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Editorial

The Journal of Communication and Education (JCE) is an online journal of the Hong Kong Association for Educational Communications and Technology (HKAECT) and publishes original research papers, practice and experience, and book review. In December 2014, HKAECT held an international conference at the University of Hong Kong, entitled, "Communication and Education: New Media, Knowledge Practices, and Multiliteracies." This 2015 volume, in two issues, is dedicated to publish some selected articles presented at the conference.

New media appear both with multimedia presentation elements and interactive knowledge units which call for emergent knowledge practices. All these multifaceted ways of communication require the ability to understand multiliteracies in terms of culture, disciplines, media and technology. Articles in this volume make an intellectual knowledge exchange on communication and education in three main aspects: New media, knowledge practices and multiliteracies.

In the New Media aspect, Wen and Park discussed the implementation of digital game-based learning in the context of multicultural environment while Cheng, Park and Yuen explored the influence of school and home cultural factors on the educational use of information and communication technology. In the Knowledge Practices aspect, Chan investigated gender differences of trust on online knowledge sharing behavior; Ma and Chan related online knowledge sharing with psychological well-being among Chinese college students; Lan and Lu studied teachers' experience and attitudes for educational application; and Wang and Lu described the design of high-quality resource shared classes in China of an abnormal psychology course. In the Multiliteracies aspect, Lai, Chung and Po reviewed how media shaped social reality perceptions; Kwong, Chan, Leung, Ho, Wong, and Wong reviewed the impacts of agenda-setting in recent studies; Hoi, Teo, and Zhou explored media and information literacy among Macau university students; and Ma, Hui, Tong, Tse, and Wu examined news reading behavior to identify distinctive reader profiles.

Different lens even viewing the same issue would offer very different perspectives. We hope this volume providing a different lens through the three main aspects in new media, knowledge practices and multiliteracies to serve as a rich and resourceful exchange in our understanding of communication and education.

Will W. K. Ma
Editor

A Discussion on Implementing Digital Game-based Learning in the Context of Multicultural Environment

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Abstract: Digital game-based learning suits the learning style of today's students and calls for further research on what could possibly be the most educational ways of using it. In addressing this question, we conducted a case study looking at the learning process among culturally distinct students based on the assumption that cultural differences can influence digital game-based learning processes. This paper reports a pilot study of a forthcoming larger scale study. We first developed two digital games for Chinese language learning in order to tease out culture-dependent preferences and traits among Eastern and Western learners. These were compared with data arising from direct observations and interviews with four students. The findings indicate that in general, Eastern learners were fond of the type of digital game that involves social cues and situational factors while Western learners preferred simple design and goal-oriented learning game in which they can have the power of control.

Keywords: Culture, Digital game-based learning, Education, Social cues, Power Control

1.1 Introduction

Digital games are known to have numerous educational benefits if used appropriately (Tsai, Yu, & Hsiao, 2011; Prensky, 2001a, 2001b). The so-called Digital Game-based Learning (DGBL) can provide today's learners with an accessible, flexible, independent and individualized learning (Thomson, 2010).

Digital games can also enhance learning engagement (Van Eck, 2006) by stimulating learners' interest and active participation with multi-sensory environment (Batson & Feinberg, 2006; Robertson & Howells, 2008). DGBL is also known to better sustain the motivation of learning compared to traditional teaching and learning process (Tuzun, Yilmazsoylu, Karakus, Inal, & Kizikaya, 2009). Some other studies highlighted that DGBL enhances students' social development (Yien, Hung, Hwang, & Lin, 2011) and facilitates players' communication skills and social interaction abilities with other players (Tsai, Lin, & Chien, 2011).

Note. This paper was earlier presented at and published in the proceedings of the HKAECT International Conference 2014 held in Hong Kong, in December 2014.

The foregoing and other mainstream studies analyze the benefits of the DGBL in general. However, since there are different types of games and learners themselves are from equally different backgrounds, many extant studies could be criticized on the ground that there is no such a thing as "one size fits all" DGBL for learners across all social and cultural contexts. The literature on what kind of DGBL suits best for culturally diverse students is almost non-existent in the field.

We report hereafter a pilot study of a forthcoming larger scale research that examines a specific moment in a DGBL implementation for language learning. More concretely, we look at how culturally diverse students have different user preferences and learning patterns in DGBL.

In this paper, the concepts such as 'East Asians' and 'Westerners' are used in their broader meaning as they appear in the framework of social psychology researches conducted by Richard Nisbett and collaborators (Nisbett, Peng, Choi, & Norenzayan, 2001; Nisbett, 2003; Nisbett & Miyamoto, 2005):

1. Perception of the world—Easterners see the world as a net full of relationships while Westerners see the world as a combination of unconnected individual objects. The holistic view and analytic view possessed by Eastern and Western students lead them to focus on different aspects: Eastern turn to pay more attention to social relationships and environmental factors and see the world as a whole while Western are likely to attend more to objects and regard the world as a place of discrete things under different categories.
2. Cognitive process—When facing a new problem or event, Eastern students ask "How" as twice as that of Western students while Western students ask "Why" more frequently than Eastern students. Process-oriented behavior leads Eastern pay more attention to how the event is developed while goal-oriented behavior leads Western to set a goal and try to achieve it.
3. Controllability—Western students have a much more feeling for control compared with Eastern students.
4. Complexity and Simplicity—Western students prefer simplicity while Eastern students would like to believe that things are complex than it looks like.

The starting assumption of the present research is that Eastern and Western learners are different in terms of their cultures and these in turn can influence their learning through DGBL. All of the mentioned above could be factors that affect learners' effectiveness when engaged in DGBL.

1.2 Design of Two Digital Games

In order to investigate how and in what ways that culture differences affect learning in the implementation of DGBL, two digital games were designed. The two online digital games were designed taking into account three aspects: technical aspects, educational aspects and interphase aspects. Both digital games follow similar rules and share similar features in the first two aspects, but they differ in the interphase aspect. In terms of the interphase, one game is based on Eastern culture while the other, on Western culture.

1.2.1 Technical Principles

A good online digital educational game should in animation form with interactive sounds coming out when playing. Meanwhile, the functions of pause, repeat and hints offering are all important (Wood, 2001). The CARE model (Yuen & So, 1999) also indicates that a good online learning game should be user-friendly. Based on the principles mentioned above, two online digital games were designed to be user-friendly, to our best ability, with the functions of pause, repetition and hints so that the users can stop or switch the game based on their own interests.

1.2.3 Educational Principles

In terms of evaluation criteria for the educational perspective, especially on vocabulary learning aspect, Wood (2001) suggested several principles. In the two designed digital games, we adopted two

principles from Wood: firstly, the games provide in-depth processing; secondly, they offer the opportunity of providing multiple exposures to the new words.

1.2.4 Interphase Design Principles

A good online digital educational game should in animation form with interactive sounds coming out when playing. Meanwhile, the functions of pause, repeat and hints offering are all important (Wood, 2001). The CARE model (Yuen & So, 1999) also indicates that a good online learning game should be user-friendly. Based on the principles mentioned above, two online digital games were designed to be user-friendly, to our best ability, with the functions of pause, repetition and hints so that the users can stop or switch the game based on their own interests.

Digital Game No.1 (see Appendix 1)

This digital game was designed based on the phycology thoughts of Eastern learners. The objects to be learned were placed in a harmonious way and they are interrelated to one another. The interphase of this game gives learners a holistic view of the relationships among the objects that are going to be learned (see Figure 1).

Digital Game No.2

This digital game was designed according to the phycology thoughts of Western learners. The items that are going to be learned were placed into different categories without any contextual connections. Also the simple, clean interphase provides learners with the scene of controllability (see Figure 2).

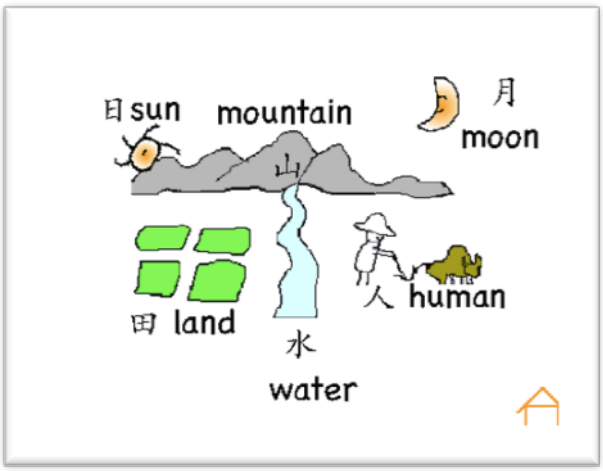

Figure 1. Interface of digital game No.1

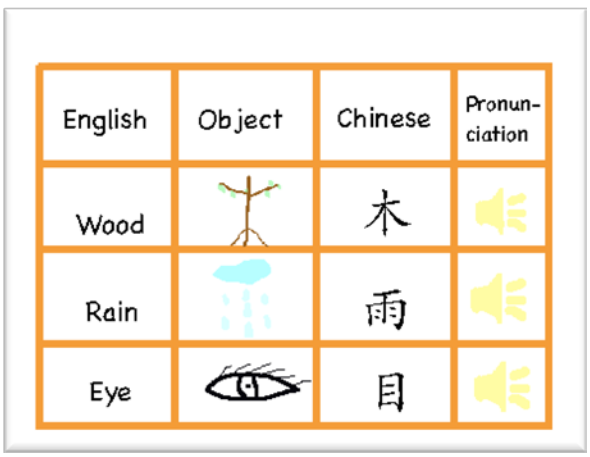

Figure 2. Interface of digital game No. 2

1.3 Purpose of the Study

This case study aims at better understanding the link between digital game-based learning and culture differences. We investigate whether there is a relationship between culture and digital game-based learning. We explore how and in what ways culture differences are influencing the digital game-based learning outcome. In addition, we collect students' feedback on two online digital games in order to understand students' attitudes toward them.

1.3.1 Research Questions

1. Is there a significant cultural difference in students' vocabulary acquisition after using two different online digital games in their learning?
2. What are the elements in the online digital games that contribute to the vocabulary learning?

1.4 Methodology

1.4.1 Choice of Approach

In this study, pre-/post-test together with interview were used to examine how and in what ways culture differences influence learning outcome in the process of implementing online digital game. Pre-/post-tests were aimed at examining whether culture differences have an impact on the learning outcome. Interviews were used to find out students' attitudes toward digital games after the application and see what are the factors in the two digital games that affect learner's vocabulary acquisition.

1.4.2 Participants

Participants in this study included four Chinese learners who learn Chinese as a second language. Among the participants, Sam and Peter (pseudonyms are used in this study to protect participants' identity) come from France. The other two participants are Emma from Japan and Theresa from India. The four participants are all adults. Besides the gender and age difference, participants are of the same level in terms of their Chinese vocabulary knowledge.

1.4.3 Procedures

Four procedures were involved in this study: Pre-test, digital game No.1 & No.2 playing, comparison test (post-test) and focus group interview.

1.4.3.1 Pre-test

All learners were required to take the pre-test. Participants had to answer 5 fill-in-the-blank questions and 5 multiple choice questions in 10 minutes. The questions were designed based on the words in the digital games. The total mark of the test is 100. The test score was assessed after student hand in the test paper. The aim of the pre-test is to find out how well students understand the vocabulary that is going to be learned and it will provide as a reference to see whether there is an improvement after learning. To ensure that this pre-test will not affect the post-test in the future, learners would not be given any feedback or marks after they handed in the test paper. Either were they informed that there would be a post-test so that no more attention would be given to the words appeared in the test.

1.4.3.2 Digital Game Playing

There was a five-minute introduction to the two games given at the very beginning. Then participants were given fifteen to twenty minutes to get familiar and explore the designed games one by one. The learning process was monitored throughout to ensure that students were playing the assigned games without getting distracted.

1.4.3.3 Post-test

There were two vocabulary sheets for learners to finish. After learners done with one digital game, they were asked to complete the corresponding sheet and then moved to the other digital game and finally finish the other vocabulary sheet at the end of exploring the digital game. Vocabularies covered in the two tests were the words that appeared in the two games and they were of the same level in terms of difficulty. Also, the vocabularies that appeared in the post-test were almost the same as that in the pre-test. However, the forms of the post-test and the sequences of the questions will be designed different from that in the pre-test in order to ensure the reliability of the test.

1.4.3.4 Focus Group Interview

All participants were invited to group interview (see Appendix 2) in order to better investigate their attitudes toward two digital games and to find out whether culture is influencing learners' preference when choosing the digital game to learn. The interview took around sixty minutes and the whole process has been recorded in written and audio format. More in depth questions were asked in order to find out what are the elements in the digital game that attract learners attention and whether there is a different preference between Eastern and Western learners when choosing the type of games. Questions like "which game do you think is more attractive to you", "why do you think so", "what are the elements in this game that you like" and " in what ways do you think the game is helpful in your vocabulary building" will be covered in the interview.

1.5 Methodology

1.5.1 Pre- and Post-test

In order to find out whether there is any difference in Chinese vocabulary acquisition before and after the online game playing, results of the pre- and post-test were compared. There was a significant increase in the mean score, from 40 to 80, which indicates that the online digital game has helped students' Chinese vocabulary acquisition. In contrast, there was no big difference between the results of Asian learners and Western learners in the two vocabulary tests of the post-test, which suggests that the two different games are almost equally effective to both Eastern and Western learners.

1.5.2 Focus Group Interview

After word-for-word quotes transcription, content analysis was used to explore students' attitudes toward two digital games. According to Janis (1965), there are three types of content analysis: pragmatical content analysis, semantical content analysis and sign-vehicle analysis. Semantical content analysis aims to categorize the signs based on their meaning (Krippendorf, 2004), thus it was used in clarifying students' attitudes toward two online digital games. When talking about the digital game No.1, the most frequent appeared words were "harmony", "interesting", and "united". When it comes to digital game No.2, the description were "simple" and "clear". There is no difference between Eastern and Western learners when giving comments on the two digital games. Taken together, Eastern and Western learners share the similar feelings toward two different types of digital games.

Pagmatical content analysis was also used in data analysis to find out the factors that are influencing the preference of Easter and Western learners when choosing the games since pagmatical content analysis seeks to group signs according to cause and effect (Krippendorf, 2004). Simple and categorized interphase is one factor brought up by Western students that makes them have a favor for digital game No.2. "The interphase is so clear for learners. Every item was placed in different categories and it makes it easier for me to choose the one I want to learn." (quoted from Peter in interview, 27th, July, 2014). Contextual learning provided by the digital game No.1 was favored by Eastern learners. "This game

provide me with a holistic view of all the items, which makes it easier for me to understand and to remember the individual word in a big picture" (quoted from Emma, 20th, July, 2014).

1.6 Conclusion

Based on a few research from neurobiology and social psychology, Prensky (2011b) suggested that contemporary digital natives think differently due to their distinct culture. However, his research and many others in the field consider that entire generation of learners belongs to one distinct but homogeneous culture. This is rather counterintuitive and problematic.

The present paper tries to understand better the culture-dependent preferences and traits among Eastern and Western learners when involved in Digital Game-Based Learning (DGBL). The data arising from direct observations and interviews with four students participating in this pilot study.

The findings indicate that, in general, there was no big difference between the learning outcome of the Eastern and Western learners in the early implementation of digital game-based learning. However, there were differences between Eastern and Western learners' preferences within the DGBL. Eastern learners are fond of the type of digital game that involves social cues and situational factors while Western learners preferred simple designed, goal-oriented learning game in which they can have the power of control. Apart from the cultural factors, learners' personality and ability should probably be taken into consideration when choosing the right type of digital game.

There are a number of obvious limitations in this study. The first and most important one is its small sample size, hence, the results from this study are not generalizable. However, it should be said the present paper is based on a pilot study that was intended to find a viable research framework and have it tested for a later research. A universal generalization is therefore neither claimed nor intended. Second, some inside factors such as participants' personality, ability, and experience of playing digital games could also influenced by the result. Therefore, we cannot claim that the findings of this study totally derive from the culture differences. It is hoped that our future main research can shed light on these blind spots.

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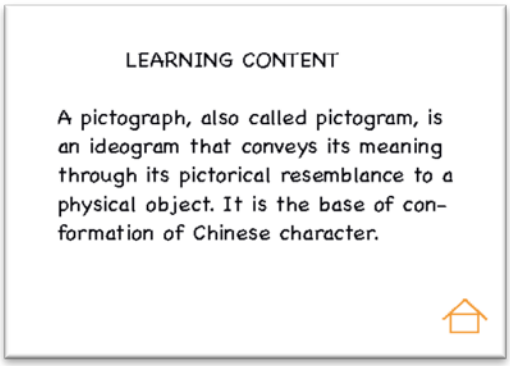
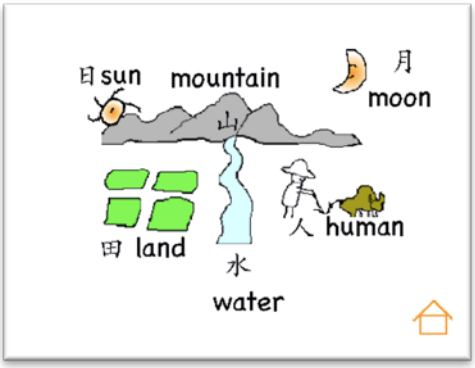
Appendix

Appendix 1. My Designed Online Digital Game No.1
Prototype of the digital game No.1
Below is the link to my online digital game (title: Chinese vocabulary learning).
http://scratch.mit.edu/projects/21041022/#player

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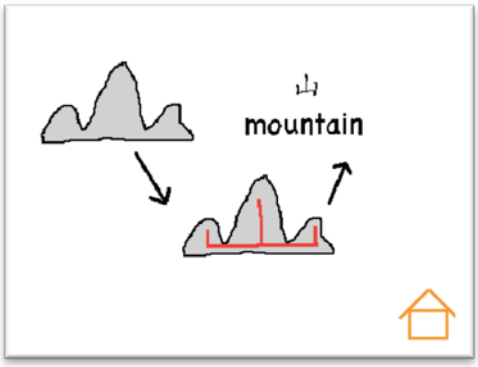
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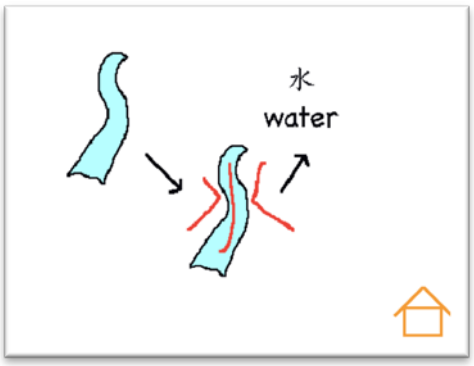
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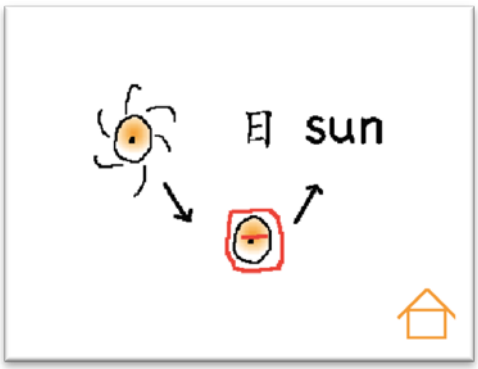
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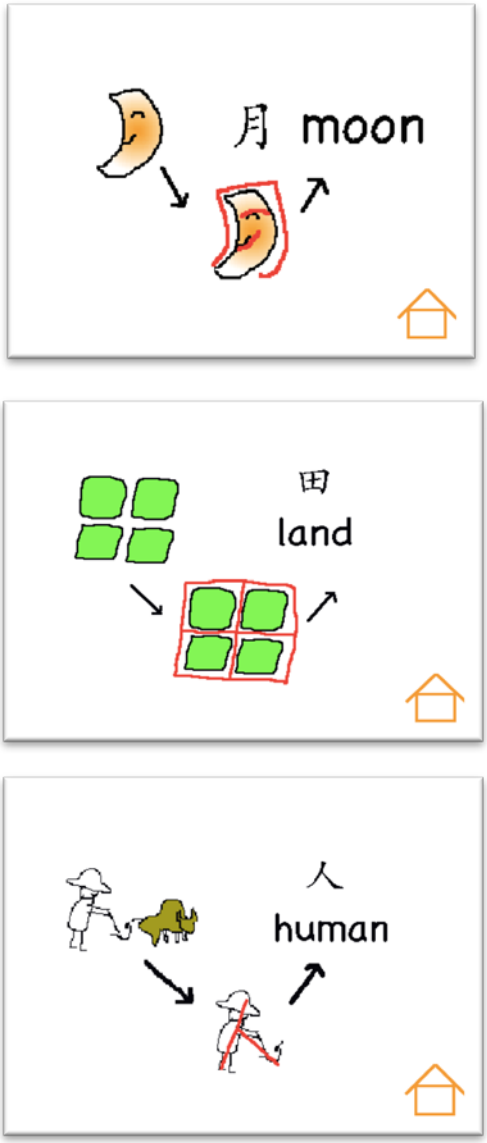

Appendix 2. Interview Questions

- Tell us a little about yourself and your Chinese learning.
- Have you ever played an online digital game before? Are they of educational benefits?
- What were some of your initial thoughts toward online digital games?
- Do you like the online digital game we gave to you?
- Which one do you like better and can you explain the reasons in details?
- What do you like most about the online digital game No.1?
- What do you like most about the online digital game No.2?
- Do you think the online digital game helps you in Chinese vocabulary learning? Please explain further.
- What are the factors do you think are most attractive to you in the online digital games?
- If you have to choose one digital game from the two designed ones, which one do you prefer better and why?

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The Influence of School and Home Cultural Factors on the Educational Use of Information and Communication Technology: A Case Study in Hong Kong

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Abstract: The influence of school or family on students' development is widely recognized as essential. Cultural factors which affect students' use of information and communication technology (ICT) need to be further explored. This research on digital divide analyzed the interview data from principals, teachers, and students from two Hong Kong junior secondary schools. The main findings suggest that cultural divide at school and home can significantly affect the phenomenon of digital divide in education. The cultural factors in school most associated with high ICT usage were the school principals' culture and values regarding ICT. Parental values, such as demanding but harmonious parent-child relationship, were the most influential home cultural factors. The results of the study suggest that the phenomenon of digital divide could be eased by previously overlooked gaps in school and family culture. Some suggestions and limitations were also provided in the conclusion.

Keywords: Parental culture, School culture, ICT use, Digital divide, Hong Kong

1. Introduction

The efforts to integrate information and communication technology (ICT) are a common place across nations and industries. Hong Kong has invested abundant resources to integrate ICT in education with three Five-Year Strategies (EMB, 1998). A cross-sectional research from 1998 to 2003 on 413 secondary schools evaluated the progress of the Five-Years-Strategies (The Hong Kong Polytechnic

Note. This paper was earlier presented at and published in the proceedings of the HKAECT International Conference 2014 held in Hong Kong, in December 2014.

University Project Team, 2005). The study demonstrated that the traditional gaps in students' access to hardware and equipment were practically closed. Comparable results were supported by other reports, which show a dramatically decreased student-computer ratio from 35.7:1 in 1998 to 6.09:1 in 2006 in Hong Kong secondary schools (Yuen et al., 2010).

Earlier conceptualization of digital inequality took into account material access to resources (Bucy & Newhagen, 2004; Compaine, 2001), socio-economic status (Ono & Zavodny, 2007; Volman & van Eck, 2001) and other forms of social exclusion (Warschauer, 2004). However, the focus of digital divide research has shifted from possession and access to usage, quality in particular (Dijk & Hacker, 2003; Dijk & Jan, 2005). If the latter is valid, the digital divide in Hong Kong education needs to be look at with a different paradigm. For example, according to a large-scale study involving 976 Hong Kong students, more than 60% senior primary school students, over 35% of secondary students, were identified as highly at risk of Internet addiction (Tsuen Wan Centre, 2004). Chu (2012) carried out large-scale research and proved that while students have generally equipped with a basic knowledge in operating computer, their higher skills still have much room to improve.

Such phenomena suggest that we cannot simply equate the abundance of ICT-related resources and access with high order ICT competence. A widening competence divide can coexist with plethora of access and use of ICT. Echoing this issue, a score of related research from sociology, physical, or political perspectives has been conducted (e.g. Shek, Tang, & Lo, 2009; Shek & Yu, 2012; Yu, Yuen, & Park, 2012; Yuen, 2003; Yuen, Law, &Wong, 2003)

It has been argued that ICT-mediated education should be explored from a holistic view by encompassing cultural contexts where education takes place (Hohlfeld, Ritzhaupt, & Barron, 2010). Values, on the other hand, could be regarded as a major connection of culture and action (Swidler, 1986).

It is broadly accepted that Confucian values are strongly embedded in Hong Kong culture (Hofstede & Hofstede, 2005; Park, 2011), where education is regarded as a channel for full development of an individual (Bond & Hwang, 1986). Confucian heritage culture has further been characterized as more masculine than feminine (Hofstede, 1996; Hofstede & Hofstede, 2005), as preferring collectivist to individualism (Hofstede & Hofstede, 2005), as stressing conformity and deference to elder demands (Ho, 1986), and as emphasizing restraint and diligent to achieve greater academic attainments (Chen & Stevenson, 1989; Stevenson et al., 1990). Values are mostly acquired from family since birth, and undergo a receptive period from ten to twelve years, and tend to stop changing at early 20s, as shown in Figure 1 (Hofstede & Hofstede, 2005). Therefore, secondary students are arguably in a critical period of value formation where the school and family are strongly influencing their interests and actions related to ICT usage.

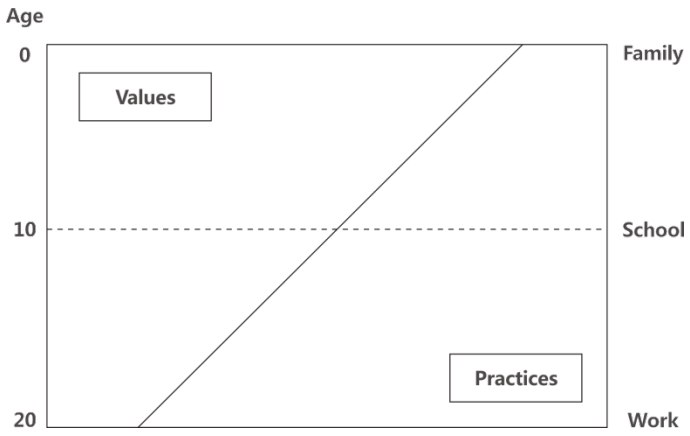

Figure 1. The learning of values and practices

Existing literature on factors affecting ICT use suggest that students' ICT usage is strongly related to their school and family that are in turn mediated by the distinctive culture of Hong Kong. The present study attempts to contribute to a better understanding of how cultures of school and parents influence on Hong Kong secondary students' digital divide. Research questions are:

- What cultural factors influence students' ICT use in school and home?
- What values do students assign to ICT use?
- What are the possible impacts of cultural factors on students' values?

2. Method

This research adopts the case study method. It is an empirical and holistic inquiry to investigate participants' experience from multiple sources of evidence using multiple research methods in a real-life context (Yin, 2009). Such approach does not only help to explore experience from the participants' own perspective but also allow researchers to understand and comprehend the meanings (Hennink, Hutter, & Bailey, 2010).

This study was conducted in two secondary schools (School A and School B) located in neighboring suburban districts of Hong Kong. Although in similar geographic location, their school contexts are different as shown in Table 1. As far as ICT facilities are concerned, both schools are well established with fully functional ICT equipment with the School B being significantly higher. To represent a full range of junior secondary students, the participants in this study were selected from first to third year of their studies. In addition, principals, teachers and parents were selected to provide a broader picture on students' usage of ICT.

Table 1. The context of the schools

School No	Total no. of students	Total no. of teachers (No. of IT coordinators)	Instruction language	School history	School grade	Annual sch. fees (HKD)
A	~ 990	63 (2- part time)	English	Since 1949	Band 1	290
B	~ 700	64 (2- full time)	Cantonese	Since 1996	Band 3	290

Informal network and gatekeeper strategies were adopted for participant recruitment (Hennink et al., 2010). By using the researchers' informal network, we sought to get endorsement from the school principals. After obtaining it, the school principals and authorized teachers by principals helped us with the participant recruitment. These principals and teachers served as gatekeepers, were critical to facilitate our research by giving approval to conduct research in their schools, helping recruit participants with required criteria, providing related information, and getting participants' trust for data collection (Hennink et al., 2010; Yin, 2009).

Table 2. Information of individual interview participants

School	Participants'	Participant	Participants' Code
A	1	Student	A_SI_1
A	2	Student	A_SI_2
A	3	Student	A_SI_3
B	4	Student	B_SI_1
B	5	Student	B_SI_2
B	6	Student	B_SI_3
A	7	Parent	A_Par_1
A	8	Parent	A_Par_2
A	9	Parent	A_Par_3
B	10	Parent	B_Par_1
B	11	Parent	B_Par_2
B	12	Parent	B_Par_3
A	13	Principal	A_Pri
B	14	Principal	B_Pri

Table 3. Information of focus group interview participants

School	Group No.	Participant	Participants' Code
A	1	Teacher	A_Tea_1, A_Tea_2, A_Tea_3
A	2	Student	A_SG_1, A_SG_2, A_SG_3
B	1	Teacher	B_Tea_1, B_Tea_2

The data in this study were collected mainly through interviews. Individual interviews were conducted as shown in Table 2. In addition, focus group interviews were organized with a total of eight participants separated into the following groups, as shown in Table 3. The interviews were all carried on in Cantonese and recorded by audio device. Daily oral reports, on-site questionnaires, and school documents were also collected to supplement detailed information on students' daily used and attitudes related to ICT.

All the audio recordings from interviews were transcribed verbatim. Content analysis was performed to identify descriptive codes, interpretive codes, and pattern codes iteratively (Miles & Huberman, 1994). Final codes were classified into three constructs: school factors (value on ICT, source of IT expertise, and style of professional development), home factors (parental skills and a demanding but harmonious family relationship), and shared value (conformity, masculine, deference and restraint).

3. Results and Discussion

This section offers an overview of students' ICT usage levels followed by a discussion on the identified school and home cultural factors that affected students' values and how these values hinder or promote their ICT competence. Some representative excerpts from the transcriptions are selected and presented.

3.1 Students' ICT Usage Level

Due to the fact that access divide in Hong Kong has been markedly decreased, the discourse on digital divide in this study highlighted the gap on usage to distinguish information divide from hardware divide (Dijk & Hacker, 2003). In the present study, the usage gap of ICT among students is apparent and it is classified into three levels: high usage level (systematically use ICT for work and education), middle usage level (better skills for entertainment whereas more difficult for learning), and low usage level (a relatively large part for entertainment with only basic ICT skills) as shown in Table 4.

Table 4. Students' ICT usage information

Participant's code	Usage level	Major purposes
A_SI_1	High	Study and work
A_SI_2	Middle	Entertainment (online games), social needs
A_SI_3	Low	Entertainment (online videos)
B_SI_1	Middle	Entertainment (online games), social needs
B_SI_2	Middle	Study and work, social needs
B_SI_3	Low	Entertainment (online video), social needs

3.2 School factors and Students' ICT Use

A significant difference exists in the values of principals, source of IT expertise, and style of professional development. The traditional hierarchy in organizational culture still exists in both schools while School B is relatively more decentralized. In general, the values presented in the majority of the members in schools were consistent with their principals. Therefore, students' conformity and deference to their teachers remained, and students with better academic performance were believed and proved to be more restraint to use ICT mainly for learning.

3.2.1 Principals' values on ICT

The results indicate that principal in School A (A_Pri) has a lower expectation on the role of ICT whilst principal in School B (B_Pri) clearly emphasize the importance of ICT in leveraging teaching and learning. It is interesting to note that the practices of teachers and students followed similar pattern of their respective principals. This is consistent with reported understanding of cultural context of Hong Kong, for example, the deeply rooted values of conformity and deference toward rulers and elderly (G Hofstede & Hofstede, 2005). Thus, principals' values on ICT would directly affect teachers' ICT competence, pedagogically and technically, and meanwhile, indirectly influenced students' ICT usage in school.

3.2.2 Source of IT Expertise

The obstacles associated with human factors showed remarkable different between the two schools. In this study, insufficiency of qualified technical support was strongly perceived by the principal in School A whilst its existence was not evident in School B. While comparing the practices of principals and teachers in both schools, the reasons led to this differentiation appeared to depend significantly on the source of IT expertise.

While successful ICT implementation and integration depends to a great extent on teachers' pedagogical and technical competences (Yuen et al., 2010), the sustainability of ICT-related innovations are generally confined to the practices of specific teachers with great enthusiasm (Kozma, 2005). IT teacher as experts had the most profound influence on ICT integration at all levels by providing timely technical support and professional development. The value held by the IT teacher in School B is that all IT teachers should keep pace with the time and pursue continuous professional development in order to provide the best for students. In contrast, the IT teacher in School A expected much less and only hoped for basic skills for themselves as well as their students. His value and low expectation proved to affect students' usage of ICT in school:

> ICT is dispensable and can be replaced by many other approaches. (A_SG_1)

> I can learn more through computer, (such as) more software, more skills to design websites, and more knowledge. (B_SI_1)

Though the school principals are not the source of IT expertise in both schools, their values and attitudes towards ICT-mediated teaching and learning directly influenced teachers' practice. It is found that the principal in School B regarded ICT as a powerful lever in education and should dedicate to developing teacher and students' ICT competence. As for the principal in School A, he depicted his attitude as:

> I was a student of liberty art, I do not have much passion to explore IT issues, and enough is ok… Students learn basic IT skills and cultivate correct attitude on its usage is also enough. (A_Pri)

3.2.3 Location of ICT Infrastructure

Location of ICT infrastructure in school is a critical factor that reflects how ICT are used within schools (Cuban, Kirkpatrick, & Peck, 2001). The personal computers are all located in the labs and library in the School A, which also has regulations with corresponding punishments if students use ICT outside stipulated premises. ICT infrastructures in School B are more advanced, more accessible, and more integrated into instructional and learning activities, indicating a higher usage level among students in school. The IT teacher in School B exerted profound influence with the support and trust from the school principal. For example, he has implemented mobile learning in classes and library with free access to iPad.

3.3 Home Factors and Students' ICT Use

This study focuses on the parental ICT-related skills and family environment. The traditional patriarchal family culture (Ho, 1986) is apparent in this study, where parents are generally authoritative on their children. Fathers are responsible for outside work and play a dominant role in family while mothers are chiefly responsible for home activities (G Hofstede & Hofstede, 2005).

The results of the present study are consistent with other research findings that Chinese parents are more supportive in assisting their children to achieve academic success and educational needs (Stevenson et al., 1990), while they are less involved or could even be punitive towards their children's poor academic performance (Rosenthal & Feldman, 1991). Therefore, in theory, the values of deference and conformity to parents, particularly the father, could affect students' practices on ICT, and the degree of restraint to regulate ICT usage in terms of amount of time and purpose.

3.3.1 Parental Skills

The findings show that the effectiveness of parental monitoring and guidance are closely related to parents' ICT skills. Students showed more deference and conformity to parents with higher ICT competence. This claim is derived from two findings. First, when timely support and effective suggestions are provided, students are more likely to ask for help to and trust on their parents. Secondly, with the involvement of father with greater ICT-related skills, hence viewed as 'hero' or role model, children are more restraint to avoid misuse of technologies, perhaps in order to gain parental recognition.

3.3.2 A Demanding but Harmonious Family

It has been argued that conflict is a remarkable feature in Chinese family (Rosenthal & Feldman, 1991), which is consistent with the overall goal of Confucian values to maintain harmony in family through self-restraint of children to overcome individualism (G Hofstede & Hofstede, 2005). Existing literature concerning this phenomenon generally adopt a dual-concern model (Sorenson, 1999; Sorenson, Morse, & Savage, 1999), which assumes individuals' preferred method to deal with conflict is simply driven by personal concern for self or for others in decision-making. However, this explanation cannot be comprehensive without including a concern for the cultural norms existing in one's family or groups (Whiteside & Brown, 1991) . Based on the Confucian heritage culture of our participants, the factors of family relationship, family norms and collective interests are also considered (Park, 2011; Yan & Sorenson, 2004).

The results of this study indicate that students in a harmonious but demanding family environment would have higher degree of deference, conformity and restraint in terms of purposeful use of ICT. Within this specific family environment, students' usage level of ICT was more associated with family norms and collective interest. For a year 1 student from School A, who systematically used and benefited from advanced technology, his father is a big 'tech fan' and family gatherings held regularly are the reification of cultural influence in their ICT usage. Family gathering outdoors as interaction norms in family is not evident in the present study except the A_SI_1. As his mother revealed:

> Digital technologies must have influenced our family relationship more or less, however, with appropriate control, its benefits are absolutely outweighed harms. We communicate a lot and always have family gatherings on holidays. Therefore, I always know what they are doing with computers (A_Par_1)

From this description, we can also see that parents can maintain a harmonious family relationship, which help to prevent or alleviate conflicts, through collective activities such as family gathering.

4. Conclusion

In this study, we attempted to provide a novel perspective for better understanding and explaining the digital divide phenomenon. Our main claim is that digital divide is not only a divide in access to and expertise or mastery in ICT but also a divide in culture. Drawing from the case of Confucian heritage school students and their respective families, we argue that various elements of culture such as school culture (i.e., principal's values, source of expertise and location of ICT infrastructure) and home culture (i.e., parental skills, demanding but harmonious family relationship) play a significant role in mediating students' values that lead to qualitatively and quantitatively different levels of ICT integration. Their shared values of conformity, deference, and restraint derive from the Confucian heritage culture (Park, 2011) and they are indeed cultural capitals conducive for academic attainments and social mobility (Bourdieu, 1986).

The findings of this study suggest ways to ease digital divide generated by a 'cultural divide'. First, school principals could establish a positive and shared vision in school and lead teachers, technical staffs, and out-of-school communities to sustain ICT integration and innovation within school. Second, teachers and parents invest more time and efforts in enhancing their own ICT-related skills, while understanding better the ICT practices of student and avoiding negative and non-constructive reactions to their personal need and lower academic performance. Only with fluent communication, can they understand students' values, generate appropriate strategies, and guide them to better practices. In this respect, join-activities such as workshops, lectures, and gathering could be effective ways to facilitate communication, which in turn can lead to better practices in ICT usage. Finally, parents should step in to mediate students' use of ICT by instilling positive environment at home through daily life. In our view, parents' effort to strengthen their own ICT skills is compatible with cultivating a harmonious yet demanding parent-child relationship in Confucian heritage culture.

Due to the limited scale of interviews, the findings may not render a robust generalization about the influential factors of students' ICT use. However, the findings suggest that students' educational use of ICT must take into account the cultural dimension of digital divide. Therefore, further and larger research, using both qualitative and quantitative measures, is needed to look more closely at the relationship between the digital divide and culture.

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Exploring the Gender Differences of Trust on Online Knowledge Sharing Behavior

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Abstract: Online knowledge sharing is one of the important processes in knowledge creation especially with the radical development of social media. This study aims to explore gender differences in online knowledge sharing process by utilizing an online knowledge sharing model. Conducted with a questionnaire instrument, this study collected completed questionnaires from 492 high school graduates who answered their most frequent used social media, activities and opinion. Overall, perceived online attachment motivation did not have significant relationship with online knowledge sharing, as it was fully mediated by perceived online relationship commitment. In the male group, perceived online relationship commitment (β=0.47, $p<0.001$) has a stronger effect than trust (β=0.39, $p<0.001$) on online knowledge sharing behavior; while in the female group, trust (β=0.46, $p<0.001$) has a stronger effect than perceived online relationship commitment (β=0.41, $p<0.001$) on online knowledge sharing behavior. Implications on the gender differences are discussed.

Keywords: perceived online attachment motivation, perceived online relationship commitment, online knowledge sharing behavior, trust, social media

1. Introduction

Social media is a new area in which all people in the globe spent tremendous time daily to interact with each other. Social sites, such as Facebook, Weibo, twitter and blogs, are platforms that allow people to communicate with friends. These platforms are free and open to anyone who registers as a member. Specifically, as of November 2013, there were more than 1.19 billion active users of Facebook (Facebook, 2013). On the other hand, prior studies emphasize on channels' characteristics as well as the task that serve the social functions often at business level (e.g., Dickey et al, 2006). It seems that there are not many studies on interpersonal relationship and trust in the context of gender differences which would be important factors in the knowledge processes as knowledge exchange involve not an individual but both parties in the communication process. Therefore, the research objective of this proposal is to explore the factors affecting knowledge sharing. The research questions: RQ1. What are the key determinants of online knowledge sharing? RQ2. What are the gender differences between these factors? It starts with a review on literature review, identifies the factors that possibly affect the online knowledge sharing behavior under social media environment. The next section writes about the model and hypotheses development. There will be the methodology section which talks about the instrument used to collect the data. The last section will be the discussion as well as the limitation of the study.

2. Literature Review

2.1 Online Knowledge Sharing Behavior in the Context of Social

Note. This paper was earlier presented at and published in the proceedings of the HKAECT International Conference 2014 held in Hong Kong, in December 2014.

Online knowledge sharing behavior is explored in the prior studies in different aspects. From a simple review, there are myriad of studies that put emphasis on channels and tasks' perspectives rather than individual characteristics, for instance, interpersonal relationship. In the previous studies, they highlight the significance of file and video sharing through Youtube (e.g., Lange, 2008). They are mostly related to channels' functions. On the other hand, there are also studies that shed light on social functions at the organization level in which they told us about the shared understanding perspective in a shared workplace (e.g., Dickey et al., 2006). There are only a few previous studies talking about relational strategies, social network participation and political engagement (e.g., Valenzuela et al., 2009) that fall into the categories of public relations but not examining the interpersonal relationship specifically. From the review, there is only one study that examines the role of self-disclosure in relationship development on the Internet in the context of three cultures (Yum & Hara, 2006). Therefore, it is worth trying to explore in the social media where people disseminate information frequently. Ma & Yuen (2011a) defined online knowledge sharing behavior (OKSB) as "the online communication of knowledge so that knowledge is learned and applied by an individual" (p.212).

2.2 Perceived Online Attachment Motivation and Perceived Online Relationship Commitment

Ma & Yuen (2011a) defined perceived online attachment motivation (POAM) as "the degree to which an individual believes that he or she can improve his or her social interaction and sense of communion with others on an online learning platform," and perceived online relationship commitment (PORC) as "the degree to which a learner tends to continue with an established relationship in an online learning environment" (p.119). As relationship commitment is a social context could be outside the classroom but could facilitate their communication through social media platforms. However it should be noted that individuals may not always be accepted into relationship, and may instead be ignored, excluded or rejected by others. Specifically, studies found that ignored individuals feel bad and lose a sense of belonging, both in the physical world (e.g., Smith & Williams, 2004) and on the Internet (e.g., Williams et al., 2000). These findings are consistent with the observations in online learning research of online participants who feel isolated or lonely (Lofstrom & Nevgi, 2007). This element of universality is also the fundamental value of social media platforms, once they participate into the relationship that built up within the platform, they tend to keep on with this established relationship and exchange information with their circles of friends.

2.3 Trust and Online Knowledge Sharing Behavior

Trust is a common factor which we often found in previous studies (e.g., Chan & Ma, 2013). Trust is thoroughly tested in the context of online shopping. There is study that puts emphasis on the importance of building trust on consumer generated review sites (e.g., Matzat & Snijders, 2012). Studies also examine the users' perceived interactivity as well as perceived web assurance particularly (e.g., Wu, Hu, & Wu, 2010). The mentioned studies focus largely on the channel's characteristics. While Barber (1983) defined trust as "people have of each other, of the organizations and institutions in which they live, and of the natural and moral social orders, that set the fundamental understanding for their lives". Social media platforms are is also considered as the virtual world for people to put trust on to build up another social circle. Trust is also defined as "the willingness of a party, instructor, to be vulnerable to the actions of another party, trustee based on the expectation that the other, trustee will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party, trustee" (Mayer, Davis, & Schoorman, 1995). Trust's constructing factors include benevolence, integrity and ability. Existing literature on the topic of trust focuses largely on how trust could be created but neglect the prominent effect that brings after trust is generated. In this research, it will possibly help to explore more of the aspect of how online knowledge sharing behavior could be enhanced.

2.4 Gender Differences on Online Knowledge Sharing Behavior

It is notable to see that gender differences were well explored by the previous studies in different context (e.g., Ma & Yuen, 2011b). First, it was discussed in forum communication and it is found that,

emotional difference between the two genders, previous literature has found that women tend to express more intensely positive emotions such as happiness, love, and life satisfaction than men (Zhang, Dang & Chen, 2013). This suggests that women are more willing to share their own feelings in an online platform. Also, study also stated that women, compared to men, are generally more frequent computer-mediated communication users. Compared to men, women prefer and more frequently use text messaging, social media, and online video calls (Kimbrough, et al., 2013). The female groups of interviewees were reflected in the study that they are more socially interactive in the web and the frequency is higher. In addition to that, for the online shopping, when trust emerges, it has a stronger influence on the shopping intentions of women than men. While females have the trust for the platforms, they would likely to interact or even purchase from the online platforms (Awad & Arik, 2008).

Therefore, we proposed the below hypotheses to be tested in this study:

H1: The perceived attachment motivation of an individual user on a social media platform will have a positive effect on his or her perceived online relationship commitment on the social media platform.

H2: The perceived online attachment motivation of an individual user on a social media platform will have a positive effect on his or her on the social media platform.

H3: The perceived online relationship commitment of an individual user on a social media platform will have a positive effect on his or her knowledge sharing behavior on the social media platform.

H4a: The perceived trust of an individual user on a social media platform will have a positive effect on his or her knowledge sharing behavior on the social media platform.

H4b: The perceived trust of an individual user on a social media platform will have a positive effect on his or her perceived online relationship commitment on the social media platform.

3. Methodology

3.1 Background, Subjects & Data Collection

In this study, the subjects whom were explored are all secondary student graduates using social media tools. The study implemented a survey instrument to 492 high school student graduates when they queued and applied to a local university in Hong Kong. It was believed that a study of these subjects would not only provide a profound understanding of the heavy social media users, but also brought insights to explore the use of social media among the mass population. The questionnaires were printed and distributed to high school graduates who were queued and applied to a local university. After they finished all the application procedures, they were distributed a hardcopy of a questionnaire and were requested to complete the questionnaire voluntarily before they left. Most of the students spent less than 10 minutes to complete and to return the questionnaire right after. Over the three day survey period, a total of 492 completed questionnaires were collected.

3.2 Measurement Items

The questionnaire was designed to adapt previously validated scale. Specifically, five items of perceived online attachment motivation (POAM), five items of perceived online relationship commitment (PORC), and five items of online knowledge sharing behavior (OKSB) (Ma & Yuen, 2011a); nine items of trust (TRUST) (Bhattacherjee, 2002) were included in the questionnaire. All items were measured on a 7-point Likerts' Scale, with 1 as strongly disagrees and 7 as strongly agree. Subjects were also asked their self-reported usage on mostly commonly used social media. They were divided into three categories, including frequency per month, duration per month, duration of each login. The degree of current usage of computer was measured in 7-point Likert's Scale. At the same

time, subjects were asked to state demographic data in the first part of the questionnaire, including sex, age range, net knowledge and how many years they start to surf the net.

4. Findings

4.1 Descriptive Summary of Respondents and Observed Variables

There were 135 male (27.4%) and 357 female (72.6%), with mean age of 18.44. Their most frequently used social media was Facebook (88%) while others altogether were 12%. Online social media use descriptive statistics of the respondents are presented in Table 1 and variables in Table 2.

Table 1. Descriptive statistics of the respondents (N=492)

In the last week,…	*M* (1-10) (*SD*)
how often did you visit there?	7.16 (2.193)
how often did you use the message inbox there?	4.37 (2.532)
how often did you chat there?	4.15 (2.476)
how often did you make comment(s) there?	4.08 (2.391)
how often did you upload photo(s) there?	3.49 (2.466)
how often did you share news there?	3.39 (2.283)
how often did you post messages to all friends there?	3.27 (2.331)
how often did you edit your profile there?	2.86 (2.056)
how often did you share music there?	2.44 (2.094)
how often did you upload video(s) there?	1.95 (1.674)

4.2 Reliability and Validity Testing of Variables

We tested the instrument by its reliability and validity. Cronbach's alpha is generally the most appropriate type of reliability measure for survey research that involves a range of possible answers for each item (McMillan & Schmacher, 1989). All constructs satisfied the criteria of reliability and supporting internal consistency (alpha>0.70) as suggested by prior literature (Nunnally & Berstein, 1994). Discriminant validity is demonstrated if an item correlates more highly with items within the same factor than items in a different factor. The factor components were then analyzed by confirmatory factor analysis. All factor loadings were listed in Table 2 and were found significant. Measurement models for each construct were tested and all exhibited good goodness-of-fit indices.

4.3 Model testing Results

LISREL is a software product designed to estimate and test statistical models of linear relationships among latent and manifest variables using Structural Equation Modeling. It is an extremely powerful structural equation modeling technique that has been used extensively in research (e.g., Ma & Yuen, 2011a). LISREL was then used to analyze the survey and to perform the analysis towards model testing. The model fits the data well with Chi-square to degree of freedom ratio 2.895 (suggested <3); Standardized Root Mean Square Residual (SRMR) 0.058 (suggested <0.08 when N>250, number of observed variables > or = 30); Root Mean Square Error of Approximation (RMSEA) 0.061 (suggested <0.7); CFI 0.92 (suggested >0.90 where the goodness-of-fit indices were exceeded the threshold suggested by prior literature (Hair et al., 2010, p.672).

For both the male and female groups, Perceived Online Attachment Motivation had no direct significant effect on Online Knowledge Sharing Behavior, but fully mediated by Trust and Perceived Online Relationship Commitment. The total indirect effect from Perceived Online Attachment Motivation to Online Knowledge Sharing Behavior was 0.21 (=0.45*0.47) via Perceived Online Relationship Commitment.

Table 2. Descriptive statistics and confirmatory factor loadings of the constructs

	Min	Max	Mean	Std. Dev.	Cronbach's Alpha	Factor Loadings
Perceived Online Attachment Motivation (POAM)						
POAM1	1	7	3.52	1.366	0.879	0.73***
POAM2	1	6	3.25	1.271		0.75***
POAM3	1	7	3.46	1.313		0.84***
POAM4	1	7	3.85	1.405		0.79***
POAM5	1	7	3.76	1.362		0.79***
Perceived Online Relationship Commitment (PORC)						
PORC1	1	7	4.00	1.441	0.879	0.82***
PORC2	1	7	4.01	1.384		0.85***
PORC3	1	7	3.79	1.327		0.86***
PORC4	1	7	3.37	1.431		0.65***
PORC5	1	7	3.64	1.366		0.76***
Online Knowledge Sharing Behavior (OKSB)						
OKSB1	1	7	4.21	1.240	0.898	0.78***
OKSB2	1	7	4.28	1.233		0.83***
OKSB3	1	7	4.12	1.224		0.83***
OKSB4	1	7	4.10	1.183		0.85***
OKSB5	1	7	3.95	1.148		0.81***
Trust (TRUST)						
TRUST 1	1	7	3.97	1.149	0.867	0.82***
TRUST 2	1	7	4.13	1.172		0.70***
TRUST 3	1	7	4.38	1.112		0.70***
TRUST 4	1	7	4.07	.997		0.70***
TRUST 5	1	7	3.65	1.234		0.47***
TRUST 6	1	7	3.85	1.034		0.56***
TRUST 7	1	7	4.40	1.127		0.59***
TRUST 8	1	7	4.28	1.121		0.60***
TRUST 9	1	7	4.19	1.118		0.58***

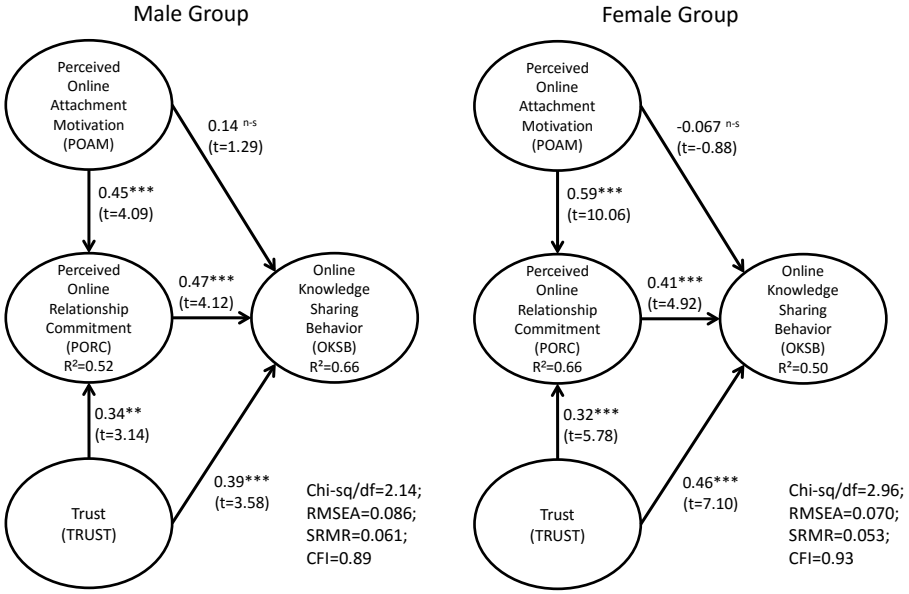
Perceived Online Relationship Commitment had a significant, direct and positive effect on Online Knowledge Sharing Behavior related to the use of social media, with a stronger standard path coefficient in the male group (β=0.47, $p<0.001$) than in the female group (β=0.47, $p<0.001$). Trust had a direct and significant positive effect on Online Knowledge Sharing Behavior, with a stronger standard coefficient in the female group (β=0.46, $p<0.001$) than in the male group (β=0.39, $p<0.001$).

5. Discussion

5.1 A Stronger Relationship between Perceived Online Attachment Motivation and Perceived Online Relationship Commitment from the Female Group

Take Facebook as an example; once they accepted your friend request, they deem you are one of their close friends that could check out their latest information. In this way, the serious they look at the circle of friends, they are more inclined to develop a long term relationship online. With more information shared with others, the updates will retain the eyes of the audiences and that leads to a longer

relationship (Zhang, Dang & Chen, 2013). Whereas, for men, what they share may not be too personal that could easily trigger off emotional attachment, what they share maybe the up to date news report or share somethings that they particularly interested in, say football matches results, tips for jobs, etc. In this way, female group once has a stronger and intensive social interaction, the more willing to develop their long term attachment with others online.



*p<0.05, ***p<0.001

Figure 1. Model testing results and path coefficients of the overall model.

5.2 Female Group's Trust on Social Media Platforms has a Stronger Factor in Predicting Online Knowledge Sharing Behaviour

It is of utmost importance to see that the female's trust helps put forward the online knowledge sharing behavior. Again, as discussed previously, trust's constructing factors include benevolence, integrity and ability (Mayer et al., 1995). Women, in the previous study, especially in the context of shopping behavior, while trust appears, they would more likely to purchase online. Once they trust the platforms, they will more frequently update the news of their life, including pictures and daily feelings. On the other hand, they will chit chat with the friends through the platform, including the instant messaging or through inbox. For the men, they share the knowledge with others, yet their behavior is not as impactful when comparing with women because they are less likely to use different method. E.g. online video calls and messaging to share what they thought (Kimbrough et al., 2013).

5.3 Male group, the Perceived Online Relationship Commitment has a Stronger Factor to Online Knowledge Sharing Behvaiour

Perceived online relationship commitment refers to what extent you want to retain a relationship with others. While users thought that they could maintain a longer relationship with friends, their knowledge sharing behavior will be ignited. From the previous study, they largely looked at it as a functional base, but here, we could see from the interpersonal perspective. Men, who are more willing to share their expertise and interests with their comrades, once they confirm the "long term friends/long term network", they not only could maintain the social network, but also being benefits in sharing what they would like to tell the others.

5.4 Limitations and further studies

In this study, the subjects are all high school graduates; the social media platform most frequently used is highly concentrated on one platform, Facebook; the use of social media is more confined to young adults and social use. The generalization of the results would need further studies in other subject domain, social media platforms, and online knowledge sharing context. Secondly, there may be other social and cultural factors that may have effect on the use of these subjects, for example, peer influence may appear as a relevant construct to young adults' behavior. Further studies may gain a wider perspective to understand the online knowledge sharing phenomenon by extend the model to include factors in social and cultural perspective.

6. Conclusion

This study examined the key determinants to online knowledge sharing, especially from the perspective of interpersonal relationship. The findings confirmed the significant relationships between perceived online attachment motivation and perceived online relationship commitment.

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Appendix

Perceived Online Attachment Motivation (POAM) (Ma & Yuen, 2011a)	
POAM1:	If I feel unhappy or kind of depressed, I usually try to around other members using the social media to make me feel better.
POAM2:	I usually have the greatest need to have other members using the social ILN around me when I feel upset in learning (subject).
POAM3:	I often have a strong need to be around other ILN users who are impressed with what I am like and what I do in (subject).
POAM4:	I mainly like to be around other ILN users who think I am an important, exciting person in learning (subject) together.
POAM5:	I often have a strong desire to get other ILN users around to notice me and appreciate what I am like in learning (subject) together.
Perceived Online Relationship Commitment (PORC) (Ma & Yuen, 2011a)	
PORC1:	I am committed to maintaining my relationship with other members using the ILN to learn (subject).
PORC2:	I want my relationships with other members using the ILN to learn (subject) to last for a very long time.
PORC3:	I feel very strongly linked to my relationship with other members using the ILN to learn (subject).
PORC4:	I would feel very upset if my relationship with other members using the ILN to learn (subject) were to end.
PORC5:	I seek the long-term future of my relationship with other members using the ILN to learn (subject).
Online Knowledge Sharing Behaviour (OKSB) (Ma & Yuen, 2011a)	
OKSB1:	The advice I receive from other members using the ILN has increased my understanding of (subject).
OKSB2:	The advice I receive from other members using the ILN has increased my knowledge of (subject).
OKSB3:	The advice I receive from other members using the ILN allows me to complete similar tasks in (subject) more efficiently.
OKSB4:	The advice I receive from other members using the ILN allows me to improve the quality of similar work in (subject).
OKSB5:	The advice I receive from other members using the ILN allows me to conduct similar (subject) tasks with greater independence.
Trust (TRUST) (Bhattacherjee, 2002)	
TRUST1:	Social Media has the skills and expertise to perform transaction in an expected manner.
TRUST2:	Social Media has access to the information needed to handle transactions appropriately.
TRUST3:	Social Media has the ability to meet most customer needs.
TRUST4:	Social Media is fair in its conduct of customer transactions.
TRUST5:	Social Media is fair in its use of private user data collected during a transaction.
TRUST6:	Social Media is fair in its customer service policies following a transaction.
TRUST7:	Social Media is open and receptive to customer needs.
TRUST8:	Social Media keeps its customer's best interest in mind during most transactions.
TRUST9:	Social Media makes good-faith efforts to address most customer concerns.

About the Author

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Online Knowledge Sharing and Psychological Well-Being among Chinese College Students

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Abstract: This survey study examines the relationship of online knowledge sharing and psychological well-being among undergraduate students in Hong Kong. A self-reported paper questionnaire was administered to a sample of 489 undergraduate students aged 17-25 from a local university. Online Knowledge Sharing Behavior (OKSB; Ma & Yuen, 2011) was adopted to measure the online communication of knowledge. There were two measures for psychological well-being – Satisfaction With Life Scale (SWLS; Diener et al., 1985) and Flourishing Scale (FS; Diener et al., 2010). Although the structural equation modeling (SEM) results showed online knowledge sharing significantly predicted life satisfaction and flourishing, it only accounted for very little variation in life satisfaction (1.3%) and flourishing (3.1%). The findings suggested that the positive effect of online knowledge sharing on psychological well-being has to be further investigated.

Keywords: Online knowledge sharing, Well-being, Life satisfaction, Flourishing

1. Introduction

Well-being is a long-lasting research of interest. It is a construct that concerns the optimal human experiences and functioning (Ryan & Deci, 2001). It is the meaning of life that anchors where we should go and live. The more we understand the factors related to well-being, the more we shall get hold of our own life. That is, it lets people to know what makes live worth living; for example, previous studies suggested that happiness is such one factor (King & Napa, 2008) and self-realization (Ryan & Deci, 2000).

Veroff & Veroff (1980) analyzed social incentives with a match to different developmental stages, including curiosity, attachment, assertiveness, social relatedness, belonging, consistency, interdependence and integrity. They suggested that individuals rated social incentives differently at different developmental stages. The factors to life satisfaction would depend on the stage and needs of an individual. Drawing from the theoretical grounds of prior studies, including Bowlby (1969) on attachment, Hill (1987) on affiliation motivation, and Baumeister and Leary (1995) on belonging, the social incentives of attachment, social relatedness, belonging and interdependence as suggested by Veroff and Veroff (1980), are very much general needs that could apply to young adults.

Note. This paper was earlier presented at and published in the proceedings of the HKAECT International Conference 2014 held in Hong Kong, in December 2014.

Previous studies have explored the relationship between young adolescents' online behavior and their social well-being but the reasons for such relationships need further investigation. For example, a study (Pea et al., 2012) on social well-being among 8-12 year old girls found that negative social well-being was positively associated with levels of uses of media that are both centrally about interpersonal interaction (e.g., phone, online communication) and not (e.g., video, music, and reading). Moreover, video use was particularly strongly and negatively associated with social well-being indicators. Media multitasking was also negatively associated with social well-being. On the contrary, face-to-face communication was strongly and positively associated with social well-being. Online communication with smartphone and computer allows anytime, anywhere social interactions among users, hence, facilitating more knowledge sharing if they wish. As both social contact and knowledge are two key social incentives to college students at their developmental stage, it is worth to further investigate the relationship between media use and social well-being of young adults.

There were prior studies (e.g., Ghaedi et al., 2010) focused on quality of life in college students. Although income and happiness have been consistently linked to well-being (e.g., Biswas-Diener et al. 2010; King & Napa 1998), these two well-being indicators might not be perceived as the most important by college students. For example, a study on college students using Facebook (Manago et al., 2012) found that larger networks and larger estimated audiences predicted higher levels of life satisfaction and perceived social support on Facebook (p.369). Another previous study (Royuela et al., 2009) found that workers' subjective perceptions of job satisfaction revealed a strong relationship with quality of work life. Similar to workers work, it is reasonable to expect college students' subjective perceptions of learning satisfaction would have a strong relationship with quality of their studying life even though studying is part of college students' life.

Together, social interactions and knowledge are two important needs of college students. The behavior of knowledge sharing is suggested to fulfill both of these needs simultaneously. Young adults have frequent social contacts with peers that fulfill their needs to belongings. According to an investigation by Kettinger & Grover (1997), 613 Internet-based respondents across 20 different countries from various backgrounds (education, business and government), categorizing the electronic communication patterns to three main usages, namely broadcast, task and social communication. Among college students, they are full-time students and their work is to study as well as to perform in learning tasks. Except broadcast which is more likely an instructor's use of electronic communication, college students would be fully engaged in task (knowledge exchange) and in social (social interactions or contacts) communication. Actually, knowledge sharing behavior involves the both processes of social interaction and knowledge exchange.

Previous literature suggested that knowledge sharing is defined as both understanding and application (Argote 1999; Darr & Kurtzberg 2000; Ko et al., 2005). While the heavy usage of online communication with respect to technological and communication advancement, Ma & Yuen (2011) developed and defined online knowledge sharing behavior as "The online communication of knowledge so that knowledge is learned and applied by an individual (p.212)." With respect to this definition, knowledge sharing behavior involves the process of communication, the learning behavior, and the application of the knowledge in future or other context.

In terms of well-being measures, Diener et al. (1985) developed the Satisfaction With Life Scale (SWLS) to focus on assessing global life satisfaction, while excluding positive and negative affects. The scale was found to correlate moderately to highly with other measures of subjective well-being. The scale was widely adopted (e.g., Vella-Brodrick et al., 2009; Gouveia et al., 2009) and was suggested to be appropriate to use across different age groups (p.71). Diener et al. (2010) also developed Flourishing Scale as a measure of well-being to assess psychological flourishing and feelings, including positive feelings, negative feelings, and the difference between the two (p.143). The scale is composed of 8 items, summarized to measure respondent's self-perceived success in important areas such as relationships, self-esteem, purpose, and optimism. The scale is suggested to converge well with measures of emotions and affective well-being. Together, the two scales represent good measures of well-being of the respondents.

Based on the above discussion, we argue that the process of knowledge sharing behavior provides a way to social contacts and communion with others so as to satisfy college students' needs to social interaction while the knowledge gained in the knowledge sharing process fulfills college students' social and cognitive needs and enhances their life satisfaction as well as supports them to flourish. In this study, we postulate,

H1: The more the online knowledge sharing behavior, the higher the well-being of college students.
H2: The more online knowledge sharing behavior, the higher the flourishing of college students.

2. Method

2.1 Participants

The participants of this study enrolled at the same university across four departments (communication, counselling and psychology, social work, and sociology). The researchers distributed 550 paper questionnaires and 489 undergraduate students filled out the survey (response rate = 88.9%). Among the participants, 72.4% were female students (n = 354) and 27.6% were male students (n = 135). The sample proportion of female to male is comparable to the overall proportion of the university that is 70 percent to 30 percent. The average age of participants was 20.31 (SD = 1.35) years old. Most of them were sophomores (16.2% in Year 1; 46.2% in Year 2; 31.7% in Year 3; 5.9% in Year 4). About 37% of participants have a religion belief (2.1% Buddhist; 3.5% Catholic; 31.7% Christian; and 0.2% other religion).

2.2 Data Collection

In the Fall semester of 2013, the researchers got the permission of the instructors across four departments (communication, counselling and psychology, social work, and sociology) at a private university in Hong Kong and went to different classes to administer the self-reported paper questionnaires. The researchers first explained the purpose of the study to the students and obtained informed consent from the participants. All participants understood that the participation in the survey was voluntary and they could withdraw from the study at any time without any consequences. On average, the students took about 10-15 minutes to complete the questionnaire. The entire data collection process was completed in two weeks.

2.3 Measures

Although the English version of the three measures used in this study have been validated by previous studies and the Chinese versions were available, the researchers still checked and modified the translation in order to ensure the face validity and readability for local college students. The items and sources for each measure are listed in Table 1 below. There are five items on the Online Knowledge Sharing Behaviors (OKSB1 – OKSB5), five items on Satisfaction With Life Scale (SWLS1 – SWLS5), and eight items on Flourishing Scale (FS1 – FS8). All items are rated on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The items of the three measures were mixed together to avoid response bias. In addition, demographic information of the participants was collected, including age, gender, year of study, and religion.

2.4 Data Analysis

Descriptive analyses for each item and each measure were conducted. Also, the internal consistency of each measure was examined using Cronbach's alpha. Confirmatory factor analyses (CFAs) were conducted to examine the construct validity of each scale and a hypothesized structural equation model (SEM) was established to examine the relationship between online knowledge sharing and well-being.

We conducted the CFAs and SEM using the Mplus Version 6.0 package (Muthén & Muthén, 1998-2010) and several goodness-of-fit indices, including Root Mean Square Error of Approximation (RMSEA, < .01), Standardized Root Mean Square Residual (SRMR, < .05), CFI (> .90), and TFI (> .90) were used to evaluate the fitness of the hypothesized SEM model.

Table 1. Items and Sources for OKSB, SWLS, and FS

Measures (Source)	Items
Online Knowledge Sharing Behavior (OKSB; Ma & Yuen, 2011)	1. The advice I receive from other members using the internet group/platform has increased my knowledge of the work. 2. The advice I receive from other members using the internet group/platform has increased my understanding of the work. 3. The advice I receive from other members using the internet group/platform allows me to improve the quality of similar work. 4. The advice I receive from other members using the internet group/platform allows me to conduct similar tasks with greater independence. 5. The advice I receive from other members using the internet group/platform allows me to compare similar tasks more efficiently.
The Satisfaction With Life Scale (SWLS; Diener et al., 1985)	1. In most ways my life is close to my ideal. 2. The conditions of my life are excellent. 3. I am satisfied with life. 4. So far I have gotten the important things I want in life. 5. If I could live my life over, I would change almost nothing.
Flourishing Scale (FS; Diener et al. 2010)	1. I lead a purposeful and meaningful life. 2. My social relationships are supportive and rewarding. 3. I am engaged and interested in my daily activities. 4. I actively contribute to the happiness and well-being of others. 5. I am competent and capable in the activities that are important to me. 6. I am a good person and live a good life. 7. I am optimistic about my future. 8. People respect me.

3. Results

Table 2 summarizes the descriptive statistics and Cronbach alpha values of the measures. For OKSB, the mean of each item was slightly above the mid-point (neutral), indicating that on average respondents slightly agreed with the statements. For FS, the averages suggested respondents mostly agreed with the statements. For SWLS, all items were above the mid-point (neutral) except item 5 ("If I could live my life over, I would change almost nothing"), indicating that on average college students would like to have a little change of their lives. The Cronbach alphas showed that all three measures had very high reliability (0.896-0.932).

Table 2. Descriptive Analysis of OKSB, SWLS, and FS

OKSB (n = 477)	*M (SD)*	SWLS (n = 486)	*M (SD)*	FS (n = 481)	*M (SD)*
OKSB1	4.41 (1.198)	SWLS1	4.97 (1.232)	FS1	5.06 (1.142)
OKSB2	4.21 (1.216)	SWLS2	4.89 (1.230)	FS2	5.05 (1.054)
OKSB3	4.15 (1.177)	SWLS3	5.00 (1.239)	FS3	5.08 (1.021)
OKSB4	4.14 (1.150)	SWLS4	4.74 (1.347)	FS4	5.09 (1.054)
OKSB5	4.17 (1.183)	SWLS5	3.71 (1.525)	FS5	5.11 (0.982)
				FS6	5.39 (1.061)
				FS7	5.14 (1.224)
				FS8	5.37 (0.958)
Cronbach α	0.932	Cronbach α	0.896	Cronbach α	0.915

Next, CFA using maximum likelihood estimation technique was performed to validate the constructs and the results are shown in Table 3. It is noted that the factor loadings of all construct items were statistically significant ($p < .001$). Furthermore, all the factor loadings of the three constructs were high or very high, except for item 5 (0.572) on the SWLS.

Table 3. Confirmatory Factor Analysis of the Constructs

OKSB	Factor Loadings	SWLS	Factor Loadings	FS	Factor Loadings
OKSB1	0.711***	SWLS1	0.855***	FS1	0.778***
OKSB2	0.874***	SWLS2	0.914***	FS2	0.748***
OKSB3	0.914***	SWLS3	0.923***	FS3	0.820***
OKSB4	0.916***	SWLS4	0.704***	FS4	0.653***
OKSB5	0.866***	SWLS5	0.572***	FS5	0.688***
				FS6	0.782***
				FS7	0.794***
				FS8	0.782***

Note. N = 487; ***$p < .001$

Finally, a hypothesized SEM model (see Figure 1) was tested to examine the relationship between online knowledge sharing behaviors and psychological well-being, namely, the direct effect from OKSB on life satisfaction as well as the direct effect from OKSB on flourishing. In addition, a bivariate relationship between life satisfaction and flourishing was added. For model testing, all goodness of fit indices (RMSEA of 0.065, SRMR of 0.036, CFI of 0.957, and TFI of 0.950) met the suggested criteria, indicating the hypothesized model fitted the data quite well. Next, we focused on the direct effect and explanatory power of using OSKB to predict psychological well-being. OKSB had significant positive effect on life satisfaction ($\beta = .115$, $p < .05$) and flourishing ($\beta = .176$, $p < .001$). Nevertheless, OKSB only accounted for only 1% of variance in life satisfaction and about 3% of variance in flourishing.

4. Discussion

4.1 Key findings

To summarize, there were two key findings for this study:

1. Online knowledge sharing behavior was significantly and positively related to global life satisfaction, utilizing the Satisfaction With Life Scale (SWLS). In other words, the more the online knowledge sharing behavior, the higher the life satisfaction of college students.
2. Online knowledge sharing behavior was significantly and positively related to respondent's self-perceived success in important areas such as relationships, self-esteem, purpose and optimism, utilizing the Flourishing Scale. That is, the more the online knowledge sharing behavior, the higher the self-perceived success of college students.

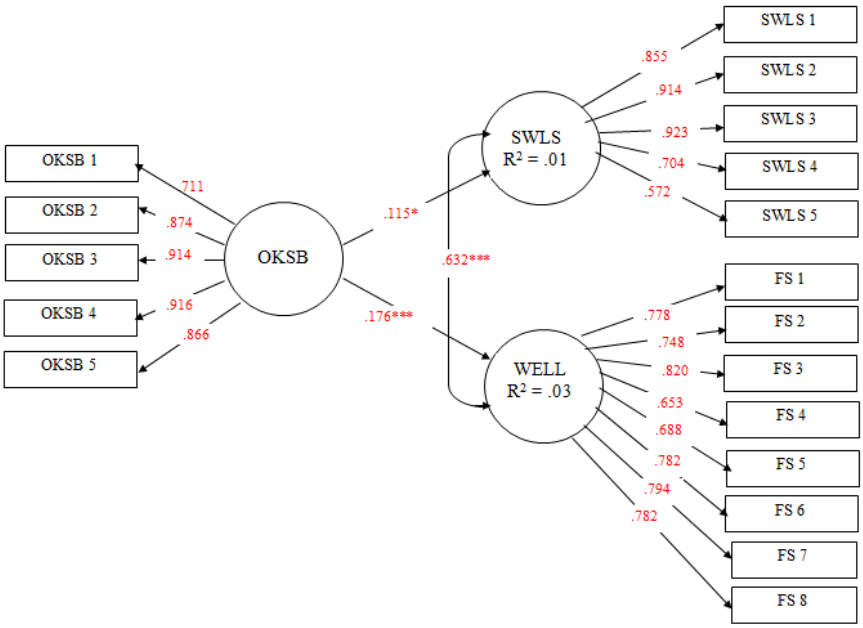

Figure 1. SEM Model for Online Knowledge Sharing and Well Being

The aim of the study is to explore factors contributing to well-being of college students. To answer this research question, the strategy is two folds. This study reviews literatures to understand needs at different life stages. While acknowledging that attachment, social relatedness, belonging and interdependence are among the important social incentives, this study focuses on social interaction and knowledge sharing as key possible areas of concern of college students. In addition, this study limits its scope within the college community and its respondents are individual college students. In real life, these full-time college students spend substantial amount of time on studying every day. This subject domain's regular daily tasks are all relevant to learning, collaboration and knowledge. Together, this study assumes knowledge sharing can significantly predict well-being of college students. Specifically, due to the heavy use of technology and online communication of individual college students, this study adopts an online knowledge sharing behavior scale to predict individual college student's well-being measured with their life satisfaction and their self-perceived success in relationships, self-esteem, purpose, and optimism.

The findings confirmed the significant positive relationship between online knowledge sharing behavior and satisfaction with life ($\beta = .115$, $p < .05$) as well as with self-perceived success in different aspects of life ($\beta = .176$, $p < .001$). Thus, the more the online knowledge sharing behavior involved, the higher the well-being of college students. In measuring online knowledge sharing behavior, there are actually three main components. Specifically, it measures online activities, it refers to a two-way communication, and it involves understanding and application of knowledge. That is, this study tries to incorporate social interaction and knowledge exchange in a specific online communication context of college students. The results also supported the theoretical grounds from Bowlby (1969) on attachment, Veroff and Veroff (1980) on social incentive, Hill (1987) on affiliation motivation, and Baumeister and Leary (1995) on belonging, in understanding the developmental needs of college students.

4.2 Limitations and further studies

The low predictive power of online knowledge sharing to well-being suggests that there are other possible factors related to the well-being of college students. This study did not consider more traditional factors to well-being, such as, happiness and income (e.g., Biswas-Diener et al. 2010; King & Napa 1998), as the study would like to target on specific factors to the college community and the learning context. However, more potential factors from both top-down and bottom-up dimensions should be included in further studies. In addition, this study only collected data from a local university and this may limit the generalizability of the results. Although the respondents in the present study came

from various departments and various years of study from the university, further studies may adopt a more rigorous random sampling procedure in order to get a more representative sample.

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Teachers' Experience and Attitudes for Educational Application: A Case Study of a Local Secondary School in Hong Kong

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Abstract: Since its first ICT education policy statement had been implemented in Hong Kong in 1998, the focus has shifted from equipping classroom with ICT to the use of technology at the right time for the right task. Currently teachers and students have ample opportunities to access and use free and commercial tools for education purpose. However, there is not much research on how teachers use them and what factors influence their adoptions. This study interviewed 9 teachers in different subjects in a local secondary school to examine what their experience and perceptions were for educational apps. It is found that teachers have a positive attitude to these apps and they are eager to learn more about them. Owing to the lack of time, good quality resources and training, we suggest successful case-sharing, well-organized workshops, and effective time use to increase teachers' confidence and develop teachers' capabilities.

Keywords: Educational application, Teachers' expectations and needs, Teachers' attitude and preference, Case study

1. Introduction

Since the new online App Store was established in 2008 (Info), the number of application software dramatically increased from 800 in July 2008 to 1,200,000 by June 2014 (Costello), and the software acquired a new popular name: App (Application). These apps enhance social networks among users, and educational apps also reinforce the learning relationships between teachers and students, support professional development, and facilitate content creation and sharing.

Secondary school students are the main target audience of these online educational apps. However due to the limitation of access to online accounts, most students feel more convenient to use the paid desktop apps or those on school iPads. But the target product that meets the teachers' need is not easy to find, because their preferences are for both teaching and learning. Some researches (Fullan, 1993; So[1] & Swatman, 2006; Wang, 2002) point out that the way teachers teach is a product of their own schooling, training, and experiences. If a teacher has not received the corresponding professional development to master the technologies they would use in class, they would not have the confidence to appropriately combine them with their pedagogical knowledge and content/subject knowledge (Archambault & Barnett, 2010; Graham et al., 2009; Koehler & Mishra, 2009). Therefore, Technological Pedagogical Content Knowledge (TPACK) helps teachers to have a deep understanding of the integration of

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technology with pedagogical knowledge and content knowledge when teaching (Koehler & Mishra, 2009). Their understanding will reflect on the selection of the technology, which will influence their teaching quality and students' learning improvement. Reciprocally, the corresponding influence will update teachers' pedagogical knowledge and content knowledge. Besides, there are many other dimensions affecting teachers' choice and use of the educational apps, such as attitude, expectations and needs, appropriate resources, training time, and support.

This study investigates teachers' experience, attitudes, and the factors influencing teachers' decision in selecting and applying educational apps. Some recommendations for schools were provided in order to help teachers increase their confidence and develop the capability for using educational apps for teaching and learning.

2. Method

2.1 Participants

A local secondary school was approached for this study as it was equipped with various facilities to support the e-learning environment and the new administration team is eager to promote ICT-based teaching and learning from a basic level to higher level. Moreover, the principle of this school is pretty favoring the integration of teaching and technology. Invitations were sent out in the school and 9 teachers (4 female and 5 male) finally participated in the study. Three of them teach science subjects (Science, Chemistry, Biology), five teach language subjects (Spanish, English and Putonghua) and one teaches handicraft Class (Design and Technology).

2.2 Data Collection and Analysis

Teachers were interviewed and each interview is about 15-25 minutes. Interview questions were semi-structured, and focusing on the issues such as "what the expectation do you like your students to achieve by using the apps" and "why do you want to use apps in your teaching". We summarize and sort out each teacher's interview into the five aspects: attitude, expectation, preference, influence factors, and support. According to these key words of different teachers in different aspects, we can conclude the teachers' general answer or thinking and the tendency they want to express on the attitude, expectation and preference. As for the influence factors, we list the educational apps that teachers are using in class currently. Then we count the number of users on each app to see the most popular apps in general, and discuss the reasons why most teachers would like to use them. Moreover, we separate the different subjects (science and language) to look at the popular apps again and analyze this preference based on TPACK. And for the support, we conclude with the teachers' experiences of support and what in their opinion would be an improvement.

3. Results and Discussion

3.1 Attitude & Preference

Teachers agree that the apps are necessary for teaching in e-learning environment. One Spanish teacher states "the daily life communication is limited while the apps help students to practice more than the traditional way". Yet, they prefer good quality, specifically-designed, official apps. One English teacher expressed "I don't like using too many platforms for my students, and I prefer the official resources". Therefore, teachers would like to use more appropriate educational apps that are suitable for their subjects. Before using these apps, teachers intend to try them intimately. One chemistry teacher said, "I would like to have a try to see whether they are appropriate for my class". All in all, these teachers have a positive attitude towards educational apps.

Google Apps is the most popular app among all teachers. It is because on one hand teachers can use school-based Google account to manage the day-to-day work, which is safe and easy. On the other hand, the aligned Google Apps allow teachers to combine general working and teaching through only one Gmail account, which saves teachers' time managing different files.

However, teachers' preference on using these apps varies in the different subjects. We separate the educational apps in two dimensions: creating and sharing. For example, Google Apps, J2E, and VoiceThread, these apps offer platforms for users to create original learning content and edit secondhand resources, or facilitate users management of learning materials. But like YouTube, e-book, and word-reference, the ownership of the resources in these apps belongs to others. The main purpose of these apps is as references to assist learning.

Table 1 shows that science teachers tend to use educational apps for creating and managing, whereas for language teachers, there is no obvious preference, which means they seemed like to use all kinds of apps that are appropriate for their teaching and learning.

Table 1. Teachers' preference on the educational application

Preference	Subject	
	Science	Language
For Creating and Managing	➢ Google Apps ➢ Nearpod ➢ Edmodo ➢ J2E ➢ Keynote ➢ Dropbox	➢ Google Apps ➢ Edmodo ➢ Three Ring ➢ Storytelling Apps
For Using and Sharing	None	➢ YouTube ➢ TED ➢ Word Reference ➢ Online Games

The subject of secondary school science is characterized by a tradition and requirement for practical work (Baggott la Velle, Wishart, McFarlane, Brawn, & John, 2007). Therefore, combined with the traditional pedagogical content knowledge, the benefit of educational apps in science education is "the models of the idealized system can be animated alongside a simulation of the real system to reinforce the relationship between practice and theory (McFarlane & Sakellariou, 2002)". In this school, science teachers like using Nearpod to have a real-time test to examine the students' performance on a particular area of knowledge. One biology teacher indicated that all the students can do the same things simultaneously, and importantly, the teacher can control the platform to use it for teaching, do a quiz or examination. It helps the teacher to analyze which part of the theoretical knowledge should be focused on immediately. Moreover, some teachers would like students to use apps like Google Apps, J2E, Keynote plus the stimulate experiment apps to record, manage, and present the experiments they do in class. Teachers intend students to learning by doing. However, at present, there is limited access to reliable subject-specific resources. A chemistry teacher said: "Some apps just like an e-book." Furthermore, although most teachers say they want to try more apps, the science curriculum is overloaded with content and the assessment requirements mean they lack of the time to experiment with more appropriate educational apps (Osborne & Hennessy, 2003).

Language teachers would like to use all kinds of appropriate apps on both the creating and sharing dimensions. As we can see from Table 1, these apps ideally provide opportunities for collaboration and interaction. A Spanish teacher indicated that game apps in Spanish offer opportunities for students to play by learning. Because students want to win the game, they have the motivation to use the wordreference to translate the language to understand the context deeply. But examples of sophisticated pedagogical thinking are explored to demonstrate that it is perhaps not so easy to transform the learning process with these apps (Gray, Pilkington, Hagger-Vaughan, & Tomkins, 2007). Although these apps provide a natural context for learner autonomy, that autonomy needs to be developed systematically, which teachers' instruction needs to be skillfully supported for learners to benefit from these apps

(Murray, 2005). One English teacher said, "Don't be too ambitious on the educational apps. Even if different teachers use the same apps, the learning outcomes or performance would not be the same". Because learning outcomes are set by each teacher, they choose the apps based on their own particular purposes.

> Perhaps what matters most is the individual teacher's 'feel' of how the changes that they are making are meeting their own personal priorities and needs; the technology becomes a tool in the ongoing organic development of the teachers' practice, rather than an instrument of imposed transformation. (Gray et al., 2007)

3.2 Expectation & Influence Factor

Teachers' expectations on educational application list as below:

- Enhance students' engagement and confidence
- Offer a better interactive environment
- Provide appropriate of good quality learning materials
- Give 1:1 feedback
- Help students' self-directed learning
- Access to learn in- and out-side school

If the teaching can be more interesting, and more engaging, students will be more motivated to learn (Cox, Preston, & Cox, 1999). Thus, teachers prefer to use the apps that have an interactive nature, because the interaction offers more opportunities for students to express their ideas, which engage them to take part in the activities and concentrate on the lecture. At the same time, teachers need good quality apps that meet the requirement of the specific subject learning outcomes, teaching and learning activities, and assessment tasks. Teachers are glad to see the apps that could help students' self-directed learning outside school. Furthermore, under the ICT experts' helping, teachers may create their particular apps based on both teachers' and students' needs in the future.

A number of factors were identified to influence teachers' choice of apps. These factors can be categorized as content factor and function factor.

Table 2. Influence Factors on choosing educational application

Dimension	Factors
Content	➢ Engagement/Interesting ➢ Access to retrieval ➢ Possess abundant continuous renewed database ➢ Pretty appearance
Function	➢ Easy to use/Convenience ➢ Real time presentation ➢ Monitoring/Tracing ➢ Collaboration ➢ Interaction ➢ Giving feedback

Both science subject and language subject teachers will consider convenience and engagement as the main factors to select educational apps. Specifically, science teachers also focus on the interaction (e.g. a Biology teacher mentioned she would use NearPod for group-based discussion, and a Chemistry teacher said he would like students to use all the apps to facilitate their group work), and language teachers are concerned with the real-time presenting function mentioned above (e.g. an English teacher intends to use Google Docs to present or edit the content in real time in class, another English teacher would like use TED videos to present the particular content for the students to practice listening). Beside, because of the nature of the subject, the Design and Technology teacher would like students to use whatever apps that will support their design.

As mentioned before, this school is at the initial stage of using educational apps in class. Teachers need more successful cases and more confidence in using the apps. First of all, due to the time limitations, the apps should be easy both for teachers and students to manage, assess and even trace students' learning. Otherwise, teachers' confidence in them would be reduced, which would affect the sustainable and scalable usage. Secondly, only if the students are interested in the class, can they concentrate on the lecture and interact with teachers. Then teachers would be more motivated in their teaching. Thirdly, science teachers prefer problem-based learning that calls for collaboration and cooperation. One chemistry teacher said, "I hope they can have a better discussion by using the apps on iPad." Yet, for language teachers, besides the factors of easy to use and engagement, they like the real-time presenting function because they can use apps to control the lecture when they have a general question or explanation. At last, in different stages of educational apps use, the influence factors are different. When the teachers' capability improves from the basic level to intermediate or advanced level, their attitude and confidence will change as well.

3.3 Support

Recently peer-working and networking as well as by the latest government approach to ICT training as "Hands-on support" is an efficient mode of sustaining professional development (Gray et al., 2007) in this school.

3.3.1 Peer-working

Science subject department is keener to use educational apps in this school. One chemistry teacher has expertise in ICT in education and he always holds some individual workshops for the other subject teachers based on their needs. One biology teacher said, "He will give me individual instruction on using these apps if I have problems" And ICT teachers will help peer teachers to deal with these apps as well. They have a positive influence on each other. However, as one teacher mentioned, they need more successful cases and more recommendations of appropriate resources. In addition to peer teacher support, peer schools experience sharing and exchange visits are also important to support ICT in education.

3.3.2 Networking

This school has a connection with Apple, Google, and some other commercial education-related companies. They will get help from these companies for professional development. One chemistry teacher said, "Sometimes, we have the training from the education department of Apple on how to use the apps on iPad." The networking with these companies helps school become aware of and select more appropriate educational apps. Nonetheless, these apps may be based on general usage instead of teacher-specific needs. And some teachers prefer the official educational apps rather than the commercial ones. For example, one English teacher expressed she would select the apps that were recommended by official authorities.

3.3.3 Government Support

The Education Bureau of Hong Kong will hold some conferences and workshops each term. Teachers have the opportunities to see what is happening in IT in education on some conferences, and learn some IT skills in some workshops. A Spanish teacher expressed that the workshops held by the government always teach a basic knowledge or skill that did meet some skillful teachers' expectations.

Above all, although teachers get the support from different dimensions, the support do not cover all the teachers' needs. We should give school-based support that is more suitable to the school e-learning background and digital culture.

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