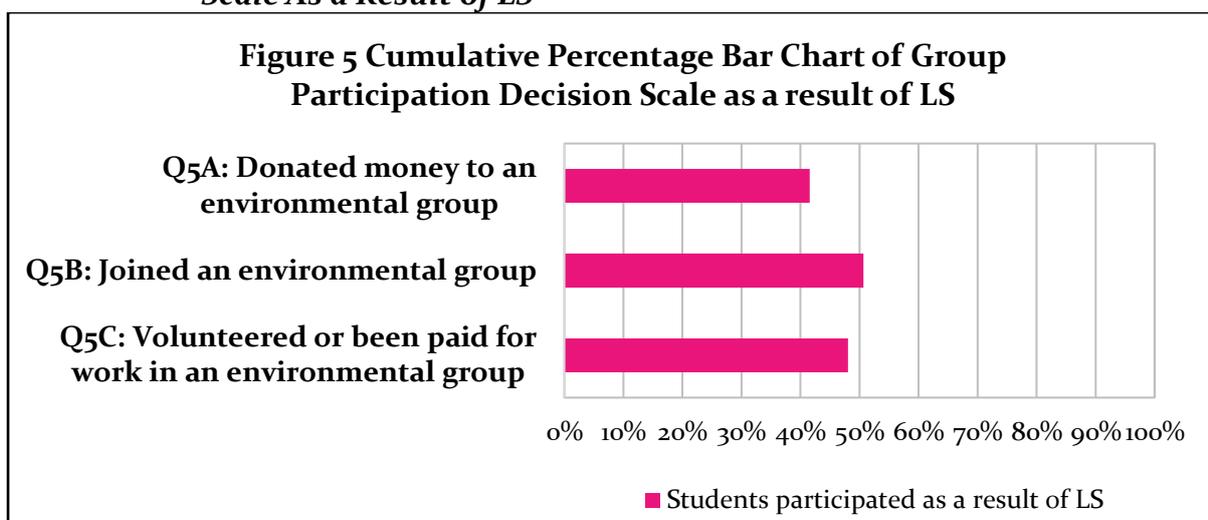
Students' participation in environmental groups and activities was measured using a Group Participation Scale. This scale includes three items with a common theme of "Have you done any of the following": donated money to an environmental group? Joined an environmental group? Volunteered or been paid for work in an environmental organization? There were two response categories: "Yes" and "No". The percentage distributions for the items of the Group Participation Scale are presented in Figure 4. The scale has a Cronbach's Alpha value of 0.924.

**Figure 4** Cumulative Percentage Bar Chart of Group Participation Decisions Scale



The results indicated fewer than 25% of students participated in environmentally related activities.

**Figure 5** Cumulative Percentage Bar Chart of Group Participation Decision Scale As a Result of LS



A following up question to each item of the Group Participation Scale asked whether the Liberal Studies programme had influenced students' decisions to participate in

environmental group activities (Group Participation Decision Scale). The question asked was “If ‘yes’ to any of the above, was this decision as a result of the Liberal Studies programme you studied at school?” The response categories were “Yes” or “No”. The percentage distribution for the Group Participation Decision Scale is presented Figure 5. For those who replied that they had participated in environmental activities, 41.6% to 50.7% said they were influenced by LS.

### 3.4 Students’ Perceptions of Other Influences on Their Environmental Understanding

Students’ perceptions of other influences that had increased their understanding of environmental issues were tested using the "Other Influence Scale". This scale had six items with a common theme of: “Have other influences increased your understanding of environmental issues?” The items were: other school lessons or activities, TV, newspapers/magazines, internet, family and friends. The response categories were “Yes” or “No”. Students were also specifically asked about the relative level of family influence. The results of this question are presented in Table 5 and the results of other influences are presented in Figure 6.

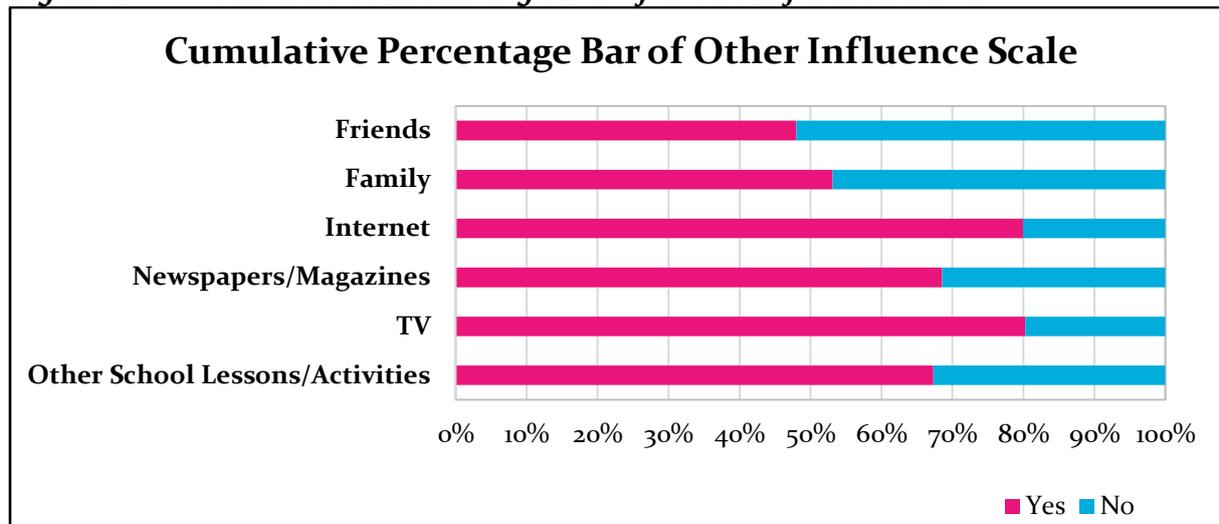
**Table 5 Q6-Family Influence on Environmental Understanding**

Q6: Has family influenced your environmental behavioural?	Mean	S.D.
Q6: Family Influence	2.49	0.963

Note: 4 point Likert Scale Questions with 1 = No change, 2 = Slightly influenced, 3 = More influenced, and 4 = Much more influenced

From Table 5, results indicated an average change of 2.49 which indicates that family does have an influence on students’ environmental behaviour but is not a major factor.

**Figure 6 Cumulative Percentage Bar of Other Influence Scale**



From Figure 6 it is seen that 80.3% and 80.0% students believed that TV and the Internet have increased their understanding of environmental issues respectively. Apart from those two major factors, other factors such as newspapers and school

activities also influenced the students' understanding with percentages of 68.5% and 67.3% respectively. Family and friends were less influential than other factors.

**Table 6** *Correlation of Other Factors Influencing Students' Understanding of Environmental Issues*

Category	School lesson / activities	TV	Newspapers / Magazines	Internet	Family	Friends
School lesson / activities	--	0.432**	0.394**	0.385**	0.375**	0.354**
TV	0.432**	--	0.534**	0.563**	0.382**	0.307**
Newspapers / Magazines	0.394**	0.534**	--	0.486**	0.344**	0.330**
Internet	0.385**	0.563**	0.486**	--	0.379**	0.349**
Family	0.375**	0.382**	0.344**	0.379**	--	0.497**
Friends	-0.354**	-0.307**	-0.330**	-0.349**	-0.497**	--

Note: \*\*. Correlation is significant at the 0.01 level (2-tailed)

(Cohen, 1988)  $r > 0.5$ : large correlation,  $0.3 > r > 0.5$ : moderate correlation,  $0.1 > r > 0.3$ : small correlation<sup>4</sup>

Results in Table 6 demonstrate that TV has a strong correlation with Internet (0.563) and newspapers / magazines (0.534). Students are influenced by the mass media, in printed and online sources.

### 3.5 Gender Analysis

Table 7 indicates that the female students are more influenced by LS than the males regarding their self-perceptions of environmental knowledge and environmental behaviour. Females are also more influenced by their families, TV, Internet, newspapers/magazines, schools and friends than males as seen from Figures 7, 8 and 9. Both males and females are less influenced by their family and friends when compared with other factors.

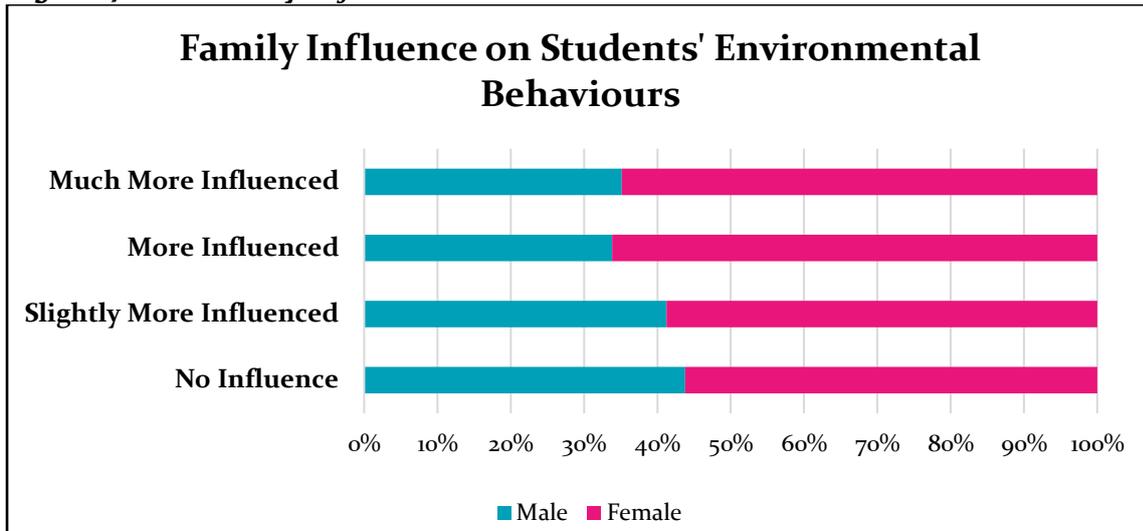
**Table 6** *Gender Comparison on Environmental Knowledge, Recycle Behaviour & Reduce Behaviour*

Categories	Males Mean	Females Mean	p-value
Q1: Environment Knowledge	2.37	2.42	0.047*
Q2: Recycle Behaviour	1.85	1.92	0.019*
Q3: Reduce Behaviour	1.80	1.91	0.000*

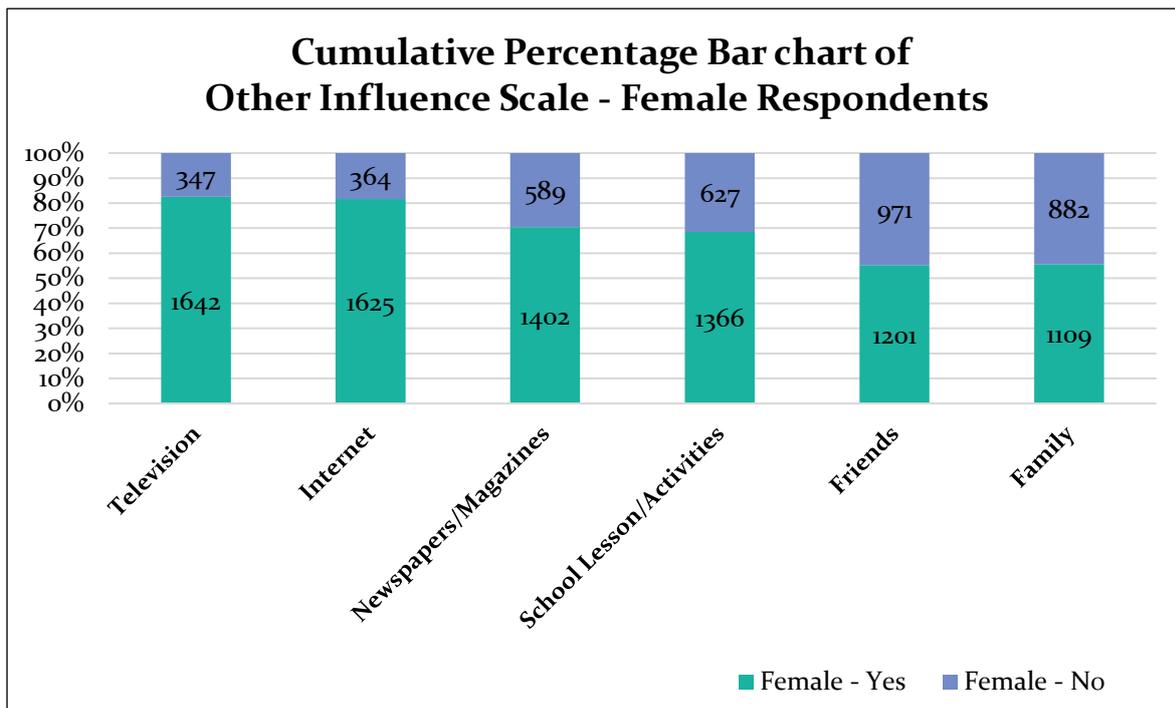
Note: Independent sample t-test was used, with\* p-value < 0.05 was significant



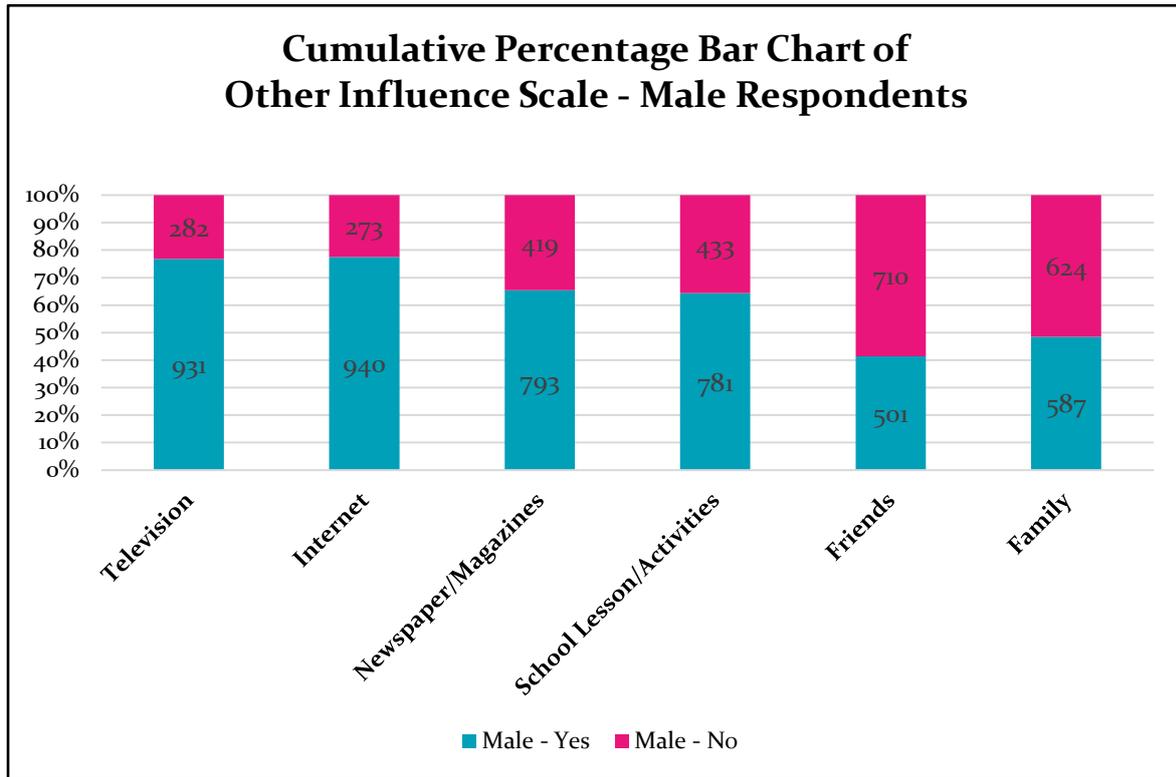
**Figure 7** Family Influence on Students' Environmental Behaviours



**Figure 8** Cumulative Percentage Bar chart of Other Influence Scale- Female Respondents



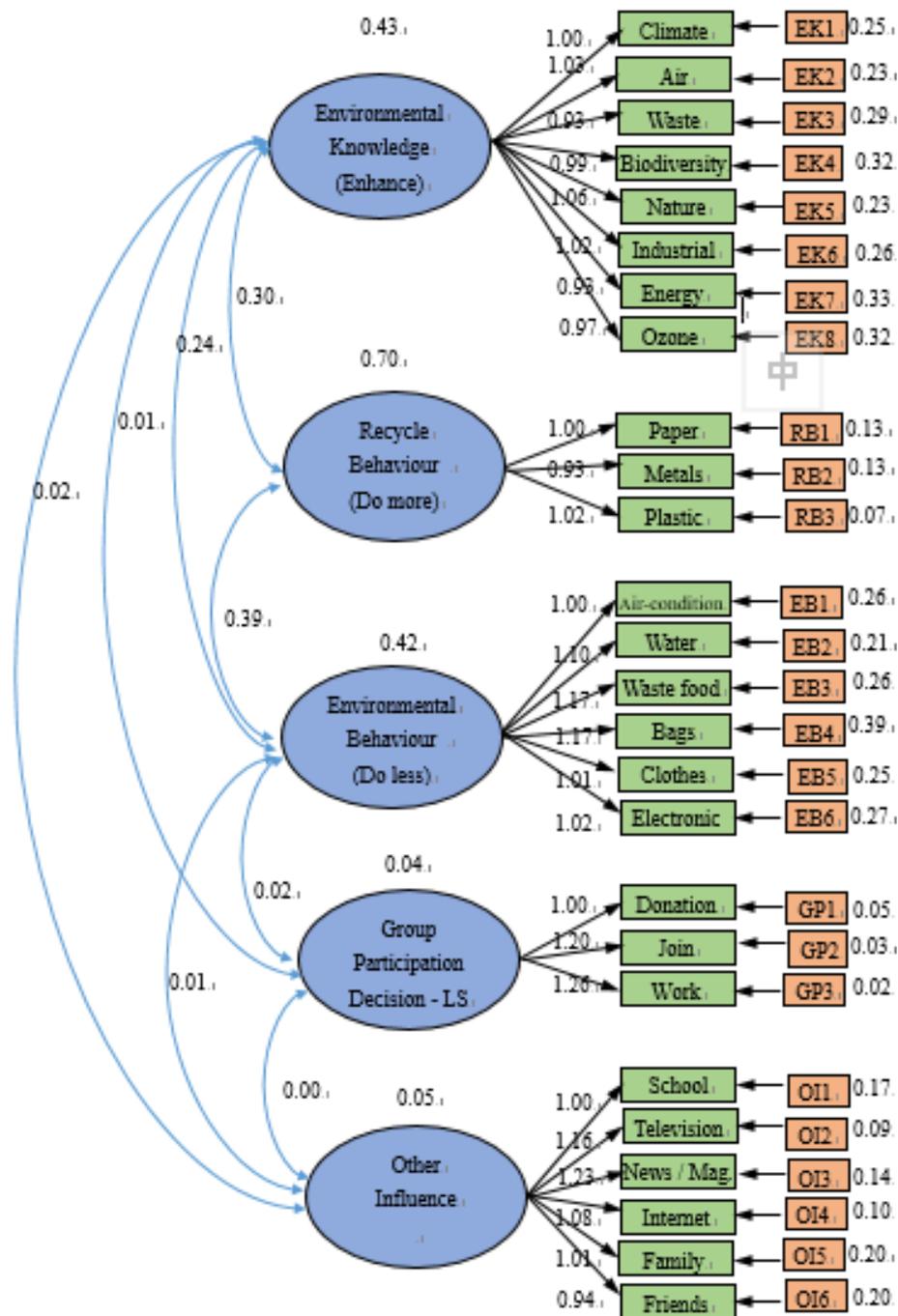
**Figure 9** Cumulative Percentage Bar Chart of Other Influence Scale- Male Respondents



### 3.6 Confirmatory Factor Analyses (CFA)

CFA was conducted by using AMOS software to examine whether the data fit a hypothesized measurement mode and to test how well the measured variables represent the number of constructs. Results are presented in Figure 10. There is a close relationship between Environmental Knowledge, Recycle Behaviour and Reduce Behaviour. However, the relationship between group participation and other influences are not significant.

Figure 10 CFA for Students' Environmental Group Activity Participation



#### 4. Conclusion

The results of this study generally indicate that the Liberal Studies programme has influenced students' environmental knowledge and behaviour. However, the influence was not great. Students self-reported that they had gained more knowledge in the areas of renewable energy, waste disposal and industrial pollution, and had changed their behaviour to use fewer plastic bags and reduce food waste. The predominant response when asked about recycling habits was No Change. Less than 5% of respondents indicated that they recycled much more paper, metal or plastic.

The results indicate that the female students are more influenced by media and social networks than male students. The internet and television have most influence on environmental protection, with no significant difference between the genders. Female students are more influenced by family than male students and family has most influence on environmental behaviour and least influence on environmental knowledge. This perhaps indicates a limited environmental knowledge by many parents. There is no evidence that Liberal Studies motivates students to participate in environmental activities or join environmental groups.

As Liberal Studies does seem to have some influence on changes in environmental knowledge and behaviour, this would present an opportunity to focus more on environmental studies as a means to make Hong Kong more sustainable in future, rather than just as a subject in which exams have to be passed.



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