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Communications in Computer and Information Science 407

Knowledge Sharing through Technology

8th International Conference on Information and Communication Technology in Teaching and Learning, ICT 2013
Hong Kong, China, July 2013, Revised Selected Papers

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ISSN 1865-0929 e-ISSN 1865-0937
ISBN 978-3-642-45271-0 e-ISBN 978-3-642-45272-7
DOI 10.1007/978-3-642-45272-7
Springer Heidelberg New York Dordrecht London

Library of Congress Control Number: 2013955356

CR Subject Classification (1998): K.3, H.4, H.5, H.3, I.2, J.1

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

This edited volume consists of extended papers selected from the 2013 International Conference on ICT in Teaching and Learning (ICT 2013). As the conference theme highlights, the contents of the papers discuss issues of "Knowledge Sharing Through Technology." They explore the sharing of knowledge with innovative technology and effective pedagogy.

Knowledge sharing, the exchange of knowledge among individuals, has become an integral part of modern education. By implementing an integrated approach to identifying, capturing, evaluating, retrieving, and sharing one's information assets, along with the support of effective pedagogy and innovative technology, teaching and learning can be effectively enhanced. By unleashing the potentials of related tools and means, online education can be taken to a new era.

In this volume, the papers are organized into four groups, namely, Management and Application of Open Education Resources, Application of ICT in Support of Knowledge Sharing, Application of Mobile Devices and Social Media to Knowledge Sharing, and Knowledge Sharing for Teaching and Learning.

Our many sincere thanks go to the Organizing Committee of the conference for their effective administration and unfailing support. Our great thanks also go to the Program Committee. The high quality of this book could not have been maintained without their professional comments and advice in the paper-review process.

September 2013

Jeanne Lam
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Two Different Types of Corpora: Japanese Students' Perceptions

Yoko Hirata[1], Yoshihiro Hirata[1], and Paul Thompson[2]

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Abstract. The recent interest in utilizing a large collection of authentic electronic language resources, called a corpus, has increased in tertiary institutions to facilitate student language learning. The examination of a corpus has made it possible for students to analyze multiple language examples and the patterns of co-occurred words. This approach, referred to as 'data-driven learning', assists students in becoming more aware of language use and patterns of various forms. This paper outlines the research conducted for the purpose of examining how Japanese students perceive the efficacy of exploring different types of corpora: one corpus familiar to students, and the other, the Brown Corpus which was unfamiliar to students. Specifically, the focus was on examining the relationships between the students' proficiency levels and their perceptions of using different types of corpora.

Keywords: Corpus-based tasks, Language learning, Education resources.

1 Introduction

Due to the recent development of computer technology, various changes in linguistics research and the teaching of languages have been made. The use of corpora is one of them. A corpus, the singular form of corpora, is "a large, principled collection of naturally occurring texts that is stored in electronic form" (Conrad, 2005; 394). These texts include academic books, journals, novels, newspapers, magazines, blogs, recorded conversations, interviews and much more (Lee, 2010). Various types of English corpora have been developed such as 'Bank of English', 'Corpus of Contemporary American English (COCA)', 'British National Corpus (BNC)', 'American National Corpus', 'International Corpus of English', and 'Brown Corpus', etc. Recent studies have shown that the examination of corpora has been proven to be effective in understanding multiple language examples and the patterns of co-occurring words. Resultantly, corpora have been used in the teaching and learning of languages (Chambers, 2005; Gaskell & Cobb, 2004; Vannestål & Lindquist, 2007), and this approach is referred to as 'data-driven leaning' (DDL), a term coined by Johns (1991). In order to analyze language patterns and forms captured in a corpus,

J. Lam et al. (Eds.): ICT 2013, CCIS 407, pp. 1–15, 2013.

a computer search tool called a 'concordancer' is utilized. This tool enables one to create contexts for a particular language item in the form of a keyword-in-context (KWIC) concordance (Flowerdew, 2012).

As corpora are increasingly applied in the language classroom, the benefits of implementing DDL are well documented in the corresponding literature. DDL has proven to be beneficial to students in the following ways. Firstly, as Gilquin and Granger (2010) have shown, DDL provides students with a large number of authentic examples in the classroom. Stubb (2001) emphasizes the importance of concordances which reveal more reliable facts about frequency and typicality of words than those given by the native speaker's intuition. Secondly, DDL assists students in providing feedback and correcting errors, such as idiomatic phrases and lexico-grammatical patterns in their own writings (Gaskell and Cobb, 2004: Chambers & O'Sullivan, 2004). Gilmore (2008) introduced corpora, such as BNC and the COBUILD Concordance and Collocations Sampler, into an English writing class in Japan in order for students to take process-based writing approaches. The results have suggested that using corpora for correcting errors in writing is appropriate for visually-oriented students. Since DDL enables students to encounter an enormous quantity of contextual words and expressions, it also helps students retain them in their long-term memory (Nation, 1990). Thirdly, DDL "makes learning more motivating and more fun" (Gilquin and Granger, 2010, 359). Hirata & Hirata (2007) point out an efficacy of corpus-based study which causes students to make their own discoveries about actual language use in a student compiled web-derived corpus. In addition, Hunston (2002) claims that DDL assists students in encouraging inductive learning approaches which include making observations about data, testing hypotheses and formulating language rules. Furthermore, DDL is assumed to enhance student autonomy and support individualized learning (Gitsaki, 2005). DDL encourages students to be more active rather than passive (Chambers, 2010) and assists student lifelong learning without the help of the instructor (Boulton, 2012).

Despite the aforementioned potential benefits of the use of corpora in the teaching of language, having been extensively discussed, many studies have displayed various challenges regarding the implementation of DDL in the classroom. Owen (1996) criticizes the descriptive teaching based on the evidence in corpora and states that the instructor's intuitive prescription is more important and essential. In addition, the majority of studies on corpus-based teaching have indicated that DDL is suitable only for advanced students (Aston, 1995: Wichmann et al., 1997). Furthermore, it has long been argued that concordance examples fail to provide students with situational and communicative contexts (Cheng et al., 2003). In addition, Geist & Hahn (2012) claim that students' "ability and motivation to use the corpus" differ from one another and critically they depend on individual students' preferences (p.130). Their research findings also stress the importance of investigating "a suitable corpus and the length of the teaching unit" as a future study. Another similar problem with DDL includes a small corpus size, students' perception of corpus work as tedious and a need for analytical skills (Chambers, 2005). Another difficulty students encounter when conducting DDL is the lack of effective analytical tools. Philip (2011), when examining the efficacy of language tools for DDL, found that few students had preferred a concordancer as the main reference tool when studying English. Due to these potential drawbacks in implementing DDL, as Szendeffy (2005) claims,

few language instructors have employed DDL in the classroom as an effective approach for language learning. Boulton (2011) examined how effectively students used various corpora to write a 20-page report. The findings suggested that providing students with an opportunity to choose an appropriate corpus is important to enhance the flexibility of a student's language learning process. In addition, individual student perception of different types of corpora is another important factor for the instructor to determine whether students can fully benefit from the activities. More research should be done concerning the examination of different kinds of corpora to promote students' self-motivation and self-direction in their language learning.

2 Purpose of the Study

The purpose of this study is to examine Japanese undergraduate students' perceptions of using different types of corpora. The different corpora being 1) a familiar corpus, and 2) the Brown Corpus which is unfamiliar. The focus was placed on understanding the relationships between the students' views on English study and educational backgrounds and their perception of using different types of corpora

3 Methodology

3.1 The Setting and Student Profiles

In this study, there were 45 participants who were lower intermediate learners of English enrolled in an English course in a Japanese university in 2012. The study consisted of 20 male and 25 female full-time students, 18–22 years old. The course the survey was conducted in was an elective English course, and the students belonged to different faculties: Humanities, Economics, Law, and Engineering. The course was a two-semester blended learning course consisting of both an instructor-directed, face-to-face learning environment, and an independent online environment. Although the objective of this course is to help students develop their general English skills, focus was placed on their improvement of lexical skills. In addition, the purpose of the students taking this course was to gain a high score on the Test of English for International Communication (TOEIC). The student survey carried out during the course indicated that almost 67% of students planned to take the test within a year. This course was offered weekly for ninety minutes in a computer-assisted language learning (CALL) classroom. Approximately 25% of students stated that their computer skills were high. Although not all students' computer skills were high, they possessed sufficient knowledge of Web browsers and acquired computer literacy to be able to use a concordancer. In addition, none of the students had previous experience using online English-English dictionaries, nor engaging in DDL activities before taking this course.

3.2 Procedures

The project described in this study was divided into two stages. In the first stage, which took place in the first semester, students were required to complete TOEIC

exercises using the textbook entitled *The Next Stage to the TOEIC Test --- Intermediate* (Kinseido, 2011). This textbook is a conventional test-preparation book and is comprised of vocabulary, listening, grammar and reading exercises. The textbook contains fifteen units with various language exercises, including multiple-choice questions and fill-in-the-blank comprehension tests. Subsequently, students analyzed a corpus, compiled by the instructor based on the text data provided by the textbook, using a concordancer called *Lex* (Hirata & Hirata, 2007). *Lex* retrieves and displays lexical combinations from any kind of text data. This program searches and extracts all the occurrences of a certain key word or phrase in a corpus. The search results can be displayed in a plain text document. Key words are displayed with approximately six words on either side. This program has been designed specifically for students without any corpus investigation experience. Furthermore, students were required to identify eight basic verbs, including phrasal verbs in the textbook, which they didn't fully understand the meaning or usage of. Students were also required to examine recurrent lexical patterns of the verbs. Prior to this task, the instructor explained the basic concepts and techniques for DDL tasks. In addition, a sample DDL example was presented to the students concerning how to examine lexical forms from the corpus. The instructor emphasized the importance of identifying collocations and other lexical combinations associated with the targeted verbs. Students were encouraged to understand how basic verbs and phrases were used in the contexts they had previously encountered in the classroom. In addition, the instructor highlighted typical English problems the students might have experienced in secondary school, and explained how corpus-based tasks might ameliorate some or all of their problems.

In the second stage, which took place in the second semester, students were required to analyze collocations and lexical combinations of the same verbs they had analyzed in the first stage using the Brown Corpus. The Brown Corpus was compiled in the early 1960s, as a readily available general corpus, with one million words of written American English (Reppen, 2010, p.3). Although the corpus consists of 500 samples, collected from 15 text genres, only genre K, containing fictions such as 'novels' and 'short stories', was used as a corpus. Genre K was specifically chosen so to make students analyze similar contents of the two different corpora and familiarize them with materials similar to that of TOEIC. The students were divided into two groups: 1) those who completed the first corpus task (using a familiar corpus) successfully, and 2) those who completed the task unsuccessfully. In the present study, those who completed the first corpus task successfully are defined as 'upper level students', and those who completed unsuccessfully are defined as 'lower level students'.

3.3 Questionnaire Survey

A questionnaire survey was conducted at the end of the course. This post-course questionnaire survey aimed to collect students' comments and opinions on the tasks they had completed throughout the course. The questions in the questionnaire were based on the previous study examining students' attitudes to learning grammar (Jarvis and Szymczyk, 2010). The questions were divided into two sections, 1 and 2, and were written in Japanese. The section 1 includes nineteen questions regarding 1) students' views upon the DDL tasks utilizing two different corpora and 2) students' views on *Lex*. The rating scale used in the section 1 was a 10-point Likert Scale with 1

representing "strongly disagree" and 10 representing "strongly agree". The responses were totaled and averaged. Standard deviation was then obtained for the purpose of examining statistically significant differences between students' responses. The section 2 in the questionnaire includes four questions, such as 1) what do you think about understanding the meaning of lexical phrases such as 'make use of" and 'get rid of'?, 2) what do you think about acquiring lexical skills using word lists?, 3) what do you think about using *Lex*?, and 4) what do you think about using the Brown Corpus?

4 Findings

The number of students who completed the first corpus task successfully was twenty three, and those who completed the task unsuccessfully was twenty two. The data collected from the students is presented below. As shown in Table 1, compared with the lower level students, the upper level students were more likely to be able to notice

Table 1. Student views upon the DDL tasks utilizing a familiar corpus and the Brown Corpus

	Lower Level Mean (SD)	Upper Level Mean (SD)
Q1. I was able to notice what kinds of words are used with the key words in a familiar corpus.	4.82 (1.22)	6.78 (1.44)
Q2. I was able to notice what kinds of words are used with the key words in the Brown Corpus.	4.77 (1.27)	6.52 (1.47)
Q3. I was able to organize lexical findings by focusing on various language features utilizing a familiar corpus.	4.36 (1.84)	5.78 (1.54)
Q4. I was able to organize lexical findings by focusing on various language features utilizing the Brown Corpus.	4.59 (1.89)	5.65 (1.30)
Q5. Concordance lines derived from a familiar corpus allowed me to identify what type of context was associated with the key words.	4.36 (1.81)	5.78 (1.62)
Q6. Concordance lines derived from the Brown Corpus allowed me to identify what type of context was associated with the key words.	4.41 (1.47)	5.41 (1.82)
Q7. The uses of high frequency verbs presented in a familiar corpus and those presented in the Brown Corpus differs to each other.	5.05 (1.40)	5.41 (1.79)
Q8. The uses of high frequency verbs presented in the scripts and those presented in the Brown Corpus differs to each other.	5.36 (1.50)	5.13 (1.74)
Q9. Organizing lexical findings utilizing a concordancer continues to be effective in improving my lexical abilities.	5.27 (1.96)	6.57 (2.37)
Q10. My organization of lexical findings is more effective than consulting online dictionaries when understanding language uses and features.	4.23 (2.00)	5.48 (1.95)

(N = 45)

what kinds of words were used with the key words in both a familiar corpus and the Brown Corpus. When utilizing a familiar corpus, the Averages (±SD) of these responses were 4.82 (±1.22) (lower level) and 6.78 (±1.44) (upper level) respectively. When utilizing the Brown Corpus, the Averages (±SD) of these responses were 4.77 (±1.27) (lower level) and 6.52 (±1.47) (upper level) respectively. Likewise, the findings also indicate that, compared with the lower level students, the upper level students were more likely to be able to organize lexical findings by focusing on various language features utilizing both corpora. When utilizing a familiar corpus, the Averages (±SD) of these responses were 4.36 (±1.84) (lower level) and 5.78 (±1.62) (upper level) respectively. When utilizing the Brown Corpus, the Averages (±SD) of these responses were 4.41 (±1.47) (lower level) and 5.41 (±1.82) (upper level) respectively. On other hand, many students, regardless of their levels, recognized the fact that the uses of high frequency verbs presented differ in both corpora. Regarding the efficacy of organizing lexical findings resulting from the tasks, the upper level students more highly appreciate it, compared with the lower level ones. The Averages (±SD) of this response were 6.57 (±2.37).

Table 2. Students' views on *Lex*

	Lower Level Mean (SD)	Upper Level Mean (SD)
Q11. In order to improve lexical skills, utilizing *Lex* is more effective than a list of English words with corresponding Japanese counterparts word by word.	3.50 (1.79)	5.04 (1.80)
Q12. On comparison, findings resulting from *Lex* provide more learning opportunities regarding usages and features than those resultant from online dictionaries.	5.59 (2.11)	5.96 (1.61)
Q13. The effective utilization of *Lex* effectively depends on how one can utilize online dictionaries.	6.41 (1.50)	5.57 (1.93)
Q14. I firmly intend to utilize *Lex* in my future English study.	4.23 (2.47)	5.09 (1.83)
Q15. *Lex* is a user-friendly tool.	4.77 (2.39)	5.26 (1.76)
Q16. *Lex* helps me improve my lexical abilities.	4.68 (2.28)	6.09 (1.59)
Q17. *Lex* helps me improve my general English abilities.	4.59 (2.38)	5.39 (1.73)
Q18. If utilizing *Lex*, online dictionaries are indispensable.	6.36 (1.94)	6.39 (2.46)
Q19. The instructor should have given us more in-depth explanation concerning how to organize lexical findings utilizing *Lex*.	5.23 (2.43)	4.43 (2.02)

(N = 45)

The results presented in Table 2 show the students' views on the concordancer, *Lex* which they used when completing their tasks. The results indicate that, overall, the upper level students highly appreciated the efficacy of *Lex* when utilizing it for tasks. More specifically, the findings indicate that the upper level students thought utilizing *Lex* for their English study was more effective in improving their lexical skills than a word list. Besides, many upper level students thought *Lex* helped them improve their lexical skills. The Average (±SD) of this response was 6.09 (±1.59). The lower level students did not highly rated *Lex* for improving their lexical skills. The Average (±SD) of this response was 5.04 (±1.80). However, there was no difference between the upper and lower level students regarding what they thought about using *Lex* and online dictionaries when completing the tasks. The Averages (±SD) of these responses were 5.96 (±1.61) and 5.59 (±2.11) respectively.

As shown in Figure 1, with regard to the students' understanding of the meanings of lexical phrases, the majority of students stated that it is 'necessary' and 'important', whereas there were only a few students who thought it 'easy' or 'interesting'. It is clear that, regarding this particular question, the lower level students commented more negatively with responses, such as 'incomprehensible', 'difficult', and 'boring' than the upper level students.

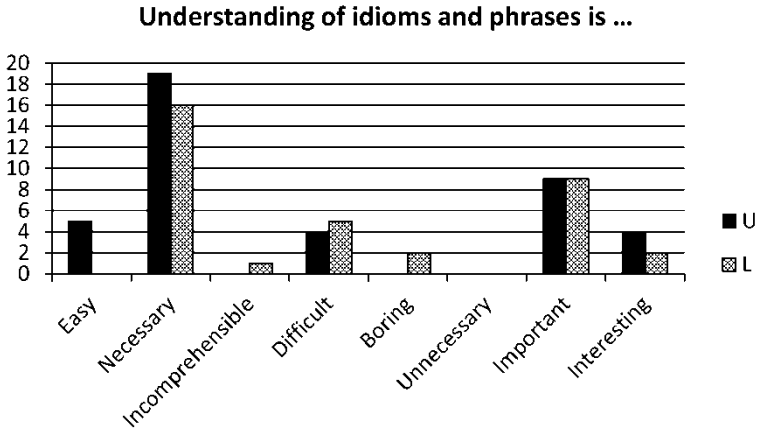

Fig. 1. Students' views on understanding the meaning of lexical phrases

As shown in Figure 2, many students thought acquiring lexical skills using word lists was 'necessary' and 'important'. The majority of students recognized the importance of gaining lexical skills for their English study. As the results indicated in Figure 1, however, there were only a few students who thought it 'easy' or 'interesting'. In addition, regarding this particular question, the lower level students commented more negatively than the upper level students.

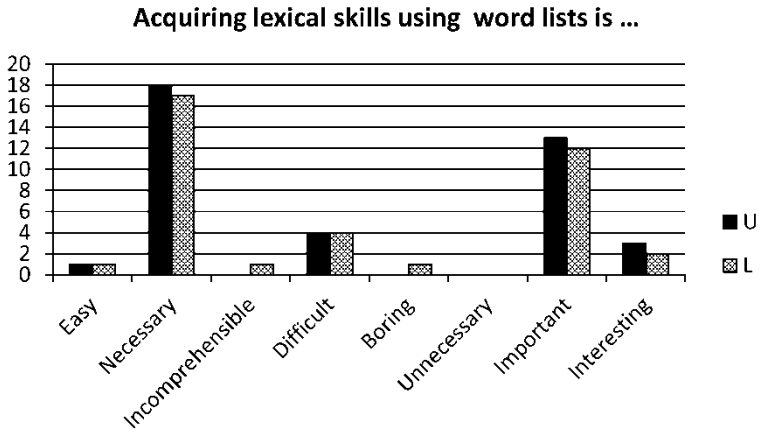

Fig. 2. Students' views on acquiring lexical skills using word lists

With regard to the use of a concordancer, *Lex*, students exhibited various responses. More than half of the students considered using *Lex* was 'necessary' or 'important'. On the other hand, regarding the usability of the system, their opinions were firmly divided: some students thought it 'difficult', while others thought it 'easy'. In addition, despite the fact that the students recognized the importance of accomplishing the assigned task using *Lex*, no more than 23% of the students declared that they didn't know why they had to use the system. Approximately 10% of the students thought using the system was boring. Furthermore, there was a larger number of lower level students who commented negatively on the system than that of upper level students.

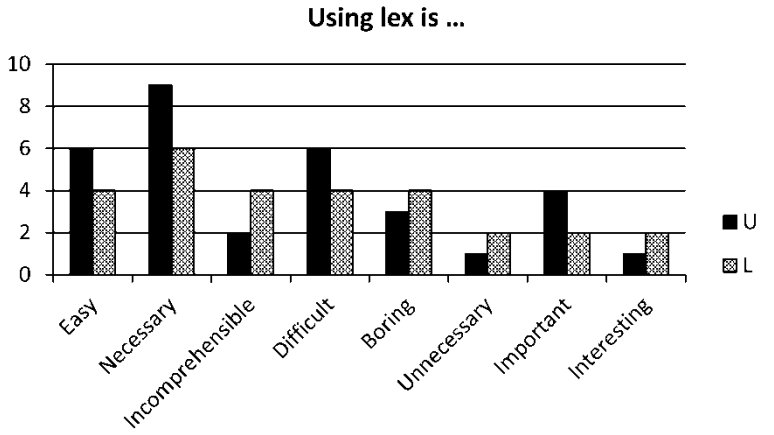

Fig. 3. Students' views on *Lex*

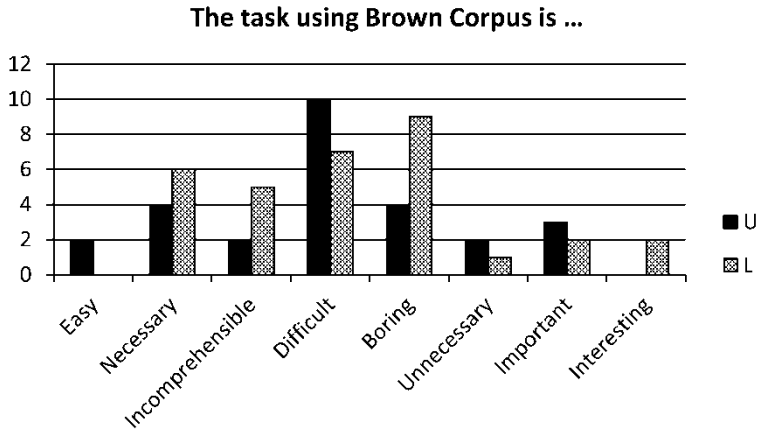

Fig. 4. Students' views on the task using Brown Corpus

Regarding the task of using the Brown Corpus, the majority of students thought it was 'difficult' and 'boring'. There were fewer upper level students who thought using the Brown Corpus was 'incomprehensible' and 'boring than lower level students. It is interesting to note that there were many upper level students who thought using the Brown Corpus was 'difficult' while none of them thought it was 'interesting'.

The results of the *t*-test do not show a significant difference between the students who perceived the efficacy of familiar corpus and those who perceived the efficacy of the Brown Corpus. Regarding the understanding of the meaning of lexical phrases, there is no significant difference between those two groups of students (t = .910; df = 44.n.s.). Regarding the capability of identifying what type of context was associated with the key words, there is no significant difference between those two groups of students (t = 1.034; df = 43. n.s.).

There was a moderate correlation (r < .6) between those who understood the meaning of idioms and phrasal verbs in the first semester and those who understood the meanings of idioms and phrasal verbs in the second semester (r = .739, n=23 p < .01). However, the results of the *t*-test show a significant difference between the upper level students and the lower level students. Compared with the lower level students, the upper level students understood the meaning of various language features utilizing Brown Corpus (t = -2.769; df = 43 p < .01). Compared with the lower students, the upper level students understood what kinds of words and phrases are used with the key words utilizing Brown Corpus utilizing *Lex* (t = -4.257; df = 43 p < .01).

As shown in Figure 5, there was a moderate correlation between those who understood the meaning of idioms and phrasal verbs utilizing a familiar corpus and those who understood the meanings of idioms and phrasal verbs utilizing an unfamiliar corpus (r = .739, p < .01). In addition, as shown in Figure 6, there was a moderate correlation (r < .6) between those who were able to organize their findings by focusing on various language features and lexical combinations utilizing a familiar

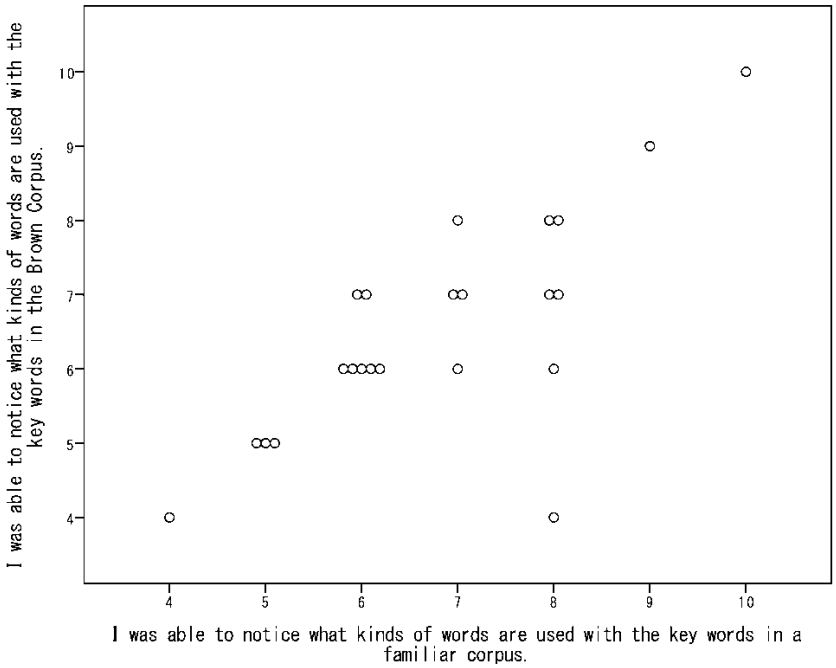

Fig. 5. A scatter chart regarding a familiar corpus vs. the Brown Corpus (Upper level students)

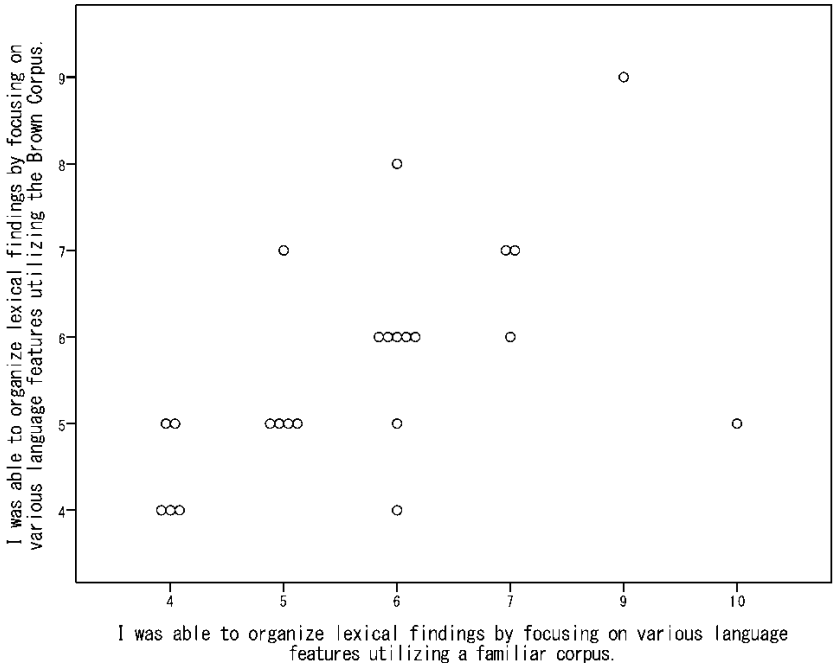

Fig. 6. A scatter chart regarding a familiar corpus vs. the Brown Corpus (Upper level students)

corpus and those who were able to organize their findings utilizing an unfamiliar corpus ($r = .552$, $p < .01$). Furthermore, the correlation of .867 was also significant between those who were able to organize lexical findings by focusing on various language features utilizing a familiar corpus and those who were able to organize lexical findings utilizing an unfamiliar corpus.

The students expressed distinct but different opinions about the corpus tasks utilizing *Lex*. Some students commented favourably about the tasks as follows.

> "Accomplishing this task was fun because this was one way of studying English I had never attempted by myself. I've learned that simple, easy words have many collocations and fixed expressions. I believe this is one of the ways I can grasp a greater understanding of English."

> "I think my vocabulary skills have been improved because of the tasks, even though I encountered words with similar meanings."

> "It is worth employing the use of *Lex* if you intend to gain vocabulary skills. However, it was a bit difficult for me to use the system"

> "Using *Lex* made me realize that a word has various meanings and helped me realize that I could look at words from different perspectives."

> "*Lex* helped me understand the meanings of words which I usually don't look up in my English dictionaries. I think my lexical skills have been improved."

> "Using *Lex* for English study is an effective learning methodology."

On the other hand, there were students who made negative comments about the corpus tasks using *Lex* as follows.

> "It was hard for me to understand how particular verbs were used in contexts, because the words/expressions around the keywords were unfamiliar to me."

> "Although the key-word-in-context (KWIC) approaches enable us to see the actual expressions before and after the keywords at the same time, it was difficult for me to understand the meaning of each line including a keyword, because the keyword wasn't in a complete sentence."

> "I wish the concordance examples were longer."

> "Working on concordance examples was time consuming, and there are several reasons why I think so. Firstly, in order to understand the concordance examples, I had to look up unfamiliar words associated with the key words many times. Secondly, the variety of the keyword usages were limited. I would prefer working on English dictionaries together with vocabulary exercise books or word lists. I don't think my lexical skills have improved."

Students' comments have shown that, regardless of different corpora, some students appreciated gaining lexical skills using *Lex*, and other students were not satisfied with the limited number of words and unfamiliar words provided by concordance examples.

5 Discussion of Findings

The present study was conducted on the premise that students would perceive the efficacy of different types of corpora for their English study. It was hypothesized that students would prefer a task with a familiar corpus to one with an unfamiliar corpus. However, one of the major findings from the survey indicated that there was no significant difference regarding the students' perception between a familiar corpus and an unfamiliar corpus. The results of the *t*-test show that the findings completely contradicted a previous study which indicated that the first use of concordance examples supports the second use of concordance examples (Boulton, 2009). In the present study, the results of Boulton's study are only applicable to the upper level students who completed the first task (using a familiar corpus) successfully. These students were also able to complete the second task (using an unfamiliar corpus) successfully. From a statistical point of view, it can be said that, overall, be it a familiar or unfamiliar corpus, both tasks were equally successful.

The findings and the comments provided by the students indicated that there were some who highly valued the corpus-based tasks regardless of different corpora. In fact, the comments regarding the efficacy of corpus-based tasks suggested that many upper level students perceived the enormous advantages of using concordance examples for their English study. There is a strong possibility that they understood the logical connection between the first and the second tasks. These students thought corpus-based tasks were more "helpful than traditional pedagogical information in recall" (Boulton, 2009, p.13). On the other hand, the students who had negative opinions about corpus-based tasks described their difficulties in understanding the meanings of words and phrases with a limited number of words given by each concordance line. These students were required to read English word by word in full sentence contexts in secondary education.

Although no statistical difference was discovered in the students' performance when using a familiar corpus and an unfamiliar corpus, the findings of the present study indicated that the upper level students completed both tasks with flying colors. This finding strongly suggests that the instructor should determine the pedagogical

impact of corpora upon different levels of students. In addition, this result indicated that the students' views on corpus-based tasks depend on their previous English learning experiences and these experiences clearly affect their perceptions of the tasks. As a result, the instructor should not consider a corpus simply as a reference tool to provide students with ample linguistic information and naturally-occurring examples. In the present study, no learner training was provided regarding how to utilize concordance examples for a student's own study. The guidance provided students with information on what corpus and corpus activities are like, and how students should engage in the tasks. More focus should be placed on providing students with learner training prior to working on corpus-based tasks. Furthermore, the findings suggest that it would take some time for some students to understand new concepts of the corpus study. It is important for the instructor to develop pre-corpus training to help eliminate a mismatch between the knowledge and attitudes that students possess regarding English learning and those that the instructor expects them to have. This learner-focused approach will assist students to reactivate their prior learning experiences and to facilitate their own language learning endeavors.

6 Conclusions

This study examines how Japanese university students perceive the efficacy of a familiar corpus and an unfamiliar corpus in order for the students to understand recurrent lexical patterns of target words. It also attempts to examine student views on DDL tasks with different corpora, and the relationships between the views of the students in the DDL achiever group and the DDL underachiever group. The results reveal that there was no major difference regarding the students' perception between a familiar corpus and an unfamiliar corpus. In addition, no strong connection between the students' views on corpus-based tasks and proficiency levels was discovered. The research reported in this paper is a preliminary and exploratory study conducted on forty-five students. However, it has provided new insights into the way the instructor develops corpus tasks for diverse students in different educational contexts. Further in-depth studies should be conducted to gain a more profound understanding of the long-term relationship between student performance using DDL approaches, and their educational effects on students. The implementation of learner training in DDL should also be further pursued by investigating students' preferred learning techniques and styles in DDL tasks.

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Open Educational Resources in Hong Kong

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Abstract. This paper attempts to review the status and development challenges of open educational resources (OER) in Hong Kong. It highlights that Hong Kong is provisioned with pervasive information technology facilities and broadband connectivity. Its education sector is advanced and well equipped with a robust technology infrastructure. Together with the population's ICT skills and educational institutions investments to promote the adoption of information and communication technology (ICT) in teaching and learning, these make Hong Kong an excellent breeding ground for OER. However, through examples of major types of online resources, this paper argues that the development of OER has been sluggish in the vibrant city. Also by reporting results of a survey conducted with people from a cross-section of the major tertiary institutions in Hong Kong, it highlights that educators' attitudes towards reuse and sharing of open content and material tend to be conservative. Based on these observations, this paper highlights a number of major challenges in the development and adaptation of OER in the city.

Keywords: Open education resources, digital resources, open content, open license.

1 Introduction

With the prevalence of digital cultures, wide adoption of information and communication technologies in education and the latest copyright practices, increasing amount of serious attention are being paid to the snowballing momentum of the development and utilisation of educational materials that are openly shared and distributed over the Internet. Such materials have been commonly referred as open educational resources (OER), and are playing an increasingly important role in education (Anderson, 2013; Murphy, 2013; Vignare & Geith, 2013).

There are four basic and distinctive features of OER. First, OER are freely available to the public, which is one the key requirements for being "open". Second, the resources are for educational purposes; they are not for commercial endeavours. Third, they are content materials that may take a wide variety of forms: learning objects, study notes, video or audio records of lectures, lists of references, as well as not-for-study teaching materials such as lesson plans and syllabi. They can be in the formats of text, audio, video, computer animation or other formats. They can be very

J. Lam et al. (Eds.): ICT 2013, CCIS 407, pp. 16–25, 2013.

small in scale, covering only one learning point or an exercise. Or they may be very extensive, consisting of all of the learning and teaching contents for a year-long course. Last but not least, such resources are all accessible on the internet.

Within its length limit, this paper discusses the development status of OER in Hong Kong. It provides a brief analysis of the development potential of OER. It quotes examples of freely accessible educational resources and offers a preliminary analysis of their development in terms of their openness so far. It also reports a survey on tertiary educators' employment of OER. In the final part of the paper, it discusses the problems confronting the development and proposes strategies that may facilitate OER use and growth in Hong Kong.

2 Hong Kong's OER Development Potential

Hong Kong, having a population of 7.17 million (Census and Statistics Department, 2013), is considered to be well-provisioned in its technology environment. As an advanced metropolitan, Hong Kong appears to be an ideal place for OER implementing.

In the small city with 1,085 square kilometres, it has as many as 193 internet service provider and household broadband penetration rate has reached 85.5% (Office of the Communications Authority, 2013). Its overall internet penetration rate is high and maintained at around 69% (Internet World Stats, 2012). With a mobile subscriber penetration rate of 228.4% (ie, on average, each person has approximately 2.3 mobile numbers) by March 2013, it had 10.7 million mobile subscriber accounts using 2.5G and 3G/4G mobile data network out of its 16.4 million mobile subscriptions (Office of the Communications Authority, 2013).

All schools have necessary ICT infrastructure and the Government has launched the Internet Learning Support Programme to help low-income families to acquire affordable computers, Internet access services and necessary internet skills (GovHK, 2012). In addition, the government has been investing substantially on ICT applications to education. For example, "a one-off grant of $200 million in 2008 was provided for schools to replace and upgrade their IT facilities and provided another one-off grant of $50 million in 2010 for schools to purchase e-learning resources" (Legislative Council Secretariat, 2013).

Higher education in Hong Kong has taken on a leading role in Asia and has built up a good reputation and recognition globally. Five universities from Hong Kong ranked in the top 200 globally while three ranked in the top 40 (QS World University Rankings: Overall in 2012). Also, universities in Hong Kong have taken three of the top five seats among Asian universities (QS Asian University Rankings: Overall in 2012). Relatively young universities, such as the Open University of Hong Kong (OUHK) and the University of Science and Technology, have both made distinguished achievements and received worldwide recognition in various ways.

While tertiary institutions differ in scale, student population, infrastructure and budgets, all universities have installed online learning management systems for courses. Such facility is usually provided by their IT services units, while the course design and pedagogy associated with the systems are supported by educational development units.

In addition, CreativeCommons Hong Kong (http://hk.creativecommons.org) was launched in October 2008. It is hosted by the Journalism and Media Studies Centre, the University of Hong Kong to promote the shifting of the traditional 'all rights reserved' to 'some rights reserved' model by means of an open content license. The existence of CreativeCommons licenses has laid a solid ground for the legitimate dispersal of OER and will enable users to freely adopt, adapt and redistribute materials.

It would be reasonable to expect that the faculties in universities and teachers in schools in Hong Kong would produce quality learning materials for their students, and that many of these products are OER. Yet, the reality is quite different and this is explained below.

3 Freely Accessible Online Content in Hong Kong

A close examination of the provision of freely accessible content for educational purposes sheds light on the actual openness of the material. There are many portals in Hong Kong offering content that bears the four basic and distinctive features of OER: freely available, for educational purposes, taking a variety of forms, and internet accessible. The following are some of the major ones.

Education Bureau Platforms

First, the most notable provider of OER is the Education Bureau (EDB) of the Government of Hong Kong SAR. It offers open content for primary and secondary schools mainly through three platforms: *Resource Banks* (http://www.edb.gov.hk/index.aspx?nodeID=79&langno=1), Interactive Activities DIY (http://diy.fwg.hk/teacher/exerciseCREATE.php) and a Resources Depository (http://resources.hkedcity.net/).

Resource Banks provides various free resources including: Learning and Teaching Resources, IT in Education, Kindergarten Teaching Resources, Native-speaking English Teacher (NET) Scheme and Resource Banks of Good Educational Practices. From the platform, a teacher can locate useful materials in any form, such as curriculum documents, visual materials for arts subjects, relevant music resources and drama reference. The platform also provides information about some useful learning activities conducted offline. It also offers links to other useful sites, such as Educational Television (ETV) (http://etv.edb.gov.hk/home-c.aspx) and EDB's YouTube Channels (http://www.youtube.com/user/edbgovhk).

Interactive Activities DIY contains learning resources that are developed by the EDB. There are different kinds of quizzes and tests including matching exercises, multiple choice, jumble sentences, reordering, sorting, fill-in-the blanks and so on. The site covers many subjects such as English, science, and technology and living. The learning objects or tools available on the website allow checking or viewing of answers, as well as restarting the activities.

The Resources Depository is a major component of the Hong Kong Education City (HKEdCity) website (http://www.hkedcity.net/index.php). It provides teachers, parents and students with a wide variety of learning resources, in the form of videos,

animations, PowerPoint files, and so on. It covers a broad range of topics, subjects and themes.

Institutional Portals to Assist Learning

Educational institutions, especially tertiary institutions, have developed a large number of online learning resources. Many of these resources are freely available for the public. One example is the English language learning resources provided by universities in Hong Kong. The following are some of these sites:

- *Learning Resources* of the Independent Learning Centre, Chinese University of Hong Kong (http://www5.cuhk.edu.hk/ilc/index.php?option=com_content&view=article&id=93&Itemid=6&lang=en)
- *Online resources* of the English Language Centre, City University of Hong Kong (http://www.cityu.edu.hk/elc/language_resources.html)
- *English for Professional communication* of the English Centre, University of Hong Kong (http://www4.caes.hku.hk/epc/)

Open courseware

Unlike the portals listed above, there seems to be substantially less open courseware. The major provider appears to be the OUHK. The OUHK offers OCW through its Free Courseware website (http://freecourseware.ouhk.edu.hk) and an external platform, iTunesU.

In OUHK's Free Courseware website, there are a large number of topics and units of open learning content. Visitors to the site may select a particular topic of interest. They may then follow the instructions and will be presented with the study content, which includes video and audio materials as well as texts and interactive exercises. Users will also be referred to relevant websites and other reference texts. Scattered among the course are learning activities and assessments (such as multiple choice questions, fill-in-the-blanks, quizzes and case study questions) which ask for learner inputs.

The OUHK joined iTunesU in 2010 and is one of the first institutions in Asia Pacific to make its content available on Apple's iTunes Store. Top universities and institutions such as museums, libraries and broadcasters around the world have been distributing their educational contents on the platform to students, faculty and the public. Contents on it can be easily searched, viewed, downloaded and played conveniently on mobile devices anytime, anywhere, in addition to being available on desktop computers. OUHK's content in iTunesU, accessible at http://itunesu.ouhk.edu.hk, includes contents for Chinese business law, basic Chinese, corporate governance, China studies, environmental studies and investor education.

4 Extent of Openness of the Educational Resources

Educational institutions in Hong Kong have made use of the internet technology to provide educational resources. The examples listed above offer fair evidence that the technological potentials have been well exploited in Hong Kong. However, in terms of the degree of openness, the present developments are far from satisfactory. One of

the most common framework for assessing the extent to which content is open is the 4Rs, as stated on the OpenContent website (Wiley, n.d.). They are:

1. Reuse — the right to reuse the content in its unaltered/verbatim form (e.g., make a backup copy of the content)
2. Revise — the right to adapt, adjust, modify, or alter the content itself (e.g., translate the content into another language)
3. Remix — the right to combine the original or revised content with other content to create something new (e.g., incorporate the content into a mashup)
4. Redistribute — the right to share copies of the original content, your revisions, or your remixes with others (e.g., give a copy of the content to a friend)

Copyright requirements for the use of the educational resources listed above appear to be highly restrictive. Virtually no content in the portals quoted in the previous section allows remixing or redistribution. Nor does it allow revision. Many do not even allow users to keep their own backup copy.

For example, at the entrance of the Interactive Activities DIY, the following copyright statement is conspicuously posted, and users have to indicate that they have read and agree to it before they can proceed to access the content in the portal:

> These teaching resources are developed by the Education Bureau of the Government of the Hong Kong Special Administrative Region for teachers' use to facilitate learning and teaching in Hong Kong. The copyrights of these teaching resources belong to the Government of Hong Kong Special Administrative Region. Except prior written authorization is obtained from the Education Bureau, any reproduction, adaption, distribution, dissemination or use for commercial purposes is strictly prohibited.

In the institutional portals, the copyright line indicating “all rights reserved” is normally put at the bottom of every content webpage of the learning resources. For iTunesU, copyright is similarly protected and users are prohibited from doing the 4Rs. Such protection inhibits the realization of openness.

5 Survey on Use of OER in the Tertiary Education Sector

Against this background, a survey has been conducted recently in Hong Kong on the prospective use of OER. There were 57 respondents, representing a small cross-section sample of the tertiary education sector, covering all of the major public institutions and the leading self-financing providers.

Most of the survey respondents indicated that they have good access to a wide range of software and hardware infrastructure tools and are familiar users of PC (87.2%), the Web (71.8%), email (76.9%), presentation software (65.8%) and online library catalogue (66.7%). A significant percentage of them indicated that they had access to the resources (95.9%), and had used a variety of digital resources including search engines/directories (79.5%), personal collections (66.7%), free image databases (46.2%), library collections (43.6%), and journals (46.1%). Formats in use range from PDF reader (69.2%), online references (66.7%), visual materials (58.8%) to course packs (43.5%) and online class discussion (41%).

While the majority of them (89.5%) had some experiences in using OER, and the rest can comment on the institution's practice of OER, these practitioners tend to use the digital tools and online resources mainly within a personal scope. Less than half (43.6%) of them often use the digital resources in class/lectures and they seldom link the resources to student learning activities or assignments. They came across OER only incidentally and had not been actively advised of the existence of digital resources either. In terms of sharing the digital resources available, most respondents indicated that the digital resources they have gathered are for maintaining their own collection of digital resources (68.4%), rather than making their own digital resources available to others.

Production Barriers

While more than half of the respondents acknowledged that there is good support from their institutional management towards staff production of OER and open source software, only 21.1% of the respondents said they have ever produced OER as a full or part of a course, or as learning objects — a few collaborated with other people, and very few have exchanged with others or published them online. Those who are interested in OER appreciated the potential benefits for institutional and personal reputation, enhancing users' knowledge, sharing best practices and improving students' access, etc. However, few (only three of 57 respondents) had submitted and published material as OER. Only a minority (31.3%) are willing to share their materials globally and they are generally unwilling to place them in open repositories such as OCW Consortium and OER Commons.

In terms of attitude, the respondents are unanimously concerned about acknowledgement of the creator of the resource when it is used or adapted by others. They also want to know by whom and how the resource is used and/or changed, and if the contributor is rewarded by money, or through their work plan, promotion, awards or other mechanisms.

Use and Reuse Barriers

The majority of respondents understand and appreciate the purpose and value of OERs, agreeing that they can excite students, improve their learning, teach information literacy, critical and creative thinking skills, let them know the most up-to-date development and create a sense of community in the course. They agree that OER saves time for teachers, allows them to do things they could not do otherwise, provides convenient access and lets them stay up to date with colleagues.

In a broader context, respondents believe that OER can help build fruitful partnerships with colleagues and institutions worldwide and benefit students from the range of approaches to the subject available. In addition, it will enhance the reputation of the University, and attract better students and better staff. OER are a useful way of developing new courses. Exploring the available OER worldwide will enhance the respondent's teaching and raise standards across the University.

However, opinions are divided (54% vs 43.6%) among respondents over whether or not to make their teaching practices and course materials open to any users. The majority of the respondents would only use OER in their teaching if they are able to

edit and personalize the materials for use with their students; they would be more willing to share their teaching resources openly if they have good control on their being reused by others.

One's use of digital resources depends on whether they are available for free (84.2%), or whether they are an easy option. Less than half (42.1%) of the respondents have used OER created by others in their teaching. A large majority said the materials the respondents used were produced by themselves, or within the institution. A small proportion were downloaded freely from an OER repository (16.7%), the Internet (44.4%), or from other educational institutions through an established cooperation (27.8%).

Respondents in fact used OER in their teaching or course delivery for more practical reasons, such as gaining access to the best possible resources (88.2%), promoting scientific research and education as public open activities (58.8%), bringing down costs for students (58.8%) and course development (58,8%), reaching out to disadvantaged communities (53.0%), assisting developing countries (53.0%), creating more flexible materials (76.4%), conducting research and development projects (58.8%), and building sustainable partnerships (53.0%),

The majority of respondents do not see any major problems in the technical support environment. They however expect support for OER users in such aspects as search, credibility and relevance, copyright issues, using and integrating with a learning management system, digitizing, uploading, gathering, organizing and maintaining, student training, as well as technical infrastructure relating to servers, computers, and smart classrooms (71.1%).

The respondents considered the lack of awareness, skills, time, hardware, and ability to locate quality OER, and the reward and support from management to be important barriers to the use of OER by other colleagues in their teaching.

Although about half of the respondents (53.0%) disagree that publishing OER will lead to students' absence from lectures, a considerable minority believe that digital resources cannot substitute for their teaching (43.5%).

Other negative opinions include that OER only helps other institutions copy other's best ideas, that publishing OER could damage the University's reputation via association with inaccurate or poor quality materials.

The major barriers that the respondents have experienced in publishing or using OER materials include: lack of awareness of the university OER repository and other OER repositories; fear over copyright infringement, ownership and legal barriers other than copyright, the large amount of time required, lack of reward and recognition, possible negative impact on reputation, lack of support, and irrelevance of the materials available.

6 Further Thoughts

The survey echoes and supports the analysis made earlier. It in general indicates a very favourable potential in the higher education sector in Hong Kong to capitalise on OER. Underpinning the potential is the vibrant city's robust technological infrastructure, high level of IT literacy, transparent legal framework, and abundance of tools. Academic practitioners are also conversant with up-to-date IT skills and their applications.

In terms of provision, open content is already thriving and plentiful in supply. Nevertheless, resource alone would not constitute paradigmatic shift but would typically endure a 'cultural lag' (Brinkman & Brinkman, 1997) that hinges on developments in institutional culture, pedagogical knowledge and non-hardware resources such as funding, personnel and time (Donoghue 2006). On this foundation institutional leaders need to play a stronger role in raising general awareness, provide sufficient policy and physical support as well as incentives for academic members to map technical affordance with pedagogical knowledge and integrate OER into mainstream teaching and learning in a well-defined, consistent and long-term strategy.

In addition, comparing Hong Kong with regions and cities where OER prospers, we can see that the environmental factors are similar. The fears Hong Kong educators mentioned (over problems such as potential copyright infringement, ownership and legal barriers other than copyright) exist in other parts of the world too. The real problem is the culture lag. The culture to share and collaborate has yet to be strengthened as a part of academics and educators daily work. Boosting such a culture requires institutional support and promotion.

Looking ahead, several developments in the general and higher education sectors in Hong Kong are conducive to the adoption of OER en masse in the longer term. The continued growth and internationalisation of higher education based on 'users pay' philosophy implies significant challenges to the pace, costs, methods, curricula and structure of institutional operations. OER may help providers to address the vagaries arising from a heterogeneous student body and fast changing needs. Educational institutions are urged to enhance student learning, seek pedagogical innovations and strengthen support in which facilities, learning resources and educational climate play an important role.

A vision to promote open education in the *Cape Town Open Education Declaration: Unlocking the promise of open educational resources* (http://www.capetowndeclaration.org/) of 2008 was stated as: "educators worldwide are developing a vast pool of educational resources on the internet, open and free for all to use. These educators are creating a world where each and every person on earth can access and contribute to the sum of all human knowledge…" Three strategies were proposed to increase the reach and impact of OER:

- Encourage educators and learners to actively participate in the emerging open education movement. Participating includes: creating, using, adapting and improving open educational resources; embracing educational practices built around collaboration, discovery and the creation of knowledge; and inviting peers and colleagues to get involved. Creating and using open resources should be considered integral to education and should be supported and rewarded accordingly.
- Call on educators, authors, publishers and institutions to release their resources openly. These open educational resources should be freely shared through open licences which facilitate use, revision, translation, improvement and sharing by anyone. Resources should be published in formats that facilitate both use and editing, and that accommodate a diversity of technical platforms. Whenever

possible, they should also be available in formats that are accessible to people with disabilities and people who do not yet have access to the Internet.

- Have open education made by a high priority governments, school boards, colleges and universities. Ideally, taxpayer-funded educational resources should be open educational resources. Accreditation and adoption processes should give preference to open educational resources. Educational resource repositories should actively include and highlight open educational resources within their collections.

These strategies are highly relevant to Hong Kong and should be considered seriously by policy makers.

7 Conclusion

Hong Kong is one of the most advanced cities in Asia in terms of the education quality, internet penetration and technological infrastructure. It is natural to expect OER to flourish in the advanced city, but as highlighted in this paper, the reality is that OER development is still in its infancy.

By examining major freely accessible education resources available in Hong Kong and through results of a survey on educators in tertiary institutions in the city, this paper has made clear that the current level of openness of our education resources is still unsatisfactory and that a sharing and collaboration culture is badly needed for OER to thrive. To achieve our goals of attaining more openness in education resources, the government and institutions should make greater efforts and implement strategies similar to those proposed in the *Cape Town Open Education Declaration*.

As Deimann and Farrow (2013) highlights, in education, 'openness' necessarily shifts the focus from content to practices, ie, from OER to OEP. A paradigm shift in the production and use of OER can hardly take place effectively without a cultural shift in the practices, which requires facilitation by policy at government and institutional level (Stacey, 2013). This is not unique to Hong Kong and there are challenges to overcome for any place to realise the potential of OER (Murphy, 2013). This paper has highlighted that it is high time Hong Kong caught up.

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An Overview of Open Education Resources for Higher Education

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Abstract. Since adopted in early 2000's, open education resources (OER) have evolved as a major source of learning materials for higher education. In general, there are four categories of OER, namely, open textbooks, open courseware, open online courses, and open-source software and tools to support teaching and learning. This paper attempts to characterize these four categories of OER with representative examples, and elaborates various commonly adopted open licensing options for OER.

Keywords: open education resources, higher education, open textbook, open courseware, online open courses, open license.

1 Introduction

With the advent of information and communication technologies and the prevalence of digital cultures together with the open licensing practices, open education resources (OER) have evolved as a major source of educational materials at various levels. Open textbooks and open courseware are good examples. OER are broadly defined as freely and openly accessible resources which are useful for educational purposes. These resources are usually delivered by electronic means via the Web, taking the forms of electronic books, courseware, streaming videos, learning objects, or software and tools to support learning. OER are formally defined as the "digitized materials offered freely and openly for educators, students and self-learners to use and re-use for teaching, learning and research." (OECD, 2007).

OER range from the user-generated contents such as Wikipedia (2013) and Wikibook (2013), and institution-led open courseware and online courses (OCW, 2013; OUUK, 2013; EdX, 2013; Coursera, 2013), to digital repositories of learning objects, materials and textbooks (CCOTC, 2013; FDLC, 2013; FlatWorld, 2013; CNX, 2013) and open-source software and tools to support teaching and learning (Moodle, 2013; Sakai, 2013). At present, vast amount of OER have been developed and are available from the Web. For example, Wikipedia (2013) has accumulated 26 million articles in 286 languages. Opencourseware has made 2,150 open courseware (OCW, 2013). Coursera (2013) has offered several hundreds of open online courses. Connexions has hosted more than 17,000 learning objects and modules for open access and adaptation (CNX, 2013). Wikibook (2013) has accumulated over 2,600 open textbooks.

J. Lam et al. (Eds.): ICT 2013, CCIS 407, pp. 26–34, 2013.

Widely adopted in universities and colleges, OER have become a major source of educational materials for higher education. This paper investigates the OER for higher education. Four categories of OER are defined. They are open textbooks, open courseware, open online courses, and open-source software and tools to support teaching and learning. In this paper, we attempt to characterize different categories of OER in accordance with the nature, purposes and usage. Their distinctive features are highlighted, and some representative examples are cited. As OER are open for use, revision, adaptation and distribution, licensing is an important concern in developing, deploying and re-distributing OER. This paper also elaborates a number of open licensing options defined by Creative Commons, which have been commonly adopted by the OER community (CC, 2013).

The rest of this paper is organized as follows. Section 2 defines the four categories of OER for higher education, with representative examples. Section 3 focus on the licensing issues of OER, and elaborates a number of open licensing options defined by Creative Commons. Section 4 then concludes this paper with a discussion on the prospect of OER for higher education.

2 Open Education Resources

In general, there are four categories of OER for higher education, namely, open textbooks, open courseware, open online courses, and open-source software and tools to support teaching and learning. In the following, we characterize each of them in accordance with the nature, purposes and usage, highlight their distinctive features, and illustrate with some representative examples.

2.1 Open Textbooks

Open textbooks are by nature self-contained electronic books that can be accessible online and downloadable for offline usage. They invariably consist of digital contents which can be delivered in different formats, including texts, images, audio, video and other multimedia versions. They are coherent in contents and aligned to particular textbook guidelines and standards, and can be customized to meet individual needs. Open textbooks can be used as traditional textbooks for classroom-based teaching, as well as for self-learning, in universities and colleges. They are self-contained in the sense that the textbook contents are substantial enough and well organized as a single volume on a special subject or topic.

Open textbooks have a number of advantageous features over traditional textbooks. They are free and openly available. Revisions and updates of textbook contents can be made efficiently. Instructors and students need not wait long for the revised textbooks, as the revisions and updates can be made online for instant accesses. Moreover, open textbooks allow easy adaptation and modification to cater for the learning difference, where instructors may select and customize the textbooks to fit specific teaching and learning needs of individual groups.

There are many examples of OER, taking the form of open textbooks for higher education. Some representative examples are cited as follows.

- College Open Textbooks aims at driving awareness and advocacy for open access textbooks, training teachers to adopt open resources, conducting peer review, and growing online professional networks which support authors to share the resources (CCOTC, 2013). It provides hundreds of tertiary-level open access textbooks. A detailed guide for adopting open access textbooks and creating associated teaching and learning materials is also provided.
- The Open Access Textbooks project is an initiative to create a sustainable model for the discovery, production and dissemination of open access textbooks (FDLC, 2013). Funded by a grant from the Fund for the Improvement of Post-Secondary Education, this project builds on lessons learned in open access textbook efforts across the United States and seeks to create a collaborative community to further sustain the implementation of open access textbooks. At present, a digital repository of hundreds of open access textbooks has been deployed.
- Flat World Knowledge claims to be the world's largest publisher of free and open college textbooks. Its books are written by leading experts and are peer-reviewed, edited and highly developed (FlatWorld, 2013). They are supported by test banks, slides, instructor manuals, print desk copies, and knowledgeable service representatives. Its whole stock (with over 100 college-level textbooks) is completely free online. The textbooks come with integrated audio, video, interactive features, and powerful search capabilities.
- Project Gutenberg offers over 33,000 free electronic books to download on PC, iPad, Kindle, Note, Sony Reader, iPhone, iPod Touch, Android or other mobile or cell phones (Gutenberg, 2013). No fees are required. All of its electronic books are quality assured, and previously published by bona fide publishers. The project has digitized and diligently proof-read them with the help of thousands of volunteers.

2.2 Open Courseware

Open courseware are by nature courseware or self-contained course materials that can be accessible online and/or downloadable for offline usage. An open courseware invariably consists of a collection of learning objects and modules which are organized for a course of study. They are coherent in contents, and are aligned to particular syllabus and requirements, but can be customized to meet individual needs. Open courseware can be used as course materials for classroom-based teaching, as well as for self-learning and distance-learning, in universities and colleges. Indeed, many open courseware are the distance-learning course materials being used by open universities and distance-learning institutions.

Some representative examples of open courseware for higher education are cited as follows.

- Opencourseware was initiated by the Massachusetts Institute of Technology to make the educational materials of its undergraduate and postgraduate courses openly and freely available to everyone via the Internet (OCW, 2013). The Opencourseware Consortium was formed in 2008, and is now a community of over 250 universities and associated organizations committed to courseware sharing. Opencourseware has offered materials of 2,150 courses, attracting 125 million visitors.
- iTuneU was launched in 2007 by Apple Inc. to deliver university educational materials (mainly audio and video content) for university and college students (Apple, 2013). They are lectures, language lessons and lab demonstrations, provided by universities over the world. Free download of these materials is allowed. The iTuneU has maintained over 75,000 collections from more than 800 institutions, attracting over one billion downloads.
- OpenLearn is offered by the Open University in United Kingdom that aims to break the barrier to education by reaching millions of learners around the world (OUUK, 2013). It provides free educational resources for distance learning. They are identical to the distance-learning course materials used in the Open University. Up to now, OpenLearn has offered free education resources of over 650 courses, spreading across a variety of subject areas.
- China Open Resources for Education was established in 2003 by a group of universities in China to offer free courseware in Chinese medium, principally for students in China (CORE, 2013). These courseware are provided by both China universities and oversea universities, where courseware are written in or translated to Chinese. The China Open Resources for Education has provided hundreds of free courseware, attracting over 10 million visits.
- Khan Academy is an educational platform created in 2006 by a Bangladeshi American educator, Salman Khan (Khan, 2013). It aims to provide high quality education to anyone, by offering a wide range of educational materials which are mainly audio and video in nature. These educational materials cover a wide range of subjects at K-12 as well as college and university levels. At present, 4,200 sets of materials are available.

2.3 Open Online Courses

Open online courses are by nature online courses with interactive participation and online access through the Internet. These courses are freely and openly available to all for enrolment. In addition to courseware and course materials such as lectures, readings and problem sets, which are freely provided to students, open online courses allow interactions among the instructors and the students, thus building up a strong community for them. At present, open online courses are largely university-level and college-level courses.

In recent years, open online courses have grown tremendously. Large-scale open online courses, called massive open online courses (MOOC), are offered by many universities. Interestingly, these universities are mostly world-class universities, such as Harvard University, Massachusetts Institute of Technology, Stanford University,

and the University of Toronto. Time magazine described MOOC as opening the door to the "Ivy League for the Masses" (Time, 2012).

Some representative examples of open online courses in higher education are cited as follows.

- EdX (2013) is a MOOC platform launched in 2012, by Massachusetts Institute of Technology and Harvard University. With a strong emphasis on the quality of education, EdX aims to offer the best higher education opportunity to anyone who wants to achieve, thrive and grow. At present, 27 world-class universities have joined EdX consortium to provide a variety of MOOC under 24 subjects to the general public.
- Coursera (2013) is an organization found by two professors at Stanford University in 2012. Coursera partners with a number of world-class universities to offer open online courses for anyone to take for free. It aims to empower people with world-class education that would improve their lives, and the communities they live in. It emphasizes that the courses are designed on a sound pedagogical foundations. At present, 71 world-class universities have joined Coursera to provide near 400 MOOC.
- OER University or OERU (2013) was established in 2011. It is a virtual collaboration of like-minded institutions, aiming to provide free learning opportunities to all using OER materials with pathways to gain credible qualifications from recognized educational institutions. At present, there are 34 universities and colleges joining OER University. Many of them have a strong base in offering open education and distance-learning education, such as Athabasca University in Canada, Open Polytechnic in New Zealand, and University of South Queensland in Australia.
- Udacity (2013) is an educational organization established in 2012, following the success of free computer science classes at Stanford University in 2011 where an enrolment of 160,000 students was marked. Now, it offers 25 online courses, mainly in computer science and mathematics.

2.4 Open-Source Software and Tools

Open textbooks, open courseware and open course materials provide the educational contents for teaching and learning. There is a different category of OER – software and tools that support teaching and learning. They are by nature open-source software that allow free downloading, configuration and customization. These open-source software and tools are typically online learning platforms or learning management systems. There are also platforms for open online courses, and platforms for hosting open textbooks and courseware.

Some representative examples of these open-source software and tools are cited as follows.

- Moodle (2013) or Modular Object-Oriented Dynamic Learning Environment is an open-source online learning platform that supports hosting of educational materials, and allows interaction and collaboration among

instructors and students. It also supports the administrative activities, such as submission of assignments, online quiz, and data interface with student information systems. Since launched in 1999, Moodle has continued to evolve as a comprehensive learning management system with multi-language supports. At present, it has a strong user base of over 70 million users.

- Wikibook (2013) is an online platform for hosting open content textbooks. It allows open accesses of these textbooks in the wikipedia style. These textbooks are free to use, revise and remix subject to the open license "share-alike" defined by Creative Commons (CC, 2013). Wikibook provides functions to support contribution of new textbooks and review, revision and modification of existing textbooks. Authors of open textbooks can use tools provided by Wikibook to prepare their books for dissemination. Wikibook now becomes a platform hosting over 2,600 open content textbooks.
- Rhaptos (2013) is an open-source content management software that can be freely used for creation and configuration of an open textbook platform or educational content platform. Rhaptos supports many types of educational contents, including textbooks, course materials, multimedia, and game-based contents. It provides a rich set of authoring and editing tools to support the creation, revision, modification, adaptation and customization of educational contents. Rhaptos also features a powerful lensing system for quality control, customized tagging and community-based search and discovery.
- Google apps is a bundle of several web applications provided by Google (2013). These applications include electronic mail facilities, calendar, word processing, spreadsheet and presentation tools, document management system, free online storage, online forum, and website hosting. Google apps is offered to any educational institution (K-12 schools, colleges and universities with) up to 30,000 users, for free. The applications provided by Google apps support different teaching and learning activities, especially for mobile learning and collaborative learning. At present, there are over 20 million registered users from various educational institutions.

3 Licensing Options for OER

In this section, we describe various licensing options defined by Creative Commons – a non-profit organization established in 2001, aiming to enable the sharing and use of creativity and knowledge through free legal tools (CC, 2013). It defines a set of licensing options, called Creative Commons licenses, to provide a standardized and simple way to give the public permission to share and use creative work.

There are 6 types of Creative Commons licenses, which differ by the combination of the following conditions of use and distribution.

- Attribution (BY). This allows users to copy, distribute, display and perform the work and make derivative works based on it, as long as the author or licensor is given the credits for the original creation.

- Share-alike (SA). This allows users to distribute derivative works only under a license identical to the license that governs the original work.
- Non-commercial (NC). This allows users to copy, distribute, display and perform the work and make derivative works based on it, only for non-commercial purposes.
- No derivative work (ND). This allows user to copy, distribute, display and perform the work, but not to make derivative works based on it.

The 6 types of Creative Commons licenses are defined, based on the combination of these conditions.

- Attribution (CC BY). This allows users to copy, distribute, display and perform the work and make derivative works based on it, as long as the author or licensor is given the credits for the original creation.
- Attribution and No derivative work (CC BY-ND). This allows users to copy, distribute, display and perform the work, as long as it is passed along unchanged and in whole, and the author or licensor is given the credits for the original creation.
- Attribution and Share-alike (CC BY-SA). This allows users to copy, distribute, display and perform the work and make derivative works based on it, as long as the author or licensor is given the credits for the original creation, and the derivative works are distributed only under a license identical to the license that governs the original work.
- Attribution and Non-commercial (CC BY-NC). This allows users to copy, distribute, display and perform the work and make derivative works based on it, only for non-commercial purposes, and as long as the author or licensor is given the credits for the original creation.
- Attribution and Non-commercial and No derivative work (CC BY-NC-ND). This allows users to copy, distribute, display and perform the work, only for non-commercial purposes, and as long as it is passed along unchanged and in whole, and the author or licensor is given the credits for the original creation.
- Attribution and Non-commercial and Share-alike (CC BY-NC-SA). This allows users to copy, distribute, display and perform the work and make derivative works based on it, only for non-commercial purposes, and as long as the author or licensor is given the credits for the original creation, and the derivative works are distributed only under a license identical to the license that governs the original work.

4 Conclusion

In the past decade, we witnessed the rapid development of OER for higher education, especially on open courseware and open online courses. There are at least three factors contributing to the success. First, the recent advances in information and communication technologies have made the accesses to the Web well available and affordable by the public. Second, there is a prevalence of digital media in teaching

and learning, where multimedia elements have been effectively used in many learning materials. Third, people gradually welcome the idea of openness, and accept the sharing and collaborative development of knowledge.

The adoption of OER in higher education is inevitably a revolutionary change in teaching and learning. OER aims not only for open learning and self-learning but also for classroom-based and instructor-led learning. Although open textbooks, open courseware and open online courses are primarily designed for self-learning, they can also be used together with traditional textbooks and course materials for classroom-based learning. The advantages and benefits of OER have been recognized, and there are great potentials for OER to evolve as a powerful and influential means to transform the teaching and learning practices.

This paper briefly reviews the OER for higher education, and defines four different categories of OER, namely, open textbooks, open courseware, open online courses, and open-source software and tools to support teaching and learning. It attempts to characterize them in accordance with the nature, purposes and usage. Their distinctive features are highlighted, and some representative examples are cited for illustration. This paper also describes Creative Commons licenses, which are commonly used for deploying OER. Unarguably, OER has made an impact to the teaching and learning practices in higher education. It is time for the educators to re-think how the teaching and learning process can be transformed with OER.

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Constructing and Sharing Open Educational Resources: Policy and Capacity

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Abstract. Since MIT OCW evoked a worldwide OER movement, many higher educational institutions have taken actions to consider how to take advantages of the initiatives. The concept of sharing high quality educational resources to promote education equality is widely accepted, but how to maintain sustainable development of OER challenges every university. This paper will review the mainland China's practical exploration with regards to creation and application of OER. It will narrate both government-supported projects and institutional actions to present achievements and problems. Based on some surveys and observations, the author will identify two major influential factors of policy and capacity and try to find out solutions to overcome the obstacles and facilitate the great undertaking.

Keywords: OER, policy, capacity.

1 Introduction

China's reform and openness have brought tremendous changes not only on economic prosperity, but also on educational flourishing. In the past ten years, the Chinese government has adopted many effective measures to develop mass education which has really benefitted the general public. National infrastructure has nowadays been well-installed and upgraded not only in urban areas, but also in rural areas. In 2011, state financial education funds accounted for 3.9% of gross domestic product (GDP). The gross enrollment rate has increased from 17.0% by 2003 to 26.9% by 2011, which indicates that there are more opportunities for young people between 18-22 years old to receive higher education. However, the gap between developed and under-developed areas is still obvious in mainland China. The imbalance of higher education is reflected in several aspects. First of all, it is the uneven distribution of higher educational institutions (HEIs). The Statistical Communiqué on National Educational Development in 2011 showed that there were 31,670,000 students pursuing higher education in 2,762 HEIs around the country. Nevertheless, most well-known universities are located in big cities or developed coastal areas. According to some observations, the western part of China is covering half of its territory, but the number of HEIs is accounting for only 10.1%. 60% of the universities involved in the

J. Lam et al. (Eds.): ICT 2013, CCIS 407, pp. 35–42, 2013.

project of 211 (a project supported by the government) were concentrated in the eastern part, with only 21% and 19% in the western and middle part respectively. So it is with the higher educational resources distribution. Noted professors and scholars are usually working for well-known universities, whereas not well-trained faculty members in some universities have to take up teaching work that they are not competent. The distinctive phenomenon also exists for students as those living in big cities may have better opportunities for quality resources than those in remote and rural areas. As such, it is inevitable that relative departments should consider how people in different parts of China can enjoy equal quality education. As a revolutionary initiative, OER has in effect made breakthrough for the configuration of elite education dominating quality resources. It has not only created equal opportunities for the vast majority of social members wherever they are to access quality open courses, but also promotes knowledge sharing around the world. The OER movement represents an orientation of human progress in making knowledge to be open and accessible for all, which will surely accelerate the process of educational democracy and social justice. There is no doubt that knowledge sharing through OER will be beneficial for both universities and the society. In this sense, facilitating OER movement is really connected with the missions and values of universities. Since one of the historical tasks for universities is to serve the society, universities must take the lead in disseminating and creating knowledge for their students as well as the social members and advocate consistently to give an impetus to social development. In fact, MIT's initiative and many other projects have already received such an effect. Like many HEIs in the world, universities in mainland China are now experiencing the undertaking to build world's first class universities by facilitating the improvement of higher education quality. Therefore, joining the international OER movement will have far-reaching impact on our higher education reform and innovation, on our absorbing in worldwide quality educational contents, on our innovative teaching organization and pedagogy, on equal attainment of higher education resources, and on more cross-culture collaboration with other countries. The process of informalization in mainland China offered favorable condition for us to develop OER, which indicates an urgent need to mobilize our intelligence and wisdom. According to China Internet Network Information Center (CNNIC)'s 31 Statistic Report on Internet Development in China, there are 564 million people who can access to Internet by the end of 2012. The rate of popularity reaches 42.1%. More than 70% of the number gets access to Internet via their PC and more than 74% of the people get access to Internet via their mobile phones. In such a context of online learning environment, we can anticipate that OER has great potential for development in China. Through promoting OER, knowledge sharing will surely be further enhanced among HEIs and in the learning society.

2 Status Quo in Mainland China to Create and Use OER

The China government has put great attention to promote the popularity of high quality educational resources since the reform and openness. The recently released

document of "National Outline for Medium and Long-term Education Reform and Development (2010-2020)" has once again stressed the importance of sharing quality resources and enabling our mass to enjoy high quality education. It emphasizes that we should establish an open and flexible public service platform of educational resources to facilitate popularity and sharing of quality educational resources, which is coincident with the trend of OER movement in the world. To look at status quo in mainland China of creating and using OER, we can see the enthusiasm and actions below.

1. In response to MIT OCW, a consortium namely China Open Resources for Education (CORE) was established in 2003. Though it is a non-government organization, it has motivated some institutions and volunteers to take part in OER movement. Several universities have their faculty members to make use of overseas open courses in their programs and teaching activities. A lot of volunteers have started their translation work for Chinese learners to appreciate conveniently the original open courses. Around 140 courses have already been translated from English into Chinese. Discussions and research on OER creation and application have been made among professors and practitioners. However, this is only part of the OER development in mainland China.
2. Owing to distinction in education context and people's appeal, China has its peculiar way to promote OER. As a matter of fact, the government-supported project of Excellent Courses and some other institutional-supported projects are coincident with the idea of OER. In 2003, the Ministry of Education in mainland China launched the project of National Excellent Courses, aiming at serving teachers and students mainly, offered diversified online shared basic courses and specialization to different learners in the society simultaneously. The idea of that lies in constructing and sharing quality resources of courses among higher education institutions, stimulating changes in teaching concept, updating teaching content, facilitating reform on pedagogy, improving quality of fostering talents and serving a learning society. From 2003 to 2010, national-level excellent courses amounts to 3,862. The number of institutions involved is 746. Owing to a 3-layer design of framework, the majority of universities paid much attention to the construction work, while assessing national excellent courses, tens of thousands of excellent courses have been developed at provincial and institutional level. In 2011, the MOE decided to launch National Open Excellent Courses which include Excellent Resources of Sharing Courses and China University Open Video Courses. The MOE expected that during the 12th Five-year Plan, 1,000 excellent open video courses will be built. By now, more than 1,670 episodes of 244 courses have been posted online (See http://video.Jingpinke.com) and many are under construction, covering 6 major categories such as literature and art, philosophy and history, economic management and law, basic science, engineering and technology, agriculture, forestry and medicine, etc. The contents are related to extensive sphere. Apart from constructing excellent courses, the government has initiated some other experimental projects to try out the pathway of making resources open to the public.

3. National Online Consortium of Teacher Education has linked with colleges and universities that conduct teacher education with publishing house and offered open courses for training primary and secondary school teachers, and open and free courses for those in-service graduates majoring in distance education in normal universities.
4. National Digital Resources Center has developed some open resources that are specialized for vocational students, communities, and social members. With a view of more flexible learning, they have divided some courses into small blocks as five-minute micro-courses so that people can enjoy those resources conveniently.
5. Along with the government-supported projects, many institutions have adopted actions to encourage their staff members to participate in knowledge sharing programs. Sun Yet-San University has initiated an online open classroom which is addressing to the general public and is very welcomed by the society. Science and Technology University of Dalian carried out the project of iLab with MIT so that its students can share the iLab with MIT to improve their practical skills. Some universities have started to introduce open source educational tools and software, like Sakai, Moodle, and eduCommons, etc. and try to localize them and put into wider range of uses. On the basis of that, several universities are making efforts to develop some open source software independently. Also, in mainland China, Sun Yet-San University, Xian Jiaotong University, the Open University of China and Beijing Open University have already selected their featured courses and put them onto iTunes U in succession.
6. In addition, some IT companies like Wangyi (http://open.163.com), Xinlang (http://open.sina.com.cn) and Chaoxing (http://openv.chaoxing.com) have started to use creative commons (CC) agreement of Chinese 2.5 version to provide online contents of OER with different features. Hujiang Network and YY Education have offered part of their specialized English learning or training contents as open resources.

3 Obstacles and Issues

Influenced by the worldwide OER movement, the mainland China has supported many innovative projects to facilitate quality higher education to be shared among universities and by the general public. Nevertheless, creating and using OER seems not to have conducted as widely as expected. The survey, conducted between January and March 2011 among some institutions of CORE does, to some extent, present to us the current situation of creating and applying OER in mainland China. Using quantitative research methods, we have collected some effective feedback through the website of CORE. Though the number of collected questionnaires is very limited, it has at least informed us some opinions and attitudes from some institutions and individual professors, technicians and managers towards OER. 65 valid individualized questionnaires have been submitted and 26 valid institutional representatives filled in the questionnaires.

- The results indicated that although most people are aware of the importance to develop OER, they have not demonstrated much enthusiasm and taken real actions to promote OER.
- Many faculty members have not showed much interest in producing OER as they insisted that their institutions did not offer appropriate policies to draw forth their motivation and enthusiasm.
- For individuals, the principal barriers to the use of OER are lack of (1) awareness; (2) the ability to locate quality OER for teaching; (3) skills; (4) interest in pedagogical innovation amongst staff members; (5) incentive mechanism for staff members to devote time and energy; (6) support from management and (7) the ability to locate specific and relevant OER for teaching.
- As for institutions, the principal barriers include (1) awareness; (2) an incentive mechanism for staff members to devote time and energy; (3) interest in pedagogical innovation amongst staff members; (4) skills; and (5) proper software.
- Another phenomenon that we have observed is that traditional consciousness towards teaching in many institutions is still taking precedence as many faculty members have long been accustomed to immersing themselves in a familiar teaching environment and lack of innovative spirit. Many young teachers have interest in some open courses only out of the sense of novelty and curiosity, but they do not really understand the nature and value to develop OER, not to say to consider how to maintain the sustainability of OER movement.
- Furthermore, many faculty members have no sufficient knowledge of judging quality open resources and making use of creative commons. Therefore, it is necessary for institutions to develop relative policies to support their staff members and encourage them to throw themselves conscientiously into the OER movement and increase their own capacity in the course of it.
- Creating OER needs self-confidence that comes from capability, awareness and many other skills, which calls for sustainable professional development of our staff members.
- In addition, sustainable development of OER needs a feasible business model. Investment from foundations or government cannot last long. In which way can we keep a steady flow of learning resources, open and free? How can we really satisfy the increasing number of learners by quality and quantity? How can we ensure OER can enable knowledge sharing to keep on? It is hard to copy the model from other countries. We need to look at the problems behind the phenomenon.
- In the Chinese context, national and institutional policies are still playing an important role. Without national policies, there will be no competitive mechanism among institutions. Without institutional policies, staff members will have no motivation and enthusiasm to create and apply OER.
- Also, capacity is another issue for institutions and their staff. Even when young faculty members incline to participate in creative activities, they need to be trained and guided. Institutions have to develop incentive mechanism to involve more and more people to be proactive in educational innovation.

4 Potentials and Perspectives

The objective to develop OER throughout the world is the same in the respect of sharing knowledge and serving all people. However, each country has its own way to promote OER development. None of us can neglect the circumstances of its own. The mainland China needs to address several issues when developing OER.

1. **Demand-Driven:** Above all, creating OER comes from driven-need requirements. Hence, analysis of demography and social demands are necessary. Four major groups should be addressed apart from university students, including (a) Young people who need career development but cannot acquire quality learning resources from campus-based learning environment; (b) In-service employees with ability of independent learning, who expect to expand their knowledge, but with limited educational opportunities; (c) Overseas individuals who have special desire for learning Chinese and appreciate Chinese culture, but could not locate what they need; (d) The specified groups of people like the elderly who have left their working places, but yearn for rich later life. Although the ultimate goal of developing OER is to allow all to enjoy quality education resources, it takes time and needs us to promote it step by step.
2. **Policy Support:** Though most universities in mainland China have participated in the national projects to offer their excellent courses to students and general public, stimulating policies are still needed. The policy from government level should focus on establishing a competitive mechanism and facilitating the process of building a flyover for lifelong learning within the country. OER will attract different learners with free and open learning content. However, learning does not only mean to provide resources and contents as learners need their learning achievements to be accredited and recognized. Therefore, national credit bank should be developed. Institutions should offer policy to encourage their staff to be proactive towards education innovation and development, and try to establish an incentive mechanism to excite their staff to take actions.
3. **Capacity Building:** To overcome new challenges, institutions need to develop capacity of offering best quality resources and assessment index when their staff join in creating OER. Universities should not only train course designers, but also online tutors and technicians to create open learning resources which are really useful and efficient for various learners. While acquiring outside knowledge, institutions also need to foster their staff members to develop capability in creating new knowledge, managing online teaching activities and being familiar with technological tools.
4. **Quality Assurance:** Learners need credible and quality open learning resources. Some people insisted that National Open Excellent Courses should not only be reviewed by the expert panels, but also need to be evaluated by its users. Higher education institutions should enhance the sense of social responsibility and response to the social concern and reflect its real value in the process of promoting OER movement.

5. **Copyright:** It is imperative to increase consciousness and knowledge of copyright so that our staff, students and all other users will no longer fear over copyright infringement while using and creating OER content. Training our staff members to know creative commons and other open license can also increase their sense of protecting their own rights.
6. **Collaborative Mechanism:** While creating quality OER, universities should establish partnership with other organizations, enterprises and companies, and give free rein to each one's superiority. The joint efforts of constructing and sharing quality resources of learning contents will surely reduce the cost of production and realize the scale efficiency. Also, collaboration will definitely benefit all stakeholders.

4.1 Perspective for OER Development

With the development of OER, we can observe many new initiatives in higher education. For instance, the idea of Massive Open Online Courses (MOOCs) are being accepted by many institutions and many new operating model of consortium like edX, Coursera, and Udacity are being explored. Meanwhile, by using, revising and sharing OER, worldwide education has reached more people and open source platform has attracted much more higher education institutions to work together or link their hands to create consortium and accumulate wisdom and intelligence, where international communities of scholars can share experiences and insights, learners from different backgrounds may openly share their ideas and have discussions with others via the forum, which will surely give impetus to the development of higher education and offer a renewed learning experience to our students in the era of informatics. Further research will no longer be limited to creating knowledge and establishing collaborative mechanism of how to design quality resources, but more on exploring the way to organize and implement open learning. It is easier to solve the technical issue, but it is hard to change people's deep-rooted ideology. Therefore, our policy must be favorable to stimulating creating initiatives of faculty members and to lightening our staff and students' enthusiasm of proactive participation in open online learning. Meanwhile, we need to explore learning expectations from the general public, and try to solve the contradiction between producing quality resources and enabling open learning to really happen.

Institutions in mainland China have taken actions to respond to the challenges from outside. Peking University is now seeking for collaboration with relative MOOC platform, Shanghai Jiaotong University has decided to sign agreement with Coursera. Meanwhile, the Open University of China is now implementing its strategic plan to build some core online courses to satisfy students and social demands. As we observe the rapid progress of the outside world in diffusing, creating and sharing knowledge, we are converging ourselves into the mainstream of OER movement. We would keep our eyes on the new development and conduct research accordingly. We will not only assimilate the splendid world knowledge and spirit wealth, but also make tremendous contributions to the world culture heritage and educational innovation.

5 Conclusion

OER movement is a revolutionary initiative. It has evoked human beings to participate in the movement of diffusing, sharing and creating world knowledge. It has surged higher educational institutions onto the stage of reform and innovation. It has enabled all people and societies to enjoy quality educational resources and experience vast pool of the world culture. However, to establish a sustainable and scalable OER ecosystem needs our joint efforts. OER development in each country is connected to its infrastructure, human environment, national policy, institutional capacity, enthusiasms from the creators, skills of learners, concept of its education, and model of its operation. Further promotion of knowledge sharing in mainland China needs us to address on social demands, business model, collaborative mechanism, evaluation and quality as well as the organic combination between construction and application so that we can find ways out of OER with various kinds of channels to reach the ultimate goal of lifelong learning.

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Designing Open Textbooks for Effective Teaching and Learning

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Abstract. Printed textbooks are often criticized for only 'transmitting' knowledge to readers in a linear fashion whereas in e-textbooks, interactivity can be built in; so learners are 'connected' with other resources. There are e-tools for learners to communicate with the teacher and their peers, and they can also support individualization in the learning process. Here we will need appropriate design elements in language usage, conceptual organization, spatial arrangement and levels of interactions. Electronic textbook content in various file formats (e.g. web, PDF, e-Pub, audio) can be used in different devices to suit learners' reading preferences. Open textbooks on the other hand, allow teachers to reuse, revise and remix the content. Linking to a repository of learning assessment items, an open textbook can also provide effective assessment of learning outcomes, an important requirement in Hong Kong schools. The paper first describes how an open textbook system for Hong Kong comes to fruition. It will then discuss in detail the pedagogical, quality assurance and technological considerations in the development of the open textbooks.

Keywords: Open textbooks, open content, open license.

1 The Problem of High Prices of Printed Textbooks in Hong Kong

The problem of too high a price for primary and secondary school textbooks has been haunting Hong Kong for the past decades. Before 2003, publishers were complained for revising textbooks too often, making it difficult for 'second hand' textbooks to be reused and pushing parents to purchase new textbooks. This problem seemed to be solved in 2003 when the government set up a 'three-year rule of no revision'. In 2009, this three-year directive became a five-year rule (Education Bureau, 2012, p. 64).

The high prices of textbooks are not due to high profit, but high production costs, publishers often explain. But textbook users are not satisfied with the luxurious format of the textbooks. There are criticisms about the overly colourful printing (4-colour printing), and that the papers used are too thick and hence too expensive. Some users hence call for 'no-frills' black and white versions of textbooks to be provided as a choice. Publishers' response is that the difference in cost between B/W and 4-C printing, and between thick and thin paper printing, is minimal. Besides, the choice

J. Lam et al. (Eds.): ICT 2013, CCIS 407, pp. 43–55, 2013.

for B/W textbooks is so small that it is not economically viable to provide such option to the market.

Publishers have also been criticised for mounting expensive marketing/promotional functions for the books, such as hosting talks for teachers in lavish hotel conference rooms, offering them gifts and teaching related items (Apple Daily, 2008; Legislative Council Panel on Education, 2010, paras. 20 and 21). Some publishers have also been accused of providing teaching aids to schools free of charge or on a permanent loan basis, or funding school functions, sponsoring school publications, sending speech day floral baskets, or giving scholarships to students. Such practices were halted by the government (Legislative Council Panel on Education, 2010, para.13).

Teachers are also given complimentary copies of the textbooks they have chosen for their classes, as well as the teacher's edition (teacher's guide). Other give-away items include: wall charts, worksheets, CD-ROMs with additional teaching materials, data files for project study, presentation files for use in lessons, assessment tasks, and assessment item banks. Supporting websites of the textbooks, for teachers' access only, are also set up to provide further materials to complete their teaching duties. It is believed that the cost of these items is one of the key factors which cause the prices of textbooks to become unreasonably high, contributing up to 30% of the total development cost according to some publishers. Again such offers were forbidden by the government starting 2010. Schools would need to purchase such material out of the school budget (Legislative Council Panel on Education, February 2, 2010, para.13).

High textbook price was also seen to be due to the bundling textbooks with unwanted learning materials, only a small part of which was said to be used. Publishers were required to 'debundle' the learning and teaching materials from the textbooks and to charge them separately (Legislative Council Panel on Education, February 2, 2010, para.12).

Parents, who pay for the textbooks are discontented that only teachers make the choice of textbooks but they have to pay for them. They argue that in the selection process, teachers only evaluate the quality of the textbooks; they usually do not consider the price in deciding on the final choice.

A textbook can be used and re-used by up to 3 or 4 students before they become too worn out, and reusing textbooks can reduce cost substantially (75% if a book is used 4 times). Unfortunately, the reuse of textbooks is not a common practice in Hong Kong:

- some parents do not prefer their children use used books because they are marked or torn;
- some parents do not find it fair when they pay for the same amount of money but some students (of an earlier year) can use a newer book while others have to use an older version;
- the fact that up to 38% of Hong Kong students receive full textbooks subsidies from the government for the purchase of new textbooks, will make it a disincentive for such parents to let their children to use 'second hand' books ; and
- the administrative effort for the distribution of the used textbooks by schools is so daunting that most schools are unwilling to take up such additional workload.

There was an attempt in 2008 to try out a 'textbooks reuse scheme' for a local pilot school to reuse textbooks, but it did not work out at the end.

A major solution to tackle the problem of high textbook price is the use of Open Textbooks. It is found that open textbooks is the substantial reduction in cost (Allen, 2011). As reported in the Student PIRGs study conducted in the US, this amounts to an average drop of 80%. This is a major reason that a concern group of staff at the Open University of Hong Kong proposes the Open Textbooks project for Hong Kong in 2012 (Leung *et al*, 2012).

2 A Proposal for an Open Textbook System for Hong Kong

Experience from overseas confirms that open textbooks reduce the price substantially. However, crucial benefits of open textbooks are not just with cost but effective learning (Bliss *et al*, 2012). In Hong Kong open textbooks will help to solve the following pedagogical problems faced by teachers and students currently using printed textbooks only:

- Printed textbooks are not flexible enough to cater for the specific needs of students of individual schools or classes since they cannot be timely customized for a variety of learning objectives and contexts.
- Online and mobile learning is increasingly becoming a trend but publishers are unwilling to take much advantage of digital technology and provide the electronic version of the textbook en masse online along with the printed version, due to concerns of piracy and copyright protection.
- Some teachers in secondary schools have attempted to develop their own teaching and learning materials, as well as assessment items and learning activities; they also wish to share with colleagues those materials with others, as well as using other resources.

An open textbook system containing quality open textbooks for adoption and adaptation by students and teachers at primary, secondary and tertiary levels is hence proposed to be developed for the benefit of all people in Hong Kong and other regions. The system is planned to be an online collaborative environment to host open source textbooks which are free, flexible, current and directly available for use and adaptation by universities and schools.

Three important components of the system are:

a. An online open textbook platform: A repository for hosting textbook contents, courseware, teaching materials and resources (such as links to online contents which are available overseas) will be developed. It also includes editing tools so that users can collaborate in contributing teaching and learning materials; it will also have a review mechanism for all users to review and rate the materials.
b. Online textbooks and teaching materials: A collection of open textbooks, at tertiary, secondary and primary levels, will be made available from the platform. Most importantly it includes a total of 12 open textbooks covering the curriculum for the English language subject for all primary and secondary levels, as well as

associated teaching materials. These will be expanded to other subjects of study in due course. Such textbooks will contain the

c. Community and capacity building function: A consortium made up of potential contributors and beneficiary educational institutions will be established. Training will be provided to teachers for using the open textbooks.

3 Pedagogical Considerations of Open Textbooks

The printed textbooks are often criticized for only 'transmitting' knowledge to readers in a linear fashion. Open textbooks, which are first and foremost e-textbooks, are an emerging technology which can allow for the inclusion of effective teaching and learning functions. Since they are open for revision and re-distribution, they are most useful to teachers who often wish to customise them to suit their students' needs.

Presenting contents in a variety of electronic formats (web, PDF, e-Pub, audio), e-textbooks can be 'read' in different reader devices to suit different learners' reading preferences.

Language usage, conceptual organization, spatial arrangement and levels of interactions are some of the important considerations in designing open textbooks for effective teaching and learning.

3.1 Language Usage

As in printed textbooks, e-textbooks in general should also adopt a direct and simple writing style. Traditional printed textbooks however may not be able to cater for the varied needs and learning abilities of individual students in all classes or schools. As well, timely customization for specific learning objectives and contexts by teachers is difficult without copyright infringement. One important feature of open textbooks is that they can support individualization in the learning process (Sun *et al*, 2012).

Open textbooks grant, in advance, the right to all users for all kinds of modifications. Open textbooks can be easily customized by teachers in terms of language usage for accommodating the different needs of learners. Teachers can provide additional explanations, and whenever possible, use real-life examples to illustrate abstract theories and concepts. Teachers can also use only selected parts of an open textbook, but adding to it other learning resources, some of which may be their own work.

There are also common functions with regards to language which facilitate learning.

Dictionaries and Pronunciation. Built-in dictionaries for glossaries save students carrying along a printed dictionary. A dictionary with synchronized audio pronunciation has been shown to assist students learning English as a second language (Chu, 2003). Built-in pronunciation is of great assistance to students in their reading and the learning of a foreign language.

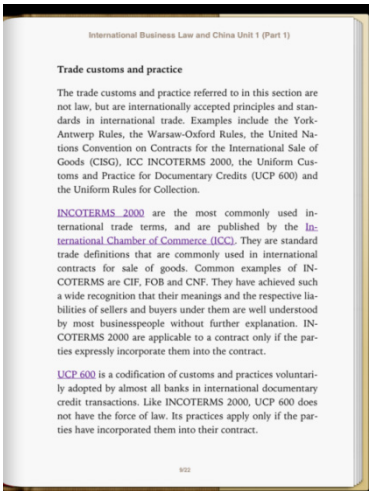
Text-to-Speech Function. Text can be read out to the learner conveniently, especially in some specific learning environments, such as when the learner is travelling inside a moving bus.

3.2 Conceptual Organization

The human processing-system searches for a conceptual organization in all sensory experiences, except the sense of smell. Learners look for and build structures of the knowledge they are learning, and such structures are used for future processing and storage of information (Gribbons, 1992). (Knowledge here includes facts, concepts, principles, rules, and procedures.) Hence, helping learners to build a structure or organization of the content to be learned is crucial for effective learning.

Conceptual organizations of content, for example concept maps, are important tools for presenting the content knowledge in textbooks. With such a structure, the component contents can be filled in.

Open textbooks allow teachers to incorporate different materials of their choice (such as websites and articles they have access to), into the learning structures. Teachers may also replace existing contents with those they identify to be of interest to their students.


International Business Law and China Unit 1 (Part 1)

Trade customs and practice

The trade customs and practice referred to in this section are not law, but are internationally accepted principles and standards in international trade. Examples include the York-Antwerp Rules, the Warsaw-Oxford Rules, the United Nations Convention on Contracts for the International Sale of Goods (CISG), ICC INCOTERMS 2000, the Uniform Customs and Practice for Documentary Credits (UCP 600) and the Uniform Rules for Collection.

INCOTERMS 2000 are the most commonly used international trade terms, and are published by the International Chamber of Commerce (ICC). They are standard trade definitions that are commonly used in international contracts for sale of goods. Common examples of INCOTERMS are CIF, FOB and CNF. They have achieved such a wide recognition that their meanings and the respective liabilities of sellers and buyers under them are well understood by most businesspeople without further explanation. INCOTERMS 2000 are applicable to a contract only if the parties expressly incorporate them into the contract.

UCP 600 is a codification of customs and practices voluntarily adopted by almost all banks in international documentary credit transactions. Like INCOTERMS 2000, UCP 600 does not have the force of law. Its practices apply only if the parties have incorporated them into their contract.

Fig. 1. Hyperlinks

In e-textbooks, the component chunks of knowledge in the conceptual organization are easily accessible through the use of hyperlinks (see Figure 1). Hyperlinks allow learners to have immediate access to related topics, cases, simulation and videos. It has been shown that using such links facilitates learning (McGowan, *et al*. 2009).

3.3 Spatial Arrangement

Spatial arrangements depicting the structure of information reduce the cognitive demands on the learner (Hartley, 1997). Less information processing work is required for understanding semantic information if it is presented in a spatial format, rather than in a serial, or textual manner. In the learning process, learners are often required to make sense of a complex set of information provided, to recognize the core ideas, and then to internalize difficult concepts and less essential concepts by using the graphic organizers to illustrate the problems. Graphics can also help students separate what is important to know from what might be interesting, but not essential information. Using a few clicks on those interactive graphics can lead students to explore the concepts step by step. This is one of the reasons why graphics, illustrations and tables are powerful tools to facilitate learning of students with language-based learning disabilities. In the e-textbook environment, the interactive graphics play the important roles for different learners.

3.4 Levels of Interactions

Interaction is an internal dialogue of reflective thought that occurs between the learner and the material. Things that might trigger and support this internal interaction of learning could be interaction with media—course materials that provide direct instruction (Ehrman, 1994).

Belanger and Jordon (2000) suggested three approaches to online courseware development, according to the levels of interactivity between learner and learning content. These include

a. Text and graphics

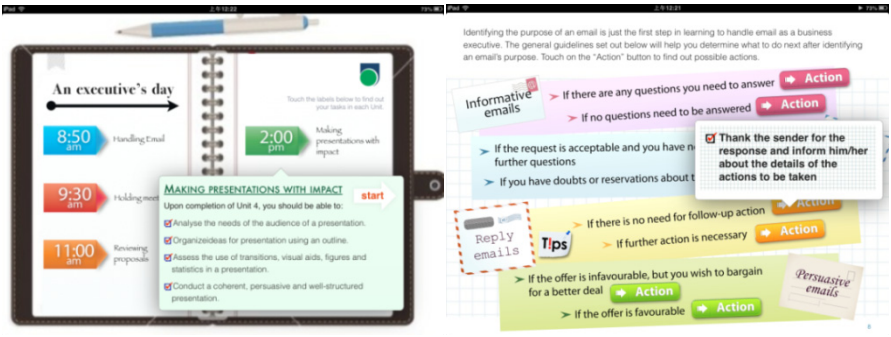


Fig. 2. Online content in text format in colour and with clickable information

b. Interactive activities with feedback

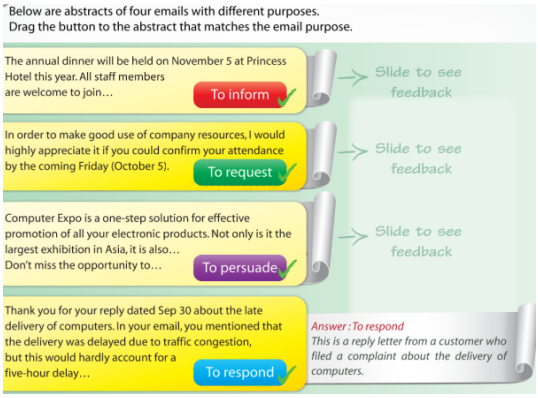


Fig. 3. Interactivities with feedback

c. Interactive multimedia components

Fig. 4. Audio components

In short, each event connected to an instructional strategy is an interaction that occurs between the learner and other human or technological resources. Interaction allows learners and participants to experience content, make sense of meaning, and be actively involved or participate in the learning process.

3.5 Other Functions in e-Textbooks Which Are Conducive to Effective Learning

Search Function. In traditional printed textbooks, an index page provided at the end of a book serves the purpose of locating the place when a topic is discussed in the book. In an e-textbook, this index function is conveniently served by the 'Search' function (Figure 5). This is a small but important tool for locating the places where a subject is discussed.

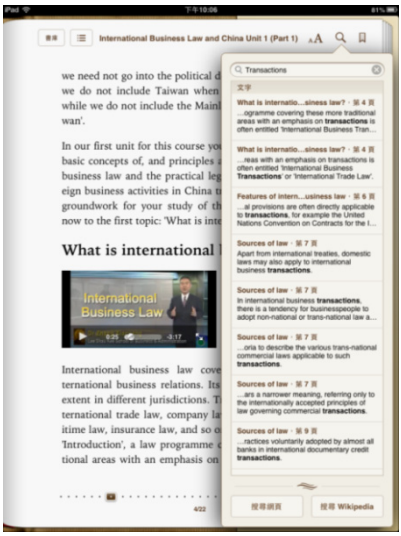


Fig. 5. The Search function

Interactive Tables and Figures. Interactive tables and figures in an e-textbook (Figure 6) provide convenient interaction between the learner and the content. Learners can visualize many 'what if?' situations when some of the figures are varied, but their own choice.

Fig. 6. Interactive tables and figures

Highlighting, Bookmarks and Notes Making. Some students find highlighting part of the text in a textbook assist memory of main points, especially for the purpose of examination. Others need to go to the place where they have left off with the e-textbook, or to jot down explanatory notes in places in the text to assist them in their revision. Such functions are easily provided for with e-books. See Figure 7.

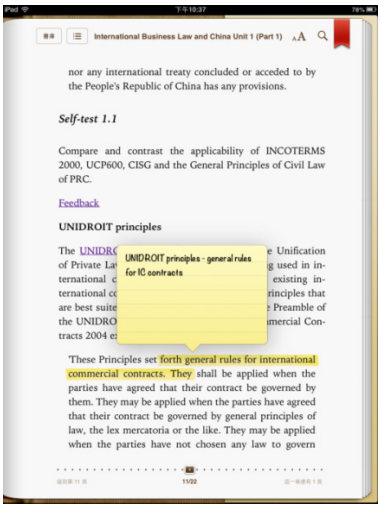


Fig. 7. Highlighting, bookmarks and notes making

Enlargement of Text. Some learners will also find this function useful when some text are presented in small font size (Nicholas and Lewis, 2009; Smith, 2008). Proper use of this function can perhaps resolve the problem of eyestrain in using the electronic display (Figure 8).

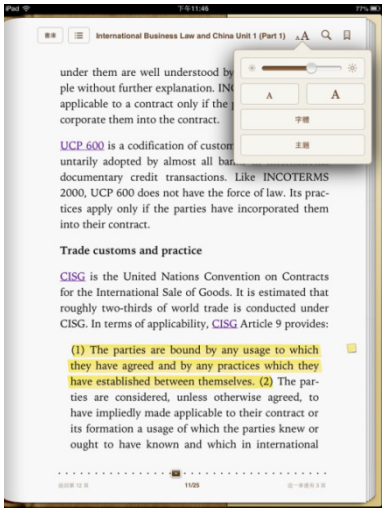


Fig. 8. Text enlargement

Communication Tools. Through this function learners are able to communicate with the teacher and their peers (Figure 9). The feature of notes sharing is another king of communication between students.

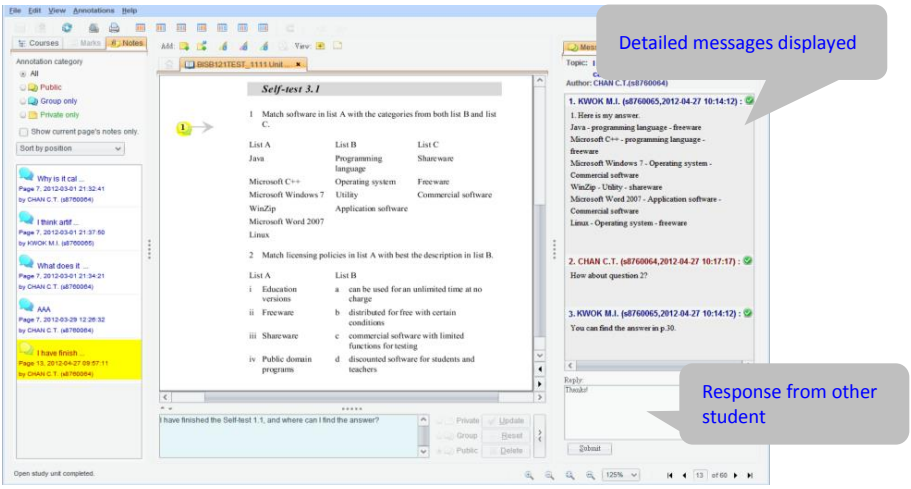


Fig. 9. Communication tools

4 Technological Considerations

Presenting the textbook content in a variety of electronic formats (e.g., web, PDF, e-Pub, audio), e-textbooks can be used in different reader devices to suit different learners' study preferences. The versatility is crucial to e-textbooks, as this is an important factor, perceived by 59% of purchasers of e-textbooks in an MBS Textbook Exchange study (Simba Information, 2006), for buying the e-textbooks.

Hence the first function the Open Textbook platform will provide is a repository for hosting textbook contents, courseware, teaching materials and resources. They will appear in different formats serving different purposes. Teachers and students can select appropriate textbook contents, teaching materials and resources, and they should be downloadable to a variety of PCs and mobile devices.

To tailor for students of different ability levels, teachers would very much wish to have an e-textbook which they can customize, i.e. they can use only selected parts of a book while adding to them other learning resources, some of which may be their own work. Due to the very restrictive copyright and technological constraints, such customization is often not easily achievable. Only open e-textbooks, which allow teachers to reuse, revise and remix the content, are able to satisfy the teachers' need. Linking to a repository of learning assessment items, an open textbook can also provide effective assessment to learning outcomes, and this is an important requirement in Hong Kong schools.

Hence the second function of the Open Textbook platform is that it will provide facilities for teachers to customize their adopted textbooks to fit specific teaching needs. The system has to support a two-way, interactive and iterative process whereby teachers can browse, download, revise, re-create and upload material to the same site.

The built-in architecture would anticipate and accommodate an on-going organic growth of the content driven by the bottom-up involvement of an ever expanding body of users, stakeholders and volunteers.

Moreover, the platform allows users to download and print out the selected and customized textbooks and courseware. It also allows teachers and students to send online requests to printing houses for mass printing of the textbooks. Besides, electronic versions of the selected customized textbooks and courseware are available to support online and mobile learning. The platform also provides a function for schools and teachers to generate an individual school site to house their customized textbooks and courseware.

In order to accommodate the flexible features, a content management system platform is required, which can handle many of structural, page layout, and metadata complexities. A flexible open source platform can handle re-flowable and page fidelity formats and incorporate with media-rich, integrated and interactive features.

A conceptual framework of the platform is given in Figure 10.

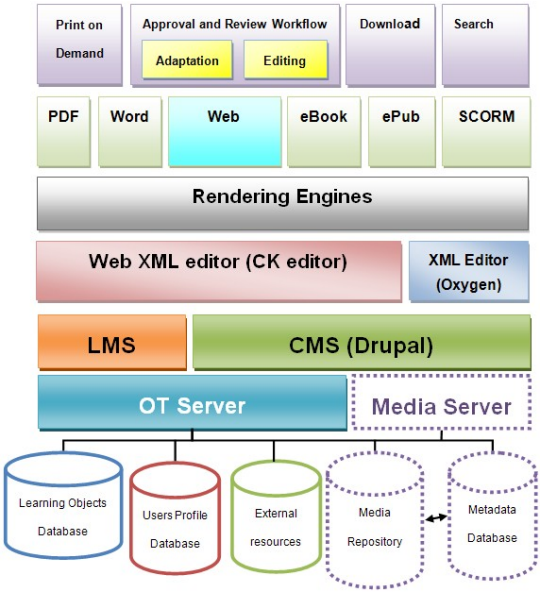


Fig. 10. A conceptual framework of the platform

5 Quality Assurance

To alleviate the worries and scepticism over the quality of free learning resources, a quality assurance mechanism will be set up and overseen by a team of subject experts, editors and technologists to monitor the development process, assess the quality, and review each item admitted to the system. These professionals take the role of 'co-authors' and 'gate-keepers' for the quality of the textbooks. The content will be continually reviewed, updated, improved and enriched with reference to the ratings and

feedback gathered online and offline. Apart from internal quality procedures, the following recourses will also be in place:

- Peer review – Where appropriate, the developed content will be forwarded to individual peers or groups from professional organisations, by voluntary or paid service.
- Government review panels – In the case of textbooks for primary and secondary education, the final product will be submitted for assessment by Review Panels of the Textbook Committee of the EDB in the same way as a commercial textbook, with a view to being placed on the Bureau's 'Recommended Textbook List'.
- Open review and rating – The online platform should provide an opportunity for teachers, educators, parents and other users to review and rate the materials in public. Such transparency helps to identify any shortcomings, ensure the effectiveness of the particular resource and in turn further bolster its quality.
- Systematic evaluation and research – The OUHK has the expertise to ensure that systematic and timely studies together with other stakeholders are carried out to evaluate the service outcomes and assess the level of users and participants satisfaction.

6 Conclusion

The project has come a long way from its conception to detailed design to development. We have only started our first step and we understand huge difficulty is still ahead of us.

However we believe that open educational resources characterized by digital development, online access and open licence will significantly reduce textbook costs, shorten production time, improve and widen public access and enhance delivery efficiency. Most importantly they will allow active participation of teachers and will enormously enhance the effectiveness of teaching and learning.

In the medium term, the benefits attained will prove their value and justify strong support by users, institutions and policy makers.

In the long run, the project will become a public platform providing services primarily to teachers and students, and any other users with the enthusiasm to collaboratively contribute to the content, whether by way of writing, editing, enriching, commenting or amending. The expanding community and capacity thus generated will ensure a clear understanding of quality standards and requirements, and provide ample energy, relevant experiences and favourable conditions for the continuous improvement of the programme and achievement of successful outcomes.

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The Multifaceted Aspects of Blogging as an Educational Platform

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Abstract. Initially a tool for social networking and recreation, the blog has now found its way into education and become a platform for learning through social and cognitive constructivist discourse. Through blogging, students collaborate and scaffold their information in order to build knowledge. This educational process is encapsulated in the Cognitive of Inquiry Framework (Garrison, Anderson and Archer, 2000) which breaks it down into these elements: cognitive, social and teaching presences. The purpose of this study was to use this framework as a basis for exploring blogging in an English Immersion Program in a University in Singapore and to investigate the efficacy of blogging in improving students' English writing skills.

Keywords: blogging, Community of Inquiry Framework, constructivism, collaborative learning, scaffolding.

1 Introduction

The dichotomous nature of blogs allows for self-expression and reflection on one hand, and two- or multiple-way communication, which enables participants to reflect, scaffold and build knowledge, on the other. Cobb (1994) labels these two strands as cognitive constructivism and social constructivism. In the former, knowledge is acquired through observation and reflection. In the latter, knowledge is negotiated and created through collaboration and scaffolding.

In the same vein and in the ESL classroom, blogging can be individualistic or collaborative in nature. Blogs can be used for both reflective journaling on one hand and group work on the other (Murray and Hourigan, 2008). Where tasks are appropriately designed, blogs help to encourage critical thinking (Orevic, 2002) and interactivity among learners (Ferdig and Trammell, 2004). Journal writing in blogs, for example, can unleash self-expression, enable students to improve their written fluency and encourage them to explore ideas through reflection. At the same time, group discussions and collective problem-solving encourage participants to work together, learn from each other, synthesize information, and build knowledge on existing ideas (Lee, 2010; Nyotim, 2010). Through that process, higher order thinking skills are developed. Such an approach to learning is based on the constructivist school of thought.

J. Lam et al. (Eds.): ICT 2013, CCIS 407, pp. 56–68, 2013.

The theory of constructivism has greatly influenced pedagogy in higher education in recent years. Vygotsky (1978) stressed the importance of social interaction and of learning from someone more capable than oneself in enhancing one's learning. In the same vein, Dewey (1959) sees collaboration as an integral part of cognitive development since cognition cannot be separated from the social context. He observed that "the educational process has two sides- one psychological and one sociological: and that neither can be subordinated to the other or neglected without evil results following (p. 20)". However, although considerable interest has been paid to translating such a concept to practical pedagogy, it has not been an easy task. Karagiogi and Symeou (2005) has pointed out that constructivism is a learning philosophy and not a learning strategy or system and so it poses great challenges when adopted in real classroom situations. In addition, it argues that not all learners are able to competently take control of their own learning. Some of them may not benefit as much as intended and may even end up learning the wrong things. Merill (as cited in Draper, 1997) notes the importance of appropriate guidance over 'sink or swim' exploration. He continues to point out that allowing students to learn in an "ill structured environment' without knowing their own learning mechanism is "not a great virtue but an abdication of our responsibility as teachers and instructors (p. 6). In addition, blogging per se does not necessarily move discussion towards higher order thinking. Most discussion would remain at the information sharing and brainstorming stage (Garrison and Arbaugh, 2007). As such, many studies have suggested the need for greater attention to be paid to blog task design, teacher facilitation and direction as there is a close link between teaching and cognitive processing. (Garrison & Arbaugh, 2007; Meyer, 2003; Murphy, 2004; Shea & Bidijermo, 2008).

The purpose of this study was to explore the constructivist approach to ESL writing through blogging and to evaluate its efficacy, particularly in engaging students in a meaningful educational process. The research questions are:

(1) How does blogging help students construct and share knowledge about academic writing?

(2) In what ways does blogging enable students to develop authentic language use?

As a starting point, the paper explores the cognitive levels in online asynchronous discourse. It further studies the role of social presence and teacher presence in drawing higher order thinking.

2 Analytical Framework

This study is based on the Community of Inquiry Framework (Garrison, Anderson and Archer, 2000). The process of asynchronous online learning is analysed according to these three elements: cognitive presence, social presence and teaching presence. All three are closely linked to each other and collectively, they influence the quality of online community discourse and ultimately, that of individual inquiry. Figure 1 illustrates this concept and an explanation of each of the elements within the framework follows.

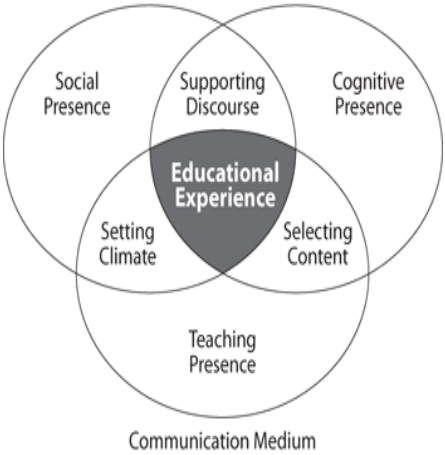

Fig. 1. Community of Inquiry (Garrison, Anderson and Archer, 2000, P.88)

Cognitive presence refers to "the extent to which the participants in any particular configuration of a community of inquiry are able to construct meaning through sustained communication (Garrison, Anderson and Archer, 2000, P.89). Cognitive presence is vital to critical thinking, which is an integral part of higher education. The second core element, social presence, is "the ability of participants in the Community of Inquiry to project their personal characteristics into the community, thereby presenting themselves to the other participants as 'real people' " (Garrison, Anderson and Archer, 2000, P.89). Social presence supports cognitive presence. In cases where it is necessary for social presence to ensure that participants enjoy remaining in the online discourse, social presence has a direct contribution to the educational process. The third element in this framework, teaching presence, is the main responsibility of the teacher, which is to support and enhance social presence and cognitive presence. The main functions of teaching presence are design, organization and assessment of learning activities, facilitation and direct instruction.

Table 1. Community of Inquiry Coding Template

Elements	*Categories*	*Indicators*
Cognitive Presence	Triggering event	Sense of puzzlement
	Exploration	Information exchange
	Integration	Connecting ideas
	Resolution	Apply new ideas
Social Presence	Emotional expression	Emotions
	Open communication	Risk- free expression
	Group cohesion	Encouraging collaboration
Teaching Presence	Instructional management	Defining and initiating discussion topics
	Building understanding	Sharing personal meaning
	Direct instruction	Focusing discussion

(Garrison, Anderson and Archer, 2000, P.89)

Table 1 illustrates the three main elements of a community of inquiry, the categories which are derived from these three elements, and the indicators of the elements found during an online discourse. These categories were adopted as a coding template for our present study.

3 Methodology

3.1 Context of the Study

The study was based on an English Bridging Program designed for pre-matriculated students who were in their third and final phase of study. Upon completion of this program, they would embark on their undergraduate studies in a Singaporean public university. In this final phase of their program, students were required to participate weekly in a class blog to reflect on their experiences and share them. The total cohort numbered 65 and they were divided into 3 groups of 22, 22 and 21 students respectively. The purpose of this blog writing activity was to encourage interaction among students, to create cohesiveness within the cohort of 65 students, and to provide a platform for discussing academic work. In other words, the blogs served both social and academic purposes.

3.2 Participants

The participants were pre-matriculated students (aged 17 to 8 years old) who had completed the second year of their senior high school in China and had taken up a scholarship to pursue their undergraduate studies in Singapore. At the point of this research, their English proficiency was judged to be of intermediate/upper intermediate level. All the students owned electronic devices such as laptops and smartphones, and they were familiar with the use of Chinese language social networking platforms like Weibo, MSN and QQ. However, almost none of them had experience in social networking in English and none had ever engaged in blog writing for academic purposes.

3.3 Procedure

At the beginning of the semester, students were told that, in tandem with their classroom instructions and team research project, they were required to use blogs to reflect on their learning. A blogspot was created for each of the three groups of students and a new topic was posted weekly. Students were required to respond to the weekly posts, and add remarks to at least one classmate's comments. Where necessary, the teacher would intervene sporadically with comments with the intention of directing the discussion. Students were told that their blog participation would be graded under "class participation". In total, there were 10 blog posts (see table 2 for details) and they fell into one of these categories: responses based on assigned readings or personal experience (blogs 1, 2, 7and 9), discussions on the different stages of the team research project (blogs 3, 4, 5, 6 and 8) reflection on the blogging experience (blog 10).

Table 2. Description of Blog Posts

Sequence of Blog Posts	Topics
1	Reflecting and sharing about challenges in adjusting to living and studying in Singapore (based on a research report about freshmen adjusting to college life)
2	Reflecting and sharing thoughts about parenting styles (based on a write-up on "Battle Cry of the Tiger Mom" by Amy Chua)
3	Reflecting and sharing about how decision on a research topic was reached
4	Reflecting and sharing about the progress of work made in a team research project
5	Reflecting and sharing about conducting a survey for a team research project
6	Reflecting and sharing about writing up a research report
7	Reflecting and sharing about the university open day
8	Reflecting and sharing about content taught during lectures about oral presentation for a team research project
9	Reflecting and sharing about the topic on happiness (based on a write-up)
10	Reflecting and sharing about the blogging experience

3.4 Data Collection and Analysis

An eclectic approach was adopted for this study. The methods used included content analyses of selected blog posts and ensuing entries written over a ten week period, analysis of survey results and qualitative analysis of students' self reports. The results were then corroborated.

Content Analysis. As the study mainly focused on cognitive presence in online discourse, only blogs 3, 6, and 8, which were students' discussion on the different stages of their team research project, were selected for content analysis. The blog discourse in those posts were coded using the categories listed in the Community of Inquiry Coding Template (Garrison, Archer & Anderson, 2000). It was decided that the unit of analysis was to be a complete message.

The wordings of the selected blog posts and the number of comments received are as below:

Blog 3 (Posted at the beginning of the research project when students were deliberating on a research topic)

> *Deciding on a research topic is not as simple as one would think. It takes quite a while to become familiar with a topic and think of an area to focus on. You also need to make sure that your topic is doable. Discuss how you decided on your research topic. What were some of the difficulties/ challenges that you faced? Also, read another person's comments and respond to them.*

A total of 182 student comments were made on this post.

Blog 6 (Posted when students were about to blog or were blogging about their research project after a lecture on "writing a research report")

Now that you have collected all your results, you must be poring over them, organizing your data, and drawing your conclusions. In 150 words or so, share your experiences of writing your report- the highs and the lows. Also, remember to respond to at least one classmate's post.

A total of 182 student comments were made on this post.

Blog 8 (Posted when students had already written up their reports and were now at the stage of preparing for their presentations)

In the last two lectures, you learned about the various aspects of oral communication. How are you going to apply these to your coming TRP presentation next week? In 150-200 words, share your thoughts here. Also, respond to at least one classmate's post.

A total of 142 student comments were made on this post.

Qualitative Analysis. A separate qualitative analysis of blog 10 (student self-report) was also carried out to corroborate with the results obtained through content analyses of blogs 3, 6 and 8 and those of a questionnaire survey. Unlike blogs 3, 6 and 8 which were analyzed using the Community of Inquiry Framework, open coding was adopted for analysing blog 10. In this method, recurring themes were identified. The wording of this blog post is as below:

This is the final blog post! In 150-200 words, share about your blogging experience here. Over this term, did blogging enable you to express yourself more freely in English? Did it help you to share ideas with your friends and learn from them? Did blogging about your TRP help you reflect on your project? Again, respond to at least one classmate's post.

Survey Results. A short survey was carried out to find out if students had found blogging to have helped them in various aspects of their writing. The responses were given on a Likert scale of 1 to 5 (5 = strongly agree; 4 = agree; 3 = neutral; 2 = disagree; 1 = strongly disagree). The results were then corroborated with findings from the qualitative analysis to form a fuller understanding of students' attitude towards blog writing on their course.

General Observations. General observations about writing style, length of reply and interaction patterns were also made.

3.5 Methods Corresponding to Research Questions

Specifically, the research methods were employed in the following manner to answer these research questions (as seen in Table 3):

Table 3. Research Questions and Corresponding Research Methods

Research Questions	Research methods
1. How did blogging help students construct and share knowledge about academic writing?	Content analysis of blogs 3, 6 and 8; general observations; analysis of blog 10
2. In what ways did blogging enable students to communicate for genuine reasons?	Survey results; analysis of blog 10; general observations

4 Results and Discussion

4.1 Sharing and Constructing Knowledge about Academic Writing

To answer the first research question "How did blogging help students share and construct knowledge about academic writing?", content analyses were carried out on blogs 3, 6 and 8. The unit of analysis was a complete message. The results and discussion are given below:

Table 4. Results of Content Analysis on Blog 3

Elements	*Categories*	*Indicators*	*Percentage of Occurrence*
Cognitive Presence	Triggering event	Sense of puzzlement	0.00
	Exploration	Information exchange	36.77
	Integration	Connecting ideas	0.00
	Resolution	Apply new ideas	0.00
Social Presence	Emotional expression	Emotions	22.62
	Open communication	Risk-free expressions	14.5
	Group cohesion	Encouraging collaboration	6.5
Teaching Presence	Instructional management	Defining and initiating discussion topics	1.57
	Building understanding	Sharing personal meaning	16.37
	Direct instruction	Focusing discussion	1.67

In blog 3, students were asked to discuss how they decided on a research topic and to respond to at least one classmate's comment. It was found that the general pattern of interaction was quite basic and linear, with the discourse rarely going beyond two or three turns. Typically, the student would post his comment and this would be followed by a response by the teacher and then by just one or two short responses from

classmates. The comments by classmates were mostly affective ones (expressing fear, hope, anxiety and exasperation), banters or words of encouragement.

At this initial stage of the team research project, which coincided with blog 3, teacher response was important as it served to encourage students to participate. In terms of the proportion of social vis a vis cognitive presence, it was found that the number of turns coded as "social presence" were higher than those coded as "cognitive presence".

Table 5. Results of Content Analysis on Blog 6

Elements	***Categories***	***Indicators***	***Percentage of Occurrence***
Cognitive Presence	Triggering event	Sense of puzzlement	16.00
	Exploration	Information exchange	23.00
	Integration	Connecting ideas	5.14
	Resolution	Apply new ideas	13.73
Social Presence	Emotional expression	Emotions	19.33
	Open communication	Risk-free expressions	13.75
	Group cohesion	Encouraging collaboration	3.70
Teaching Presence	Instructional management	Defining and initiating discussion topics	1.64
	Building understanding	Sharing personal meaning	1.60
	Direct instruction	Focusing discussion	2.11

Blog 6 was posted when students were already some weeks into their project. In this blog, they were asked to reflect on their experiences of writing their research reports. At this stage, they were on surer ground. They knew their topic, had collected data and were confident about their findings. They had also attended a lecture which helped reinforce what they already knew about report writing.

However, the general pattern of interaction was still quite basic. Typically, students would post their response to a question and this would then be followed by short comments. Typically, each student comment would be accompanied by a few very short turn and very rarely did the discourse go any further. This linear pattern of interaction was true of most of the blogs.

However, here in Blog 6, there was a noticeable shift in the type of content. Since students had done more work in their research project and were now surer of their work, the cognitive presence in this blog outweighed the social presence. There were also noticeably longer turns than those found in blog 3.

Towards the end of the project, students contributed to Blog 8. At this stage, students were required to make an oral presentation. They had previously done oral presentations and this time they were given two lectures on presentation skills. In blog 8, students were asked to reflect on what they had learned during the lecture and discuss what they were going to do next.

The general pattern of interaction resembled that of blog 6. It was mainly linear. Social presence was still significant, but the students wrote more extensively. Teacher presence was further reduced as students took greater ownership.

Table 6. Results of Content Analysis on Blog 8

Elements	***Categories***	***Indicators***	***Percentage of Occurrence***
Cognitive Presence	Triggering event	Sense of puzzlement	7.12
	Exploration	Information exchange	9.56
	Integration	Connecting ideas	23.9
	Resolution	Apply new ideas	5.96
Social Presence	Emotional expression	Emotions	26.08
	Open communication	Risk-free expressions	18.16
	Group cohesion	Encouraging collaboration	6.48
Teaching Presence	Instructional management	Defining and initiating discussion topics	1.51
	Building understanding	Sharing personal meaning	1.23
	Direct instruction	Focusing discussion	0.00

What was perhaps even more interesting was that in terms of the type of cognitive presence, exploration (information exchange) was found to be the most dominant form in blogs 3 and 6. This is consistent with the literature which reports that online discussion rarely moves beyond the exploration phase (Garrison, Anderson & Archer, 2001; Kanuka & Anderson, 1998, Luebeck and Bice, 2005; Meyer, 2003; Murphy, 2004; Lee, 2011). In blog 8, however, there was a much higher proportion of integration and resolution. This was to be expected since discussion organized around problem solutions or the completion of tasks are more likely to move towards resolution. Since direct instruction had been delivered through lectures, it was possible for students to come to a resolution quickly.

Content analyses of blogs relating to academic work showed that task designs and direct instruction had a direct bearing on the type of blog responses. For example, in blog 3 when students were asked to discuss how they decided on their research topics and about the difficulties they had faced, 100% of their blog entries could be categorized as "exploring". When students were asked to reflect on the "highs" and "lows" of writing their research reports in blog 6, the discourse was shown to have moved into the "integrating" and "resolution" dimensions. An even higher proportion of entries were categorized as "integration" and "resolution" in blog 8, when students were asked to discuss how they were going to present their research project. This was because they had received clear instructions about how to present a research project thus making it possible for them to reach a resolution. From here, we can see that discourse patterns can change over time, situation and task.

In the earlier blogs, teacher presence was more obvious. The teacher responded to each blog entry so that students would know that their work was being read. Students were highly conscious of the teacher and reacted to that fact. For example, when the students realized that the teacher tended to respond more extensively to the first few blog comments in the week, quite a few of them would compete to be among the first to post their comments. However, the pattern of interaction was still linear and rather

stilted. It was also found that teacher absence was strategically helpful in some respects. For example in the later blogs when teacher participation became less dominant, students began to "own" their writing, the interaction pattern became more natural and there were more and longer turns in the discourse.

In general, students found that through blogging, they shared ideas and discovered new perspectives. In their self reports (blog 10), students had this to say about the efficacy of blog writing to team research project writing:

"Sometimes I find that "Oh, I can think in that way", and it's really helpful in broadening my mind. [sic]

I have learned a lot from the peers and had new perspectives on some issues.

Over the same topic, I can read differing views which helped me think over a topic from different perspectives[sic]

Blogs enable us to refine our ideas, deepen our thoughts. [sic]

As for TRP communication, blogging has really done a job, especially when all the groups were conducting their research. We can communicate our thoughts on blog and sometimes learn some skills that other group used. In this sense, blogging is very useful in guiding us in TRP. [sic]

4.2 Communicating for Genuine Reasons

To answer the second question, "In what ways did blogging enable students to communicate for genuine reasons?", general observations were made and a survey was carried out. In addition, students' self report in blog 10 was analysed qualitatively.

Survey. A survey was carried out to find out if blogging had helped students express themselves more freely, share ideas and reflect. On a Likert scale of 1 to 5 the average result obtained was a more than a '4' for all three items. The results are given below:

Blogging helped me express myself more freely in English (4.11)
Blogging helped me share ideas with my classmates (4.16)
Blogging helped me reflect on my team research project (4.09)

Qualitative Analysis. Blog 10 revealed how students felt about blogging.

Students reported that through blogging, they saw that they could see that English should be used more authentically for everyday situations:

English is not always meant to be used in an academic way. Instead, most of the time, we use it to communicate with others. So mastering English and more importantly, using it freely is the real purpose of learning it. [sic]

Blogging has also enabled students to help students create an "inner" voice.

What I think about writing blog is that it could express our inner voice and that keeping blog is just like keeping journals, which is a good habit for enhancing the level of emotional well-being. [sic]

In addition, many students said that they liked to read other people's blog entries, respond to their writing and banter along because these helped them relax. Blogging also enabled them to give vent to their frustrations, particularly about their team research project. The social aspect of blogging (e.g. bantering, building a sense of camaraderie, peer support) was clearly significant as it made the online writing task and research project less onerous:

The most interesting part … must be reading others' comments! Especially the ones aimed to blacken somebody.. (Thor did a rather good job!) [sic]

Whatever hardship I met, there were always some people met worse than me and this made me feel better (I know this thought is evil…) [sic]

When we were struggling in choosing a topic for our team research, I read about other classmates' comments. After finding out that many of them also met some problems I felt much better. [sic]

It is also an "outlet" for us to release our pressure and (e)motions". [sic]

The social/personal/recreational aspect of blogging also had a practical value. For example, students would read the blogs to check and compare the progress of their peers' project work with theirs, as well as to find out what problems their peers had encountered and how these were solved:

This help our team to keep our steps with others[sic]

Generally speaking, since the students wrote for authentic and practical reasons and expected some response from peers, there was much sincerity and expressiveness in their writing.

5 Summary and Conclusion

In terms of using blog writing as a tool to develop high order thinking, it was found that blogging was catalytic in triggering ideas (i.e. creating a sense of puzzlement), exploring (i.e. exchanging information), integrating (i.e. connecting ideas) and resolving (i.e. applying knowledge to solve problems).

Being adept at social networking (e.g. facebook, MSN and Weibo), students tended to see blogging as a recreational (as opposed to academic) tool. Their less formal style of writing reflected this mindset. In the blog entries, they were able to express themselves fluently. In their self-reports, they said that they valued this social dimension of online learning because it gave them a chance to express their personal (as opposed to academic) views about issues that they cared about and a chance to develop a sense of online camaraderie. This was significant as blogging was their only avenue for self-expression and interaction in English since they normally communicated in Putonghua. Such a positive attitude towards blogging correlated with the survey findings

where, on a Likert scale of 1 to 4, students indicated that blogging had helped them express themselves more freely in English (4.11) and that it had helped them to share ideas with their classmates (4.16).

It is clear that social presence heightened students' interest in blogging, whether it was writing about social/personal topics or about academic work. Through this, students' written fluency could be developed. Therefore, in terms of task design, the social aspect of blogging should be given consideration.

However, blogs are also limited in some ways. Blogs, with their encouragement for free expression, do not allow for sufficient attention to be given to language accuracy. In addition, blog comments tend to be short, and exchanges are not sufficiently followed through to bring about a more constructivist collaborative type of learning.

Therefore, steps should be taken to remedy this so as to realize the full potential of blogging in EFL. This can be achieved through tasks designed to draw out higher order thinking.

Heightened teacher intervention should serve cause students to pay more attention to their grammar. The teacher could also play a more active role in direct discussion and ensuring that it does not sidetrack. However, care must also be exercised by the teacher not to stifle or take over a discussion. A fine balance must be struck between providing a firm hand of guidance and allowing students to take ownership.

Finally, student expectations about blogging have to be managed. This is especially true for students who use the social network solely for recreational and not academic purposes. They need to be initiated into and trained to participate effectively in online discourse for academic purposes.

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Evaluation on Students' Experience of Course Management System

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Abstract. Nowadays, Blended-Learning is growing rapidly worldwide. More and more higher education institutions are integrating e-learning into their standard pedagogy. Course Management System (CMS) is a kind of e-learning system which is adopted to facilitate instructors and students to deliver course materials, submit assignments and tests, create learning activities, and share documents. Our Institute has started to use Moodle as our CMS for two years. In this paper, we will present preliminary findings from a small scale study exploring the students' experiences on using our Moodle system. The data are obtained from group interviews with students. The preliminary findings indicate that students only utilize Moodle system for performing limited learning tasks. Students prefer using social networking to using our Moodle system for discussing assignments and sharing learning materials with classmates. As CMS is under-utilized, we believe that if students are more inclined to use CMS cooperated with popular social networking services, it may effectively promote online community and enhance collaborative learning amongst students.

Keywords: Course Management System, CMS, Moodle, e-learning, community building, collaboration learning.

1 Introduction

The blooming technologies have changed the ways of teaching and learning in educational institutions as Blended-Learning is growing rapidly worldwide. More and more higher education institutions are integrating e-learning into their standard pedagogy. Course Management System (CMS) is a kind of e-learning which is adopted to facilitate instructors and students to deliver course materials, submit assignments and tests, create learning activities, and share documents (NUIT, 2013). CMS is not intended to replace the traditional face-to-face lecture because the main roles of CMS are to supplement the traditional face-to-face lecture for delivering course materials, providing discussion forum and other learning activities through the internet or intranet in the campus.

The current CMS of our Institute has been used for two years. Most courses are available on this CMS. It is used for delivering course materials, providing discussion forum, sharing documents and creating learning activities. Therefore, variables and

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factors that influence our students' learning activities in this online learning environment have become essential concerns of the research team. A small scale pilot study was conducted to collect preliminary data. The purpose of this study is to solicit students' feedback on their experiences and their level of satisfaction with the use of our Institute's CMS. In addition, the study also aims to investigate students' views and expectations about the usage of the Institute's CMS. The qualitative data were obtained from group interviews with students. Since the study is solely at its on-going stage, the findings we have obtained are preliminary from limited data. We begin with an overview of the Course Management Systems. Then, we describe the research methodology. Finally, we discuss the preliminary findings and conclude with a summary.

2 Course Management System

A CMS is to provide an instructor with a set of tools and a framework that allows the relatively easy creation of online course content and the subsequent teaching and management of that course including various interactions with students taking the course (EDUCAUSE, 2003). This web-based system can be used to facilitate the coordinated delivery of course materials and provide a channel for communication and discussion among students and instructors. It can further be used to administer quizzes, tests, and assignments, and deliver important notices and announcement to students. Currently, there are many CMS providers around the world and the most popular CMS ones include Blackboard, Moodle, Sakai and Desire2Learn (EDUCAUSE, 2003; Watson, 2007). The Campus Computing Survey presents a snapshot of the current higher education market. Blackboard is the market leader in the higher education sector and Moodle is the second market leader (Bergen 2013). Furthermore, a report from Campus Computing Project (2012) indicates that Moodle has been increasing of its market share in the last two years. Currently, Moodle becomes one of the popular CMS in the higher education sector. According to the Moodle official website[1], there are about 83 thousand registered sites and 70 million users in 236 countries. In Hong Kong, there are about 189 sites in total including education sector, private sector and personal users.

Moodle is a free web application that educators can use to create effective online courses with opportunities for rich interaction (http://moodle.org). It was created by an Australian educator Martin Dougiamas to provide a learning environment with a focus on interaction and the collaborative construction of content. Moodle has several features considered typical of an e-learning platform. Some typical features of Moodle are assignment submission, discussion forum, files download, grading, online instant messages, online calendar, online news and announcement. Nowadays, many Hong Kong higher education institutes have adopted Moodle as their campus CMS (CIHE 2013, CUHK 2013, HKBU 2013, HKIEd 2013, HKU 2013, LU 2013, PolyU 2013, VTC 2013). It is inclined to use Moodle system in Hong Kong higher education sector.

[1] https://moodle.org/stats

3 Course Management System in our Institute

Our Institute has adopted Moodle as a CMS since the 2011-12 academic year. This e-learning platform provides a good channel for students and instructors. Instructors can upload course materials to the system whilst students can download or view them from the platform. The course materials contain necessary files to support learning and teaching. These materials include Teaching Plan, Presentation Slides, Lecture Notes, Exercise and Exercise Solution, etc. A sample of course in the Moodle system is shown in Figure 1.

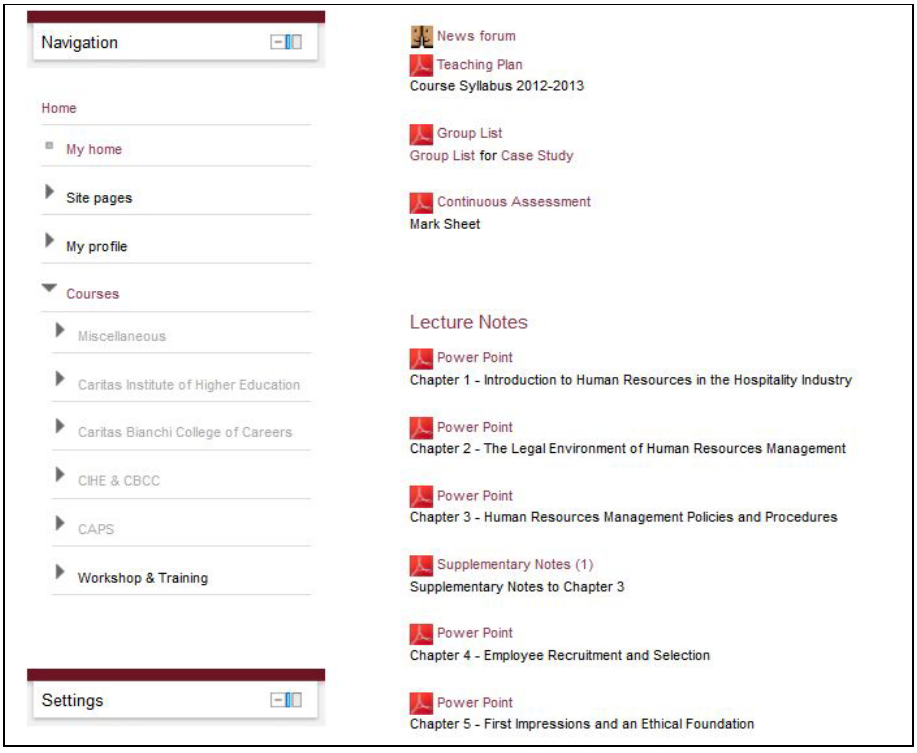

Fig. 1. A sample course in the Moodle system

Apart from these learning materials, a number of features have been introduced to the system, such as announcement or discussion forum. Instructors can use the Announcement feature to deliver notice to students. When instructors post the announcement event, the message will immediately be displayed on the e-learning platform. Students will also receive this announcement in email. An example of announcement in the e-learning platform is shown in Figure 2.

Fig. 2. An example of announcement of a course in the Moodle system

Furthermore, the e-learning platform also provides a two-way communication channel between instructors and students. The discussion forum makes the system more interactive. Instructors and students are much engaged in discussion forum. A capture screen of the discussion forum topics and contents are shown in the Figures 3. Currently, most courses of our Institute available in our Moodle system can facilitate various e-learning activities.

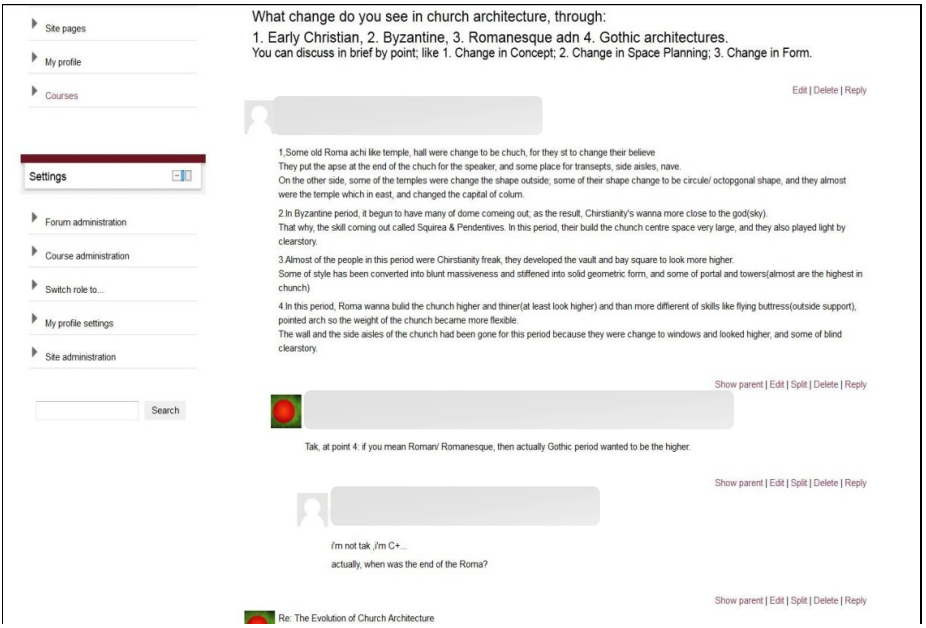

Fig. 3. The Discussion Forum in the Moodle system

4 Methodology

The goal of this study, in the form of focus group meetings with students, was mainly to solicit students' feedback on their experiences and their level of satisfaction with

the use of the Moodle system. In addition, this study also aimed to investigate students' views and expectations about the usage of the Moodle system in our Institute. Nine participants, consisted of 6 female and 3 male students, were interviewed to examine their involvement and interaction in this online learning environment. This research was conducted during the academic year 2012-13. The participants were pursuing post-secondary programmes in our Institute. In this study, participation was on voluntary basis and all responses were anonymous. This study attempted to answer the following research questions:

- What are students' views on e-learning?
- What are the general experiences of these students in using the Moodle system?
- What are the satisfactory and unsatisfactory aspects of the Moodle system from these students' perspectives?
- What are the arrangements and improvements which students would like to find in the Moodle system in the near future?

5 Preliminary Findings and Discussion

The qualitative data was obtained from interviews aiming to gather students' reflective experiences using the Moodle system. First of all, student expressed their views and past experience of the e-learning. Figure 4 showed some students' feedback about their views on e-learning and Figure 5 showed some students' feedbacks about their past experience of the e-learning.

According to the preliminary findings, students thought e-learning was related to online learning or using online platform to deliver learning materials on the Web. Students' views on e-learning were considered equivalent to the web-based learning or using online platform. By the definition from the OECD (2005), e-learning refers to the use of information and communications technology (ICT) to enhance and/or support learning in education. Therefore, the web-based learning may become a trend of e-learning.

There were many courses available on the online platform.

My secondary school has used "e-class" for e-learning.

When my teachers upload assignments on the online platform, I will download the assignment and do it.

Fig. 4. Some students' feedback about their views on e-learning

I have experience on e-learning platform even in primary school.

The e-learning platform in my secondary is similar to the current Moodle system so I am familiar with the Moodle system.

Fig. 5. Some students' feedback about their past experience on the e-learning

For their past experience on the e-learning, most of students reported that they had used e-Learning platform in their secondary or even primary schools. Only two students reported that they did not have any experience on e-learning system in their secondary schools in China. It might be due to the ICT in Education policy which started from 1998 in the Education Bureau, HKSAR[2]. It was recommended that schools should emphasize strongly the use and development of information technology in the curriculum from Primary 1 to Secondary 7. Since students had experience on using web-based platform, they might be easily to pick up our web-based platform "Moodle". The research team considered that students who studied in Hong Kong secondary school had past experience on using web-based platform for few years. The research team assumed that students might have a tendency towards using web-based platform in the Institute. Thus, students might fewer obstacles to use our web-based platform "Moodle".

About students' general experiences in using the Moodle system, students' feedback was shown in Figure 6. All students agreed that the Moodle system was user-friendly. Although there were a lot of features in the Moodle system, downloading learning materials was the only activity most of the students conducted on the Moodle system. Students might not be interested in utilization of other features in the Moodle system. Furthermore, most students agreed that they preferred using other online tools for communication with others to the Moodle system, such as WhatsApp, Facebook and email. If they need to communicate with instructors, they preferred using email because of more direct and personal way.

Instructors post PowerPoint and notes on the Moodle system.

I use the Moodle system only if instructors post lecture notes to there.

I will download the lecture notes from the Moodle system before examination.

I download lecture notes and assignments from the Moodle system to my PC; then; I share these documents and information through Facebook or WhatsApp to my classmates.

If I need to communicate with instructors, I will do it through email. It is because email is direct and personal way.

If I need to select from Moodle and Facebook to communicate with my peers, I prefer Facebook because they are common in my social groups.

I feel uncomfortable to use the discussion forum in the Moodle system because it is too formal.

Is it possible to change the Moodle system which same as some popular discussion forum sites? e.g. discuss.com.hk

Fig. 6. Some students' feedback on their general experiences in using the Moodle system

[2] `www.edb.gov.hk`: Information Technology Learning Targets, Education Bureau, HKSAR.

A recent research showed that students felt "comfortable" with instructors on Facebook and wanted regular online discussions with instructors (Muñoz & Towner, 2009). It was echoed in this preliminary finding, most students preferred using social networking services, such as Facebook and WhatsApp, so as to share information and conduct online discussions with their classmates or friends. Although the Moodle system provided similar features for discussion and forming groups, students seemed to have no interests there. The reasons why students like using social networking sites or other web tools (such as Facebook, email and WhatsApp) are simply because of their habits or daily usual rituals. Thus, we may intuitively conclude that students have already built an online community in social networking sites. Students are more willing to conduct discussion activities there. Students' attitudes did not resist using discussion forum on the Moodle system if they found peer groups there. If instructors and students can actively participate to use the Moodle forum, the online community may be built among students there.

On the other hand, some students felt that the Moodle system was too formal; they felt uncomfortable to communicate with instructors there. Students feared that their classmates could see their personal communications with instructors on the Moodle forum. Students also reflected that the popular discussion forum sites, such as discuss.com.hk or Uwants.com, have clear interface and interactive function. If the Moodle system was similar interface with these popular discussion forum sites, students may feel interest and comfortable to participate in the Moodle system.

In the measurement of satisfactory aspects of the Moodle system, students' feedback was shown in Figure 7. Most students agreed that the Moodle system was useful and could help their learning. They agreed that Moodle system was a good storage place where they could find learning materials. Moreover, students reported that they could use tablet PC or smart phone to read the lecture notes in the Moodle system. However, some students did not know how to read PDF files in the Moodle system from smart phone. It might reflect that some students' Information Technology Competency might need to enhance. More student workshops on using Moodle system should be conducted.

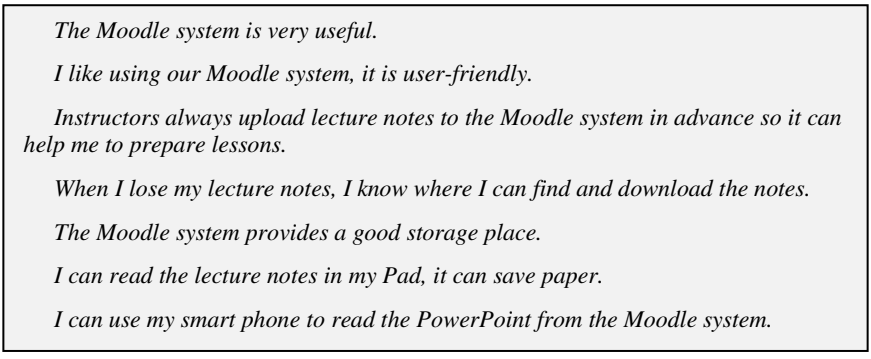

Fig. 7. Students' feedback about their satisfactory aspects of the Moodle system

In the measurement of unsatisfactory aspects of the Moodle system, students' feedback was shown in Figure 8. The layout design was much concerned by students.

They felt that the layout design of the system was too simple and unbeautiful. The "look and feel" of the Moodle interface was very important because it represented the image of the Institute. The research team considered this factor might be affected the intention of students using the Moodle system. Even though the layouts of the Moodle system are limited to the software itself, the research team agrees that it is an important issue and need to enhance the system's layout in near future.

The webpage design of the Moodle is unbeautiful.

The layout is too simple, feel boring.

I like more graphics on the Moodle system.

The Chinese font size is too small.

I wish I can access to other systems from the Moodle system, such as email and Library.

Fig. 8. Students' feedback about their unsatisfactory aspects of the Moodle system

In the measurement of the arrangements and improvements in the Moodle system, students' feedback was shown in Figure 9. Students provided very good recommendations to the research team. First of all, most students felt that fewer instructors were willing to upload lecture notes on the Moodle system. They agreed that they would spend more time on the Moodle system when more materials were uploaded to the Moodle system. Why fewer instructors to use Moodle system? Is it related to digital divide of instructors, over workload of instructors, or other reasons? These questions may need another study to find out the truth. It is a great challenge to the research team. Although some students wanted more learning materials on the Moodle system, they still concerned the workload of instructors. They did not complain instructors need to contribute more in the Moodle system. However, they appreciated if instructors were willing to upload more useful materials on the Moodle system.

I wish instructors can upload more useful notes or examples in the Moodle system because some instructors do not upload materials to the Moodle system.

Our institute can post college announcements on the Moodle system so we can find the place to check the important events, such as cancel class notice, assemble time, etc.

It is enough. Instructors have heavy download in average. They are willing to upload lecture notes to the Moodle system; they have already fulfilled their responsibility.

Fig. 9. Students' feedbacks on the arrangements and improvements in the Moodle system

Furthermore, students concerned there were too many sorts of announcement from different channels. They preferred only one channel for all kinds of announcement. Although students did not mention the Moodle system to perform this task, it may be

an ideal channel to delivery different kinds of announcement to students. At the end of the interview session, students gave the priority of features that they felt difficulty to use in the Moodle system. Five students chose the layout of Moodle system. These findings reflected that students were much concerned the beauty of the Moodle system. It was also consistent with the unsatisfactory aspects of the Moodle system in previous session.

Some limitations to this research are that the sample size contains only 9 students and the research is conducted in group interviews. The students participating in this research can only reflect the experience of these students. Therefore, the research findings are not completely representative and cannot be generalized to the rest of students. However, these limitations can be improved by increasing the sample size, the scope and the depth of the research area.

6 Conclusion

CMS has been widely implemented in the local higher education arena but our Institute has used Moodle system for only two years. The goal of this research, a pilot study, is to understand the students' experience on the Institute's CMS in order to enhance students' e-learning strategies. The qualitative data were obtained by interviews with researchers. The preliminary findings can provide informed feedback to instructors and institute administrators regarding the parts of the e-learning platform to be improved. The research results may influence the e-learning policy of our Institute in future.

According to the preliminary findings, the research team believes that students' attitude on the Moodle system is positive. Moodle is useful for learning, especially in the user-friendly environment. The activity performed by most of the students in the Moodle system is downloading learning materials. However, our students prefer using social networking or other Course Management System 2.0 tools to our e-learning platform in conducting discussion and sharing learning materials with classmates. Moreover, fewer instructors are willing to use the Moodle system. It is a challenging task to motivate both students and instructors engaging in using e-learning platform features. A study from Zaidieh (2012) showed that social networking sites could foster online communities for students to work together and thus it could be an effective collaborative learning tool. It may be a wise idea to integrate the Moodle system with popular social networking sites, such as Facebook. It can effectively promote online community and enhance collaborative learning amongst students.

On the other hand, the Moodle system can be an ideal channel for delivering all kinds of announcement. The research team suggests instructors and institute administrators can utilize the announcement features of the system to deliver announcement, notices and news. The layout of the system is another concern from students. Not only it affects the students' intention to use the system, but also affects the image of the Institute. It may be an urgent task for revamping the layout of the Moodle system in near future. Although the sample size is relatively small, the preliminary findings are very useful to make enhancement of the Moodle system later.

Acknowledgements. The project Social Communication Networking and Multimedia Lab for Excellence in Teaching and Learning Enhancement and the project Learning in an Outcome-Based System via Technology and Enhancement of Regulation Strategies (LOBSTERS) are funded by the Education Bureau (EDB) of the Government of the Hong Kong Special Administrative Region of the People's Republic of China under the Quality Enhancement Grant Scheme (QEGS).

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Practicality Issues of a Computer Assisted Counselling and Learning Support System

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Abstract. This article discusses the practical issues that maybe encountered by participants of an online academic advising and language learning support system established in a tertiary institute offering sub-degree programmes to secondary school leavers in the Hong Kong Special Administrative Region (HKSAR). Ethnographic analysis of the evidence gathered shows that users of this system may encounter a few issues which can be countered effectively by slight changes in communication modes. This paper concludes that online counselling and learning support is a viable alternative for active learning to take place outside of the traditional classroom environment in spite of the issues addressed.

1 Introduction

The wide application of computer technology in the academic sector has led to new forms of learning and counselling, especially academic counselling. Computer Assisted Counselling (CAC) can be defined as a type of counselling that is facilitated by computer hardware and software, with advisers and advisees communicating with each other using a web interface. The propagation of technology in classroom teaching and learning has long been acknowledged but the same does not apply to the area of counselling and student support services. CAC is still in its experimental stage and has its fair share of teething problems and technical difficulties. This article reports the implementation of a web-based counselling and learning support system which facilitates online counselling and language training for students in a tertiary institute with satellite campuses on two different locations.

2 Literature Review

With a growing student population having diversified learning needs and career expectations, academic advising and learning facilitation play a vital role in directing learners towards the attainment of both academic and professional goals. Hemwall and Trachte (2003) argue that using learning as an organizing paradigm in academic advising would lead to a growing interest in learning as a focal point for higher

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education. Appleby (2001) demonstrates close connections between advising and teaching. Franklin and Marshall (2003) insist that prominence should be given to learning as the centre of advising. Sloan, Jefferson, Search and Cox (2005) proclaim that counselling forms an integral part of college experience and impacts on a student's success as counsellors provide guidance and "therapeutic" assistance to college students. Counselling researchers (Barak, Jacob & Pirkul, 1999) suggest that the Internet is an effective means for individuals to connect with others and to gain support and help from others. Kwan, Chan and Lui (2005) demonstrate the effectiveness of using statistical techniques to overcome the technical difficulties in online counselling. Research in this area (Winston, Miller, Ender and Grites, 1984; Pace, 2001) pinpoints the fact that greater faculty-student interaction leads to higher levels of student satisfaction with college experience and to a higher student retention rate.

3 The CAC System

The CAC system established by the Institute supports activities in the two aspects of academic counselling and online language tutoring with a discussion forum. As the Institute mainly caters for sub-degree students who may not possess the same degree of academic aptitude and level of knowledge as their counterparts who get admitted to university degree programmes, counselling is vital to alleviate the distress, anxiety or even low self-esteem these students encounter when they first approach tertiary studies. With the assistance of the Institute's Student Affairs Office, counselling on such aspects as learning difficulties and adjustments to College life has been offered. Student opinions about campus facilities, classroom environment, teaching and learning efficiency have also been sought in these sessions. An online booking system is made available for students to make appointments with counsellors of their choice.

Results evaluating the outcomes of online student counselling have been mostly positive, repeatedly reporting significant counselees' improvement and better adjustment to the Institute's environment. In fact, the counselling service is particularly useful in reaching out to individuals who would otherwise be underserved by the traditional face-to-face mode of student counselling because they feel intimidated, marginalized and even "stigmatized" to seek counselling help in person. A counselee may feel more comfortable with CAC as he has better control over what he wants to say. However, a survey done on this aspect of the system also indicates that students tend to speak more openly about such problems as learning difficulties, campus facilities and teaching efficiency, but less forward about personal as well as emotional problems. This indicates that face-to-face counselling may be more suitable for "matters of the heart".

Besides student counselling and advising, the CAC system facilitates online language tutoring to be conducted between students and language instructors. Using the online platform, native speaking English and Putonghua tutors based on the main campus are able to hold online language counselling and tutoring sessions with students based on the same or other campuses in the form of one-on-one basis or in groups. In group sessions, the split screen enables the tutor to communicate with the group members and engage in real time discussions and language training. The "therapeutic" effects borne out by these group sessions are enormous. Participants

report that they are able to empathize and share one another's problems, and render timely support and assistance. In individual sessions, students are able to receive training in language and discuss their learning problems and difficulties with the tutors for the tutors to offer plausible solutions.

4 Methodology

In the academic year 2012-13, we were the tutors of a course called "Language Clinic" for the Diploma of General Studies programme. The course involved teaching staff interacting with the students in English, the purpose of which was to expose students in an English speaking environment and to encourage students to use their second language to speak. 213 students attended the clinics, and each student was to be present in three sessions. Each session, which lasted for 30 minutes, was made up of a tutor and four students. In each session, the teacher would be the facilitator. He/she would be introducing a topic for discussion. Topics usually evolved around current affairs, interests and hobbies, and academia. As the students were all stationing in a remote campus away from the staff offices, we utilised the CAC system to conduct the clinics. The ethnographic research was done during the sessions, which consisted of the tutors getting involved with interacting with the students and observing the conversations as part of the class community.

5 Issues in Communication Using the CAC System

In communication, people form 55% of their first impression based on body language, 38% based on tones, and only 7% by speech (Taylor 2012: 72). They are said to be able to remember about 20% of what they hear, and over 80% of what they see (Barker 2006: 54). In other words, being able to see one's fellow interlocutor's facial expressions and body gestures enhances one's correct understanding of the interlocutor's meaning. Without the use and perception of body language, the effectiveness and the efficiency of communication would be hampered. This is one of the reasons why conveying messages using letters or by telephone potentially leads to more misunderstanding than doing so face-to-face. Based on this point, we can say that the CAC system has a great advantage over many other forms of communication between people who are at different locations – the CAC system allows conversationalists to use body language, which in turns permits easier formation of shared meanings.

However, in the context of language teaching, the CAC system may still not be able to provide enough room for the complete utilisation of non-linguistic methods to communicate. To explore this issue, we conducted an ethnographic research in which we, as participants and a language clinic tutors using the system, evaluated the system by gathering comments and feedbacks by various users and reflecting on the tutoring sessions. In what follows, we discuss the two aspects of non-verbal communication that are hampered by the CAC system. They are, respectively, eye contact and feet movement.

5.1 Eye Contact and Addressee Indication

It is common knowledge that one's eye contact is an important cue to understanding one's meaning in communication. For instance, when talking with a group of people, directing one's eyesight to a specific person when asking a question or giving a comment could help listeners understand that one's question or comment is directed to the person whom the speaker is looking at. Eye contact is a subtle yet powerful indicator in conversational interactions. Not only does it grant speakers the power to control the turn-taking dynamics in conversations, it also gives listeners a cue to the direction in which the conversation turns go.

Other forms of conversation lack eye contact as a conversation cue. Both written communication and phone conversations, for example, have no space for eye contact. However, unlike face-to-face interactions, these two forms of communication do not need such a cue. On the one hand, addressees (specific or not) are usually indicated explicitly in written communication. On the other hand, the majority of phone conversations consist of only two interlocutors, which reduces the chance of misunderstanding who the speaker is addressing to a minimum.

When there are only two speakers in a face-to-face conversation, the use of eye contact to indicate a specific addressee may not be necessary. In academic tutorials, however, more than two individuals are often present. In such a situation, eye contact becomes a useful tool for the tutor to direct questions to a specific student and to regulate interactions in general. This is especially useful when the tutor wants to encourage specific students to speak up or hopes to avoid the possibility of certain overly outspoken students speaking.

While communicating with the CAC system simulates face-to-face conversations in many ways, there are still a few differences between them. The first of these is the difficulty in using eye contact. In CAC communication, one's eyesight is not directly perceived by the people one is speaking to. Rather, one's eyesight (along with other facial expressions) is recorded by the camera and displayed to the other participants. Direct eye contact is lost in this process, and it imposes a difficulty in indicating which person the speaker wants to address with eye contact.

The same issue also negatively affects other forms of body language used to indicate specific addressees. The action of pointing, for example, loses its direction when it is seen as an image from a camera. One cannot point at a specific addressee on the screen and expect the addressee to see that the finger is pointed at him/her. When the speaker points the finger at the screen, the camera, which is often placed on top of the screen, will capture an image in which the speaker is pointing his or her finger in another direction. In turn the person whom the speaker is pointing at would see that the speaker is pointing his/her finger downward. Transferring images of actions through a camera would somehow distort the direction of that action, even to a small extent.

5.2 Facial Expressions and Other Forms of Body Language

Another difficulty encountered by users of CAC is the occasionally incomplete capture of facial expressions. As mentioned above, CAC relies on the camera attached to

each computer to allow the participants to see each other online. Such a system conveniently connects people at different physical locations and enables them to chat while seeing each other's faces.

This kind of communication is indeed very similar to normal face-to-face conversations (by normal we mean the kind of conversation in which participants are at the same physical location), in the sense that interlocutors can see each other's facial expressions and may receive non-verbal cues during and in between conversation turns. These visual cues, which enable interlocutors to discern each other's emotions, level of concentration and other non-linguistic information, are not obtainable in other forms of communication (e.g. telephone conversations, emails and letters). Even though communicators may use other strategies to convey this non-linguistic information, for instance, the use of emoticons in computer-mediated communication (Crystal 2000), facial expressions and other elements of body language generate the most direct non-verbal cues.

In CAC communication, a user's facial expressions are captured by the camera and are displayed on the screens of other users. As discussed above, this is very similar to the conventional form of face-to-face conversation. However, when people interact with each other using this CAC system, they are sometimes not aware of the position of the camera and may move to areas that the camera does not cover.

Fig. 1. Screen image of a chat session in which a participant's face is not fully captured

In figure 1, one can see that the face of the participant in the top left-hand corner of the screen is not fully displayed. This may be due to various reasons, including the participant being unaware of the camera's scope; she deliberately refusing to let other participants see her face; or even her desire to be playful during the interaction.

We are not able to deduce the real reason (or reasons) without asking her directly. We can nonetheless establish that not completely showing her face makes it more difficult for other participants to gain non-verbal cues from her expressions.

Similar issues may arise in other forms of body language, too. As mentioned in section 5, much of one's impression of another person is formed and remembered upon one seeing that person's body language. Information from one's body language is not confined to facial expressions. Other parts of the body, especially hands and legs, display non-linguistic information regardless of whether the person in question is aware of it.

In CAC communication, many of the cues generated by the interlocutor's hands and legs are lost because of the scope of the camera. As seen in figure 3, only the head of each participant is seen. Sometimes, a participant's hand may be seen (e.g. the person in the top left-hand corner), but it is not as commonplace as conventional face-to-face conversations. The inability of the camera to capture a person's body language may hamper the efficiency of the conversation because of the lack of non-verbal cues.

6 Implications and Countering the Issues

In light of the above discussion, one may carelessly conclude that CAC communication is inferior to conventional face-to-face conversations. However, coming to such a conclusion would be slightly careless. First and foremost, one has to be aware of the fact that these issues do not only arise in CAC communication. Many other forms of communication in which the interlocutors do not see each other's faces (e.g. text messaging, telephone conversations and written letters) have such issues, too. These issues by no means make these other forms of communication inferior to traditional face-to-face conversations. For the same reason, it would also be unreasonable to argue that these issues make CAC communication inferior to conventional face-to-face communication.

Also, the inefficiency in communication caused by the lack of eye contact and the possibility of displaying incomplete facial expressions could be patched up rather easily by other means.

6.1 A Solution to the Lack of Eye Contact

As mentioned above, CAC communication resembles traditional face-to-face conversation closely. Speakers may sometimes not be aware of this issue and treat this kind of communication as if they are at the same physical location as the addressee, and wrongly attempt to indicate specific interlocutors by using eye contact. Since the lack of eye contact hampers addressee indications, the most direct solution would be for the speaker to address specific participants verbally and directly. The participants of the conversation have to be aware of the fact that, even though CAC communication is very similar to normal face-to-face conversations, they are still required to address the person verbally because of the lack of eye contact in this form of communication.

6.2 A Solution to the Difficulties in Displaying Facial Expressions and Body Language

Discussed in section 4.2 is the fact that the faces of participants may not be fully captured by the camera, and this may hamper other participants in obtaining the non-verbal cues conveyed by those individuals whose faces are not completely on display. To counter this problem, the leader of the CAC session (who is usually the tutor of the teaching session) may have to explicitly remind the other participants that they need to show their faces. This involves sitting properly and being aware of where the camera is. Although this may also mean that these participants may have to restrain themselves from making vigorous body movements, this is still a workable solution to such issues because it enables users to utilise the CAC system and allows everyone to convey their facial expressions more effectively and efficiently.

7 Conclusions and Recommendations

On-going evaluative research has been conducted qualitatively and quantitatively, inviting users to give opinions on such aspects as the outward design of the system, user friendliness and its effectiveness as a platform for interactive activities. The comments and opinions received have been predominantly positive indicating that the CAC system is effective in providing counselling and student support services. Although, as this ethnographic research shows, there are issues that need addressing in this CAC system; efficacy and satisfaction measures reveal high levels of satisfaction, especially among participants who would otherwise be overlooked by the traditional face-to-face counselling mode. Anecdotal reports by the counselling staff involved in the project also indicate marked improvements in their counselees. We stress that the primary aim of this article is not to undermine the effectiveness and usefulness of the online counselling system, but to raise the awareness of possible pitfalls that may reduce the effectiveness of online counselling. As we have observed through participating in online counselling sessions, participants still find this form of communication useful and effective.

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A New Dimension in Student Learning: Measuring Wait Times

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Abstract. We have developed a system for measuring wait-times in realtime. The concept of the system is ideally suited to enable new instruction designs for online knowledge sharing platforms such as open education resources or e-textbooks, particularly for assessments and training modes. In our preliminary trials with online exercises and assessments, the total time taken by a student for each multiple choice question (MCQ) was segregated into 3 parts (read time, think time and answer time). Students took longer for higher level questions, as subjectively classified by the teachers according to Bigg's SOLO taxonomy. Furthermore, there were significantly broader spreads in their think times for higher level questions. These results demonstrated that wait-time can be used to discriminate student abilities, measure assessment difficulties and allow useful correlations with various student characteristics. In providing a new dimension of time to better quantify student learning, the system would be useful for experimental research in learning. Results could further provide evidence to support instructional designs.

Keywords: wait-time; taxonomies, online assessments, discrimination.

1 Introduction

Wait-time has been known to be an important component of teacher-student interaction leading to active learning. Defined variously as pauses, silence, thinking time or reflective time, wait-time are the time intervals after a teacher asks a question and the student responds (Wait-time I) or the pause allowed by the teacher after the student completes his response before the next teacher action (Wait-time II).

1.1 Background

That wait-time is an important instructional variable at the K-12 and tertiary levels across many disciplines has been widely discussed (Rowe, 1976, 1986) and reviewed by Tobin (1987). From earlier observations, Ellsworth *et al* (1991) found that the

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average wait-time for tertiary students to answer a convergent question is 9 seconds, while that for a divergent question is over 30 seconds.

Biggs and Tang (2007, p.121) further concluded that wait-time encourages reflective thinking. While factual recalls may be prompt, higher level and deeper learning can only result from critical thinking for which sufficient wait-time must be allowed. This can be interpreted to mean that questions that relate to higher learning taxonomy levels would require longer wait-times.

In recent years, researchers have therefore continued to stress the significance of wait-time in the development of active learning strategies (Eison 2010). These include attempts to explore how observed wait-times relate to different categories of questions (Heinze and Erhard, 2006). These attempts spanned all levels (K-12, tertiary, professional) across diverse disciplines (Duell *et al*, 1992, Maroni, 2011), including some data in science disciplines. (Mitchell 2010). However, data have been sparse, mainly because of the difficulties inherent in their techniques.

Past wait-time measurements have been based mostly on observational techniques from video and audio recordings of classes or discussions. In attempts to allow easier data collection, Carvalho (2009) proposed a form-based system to record classroom observations in engineering education. The inherent problems include the following:

- It was impractical to carry out real-time in-class measurements in a discussion. An extra observer is needed to take time data.
- Post processing and measurements from recordings were extremely tedious and imprecise. For 22 mathematics lessons, Heinze (2006) found "it took a huge amount of working time", and the results were still not representative.
- Face-to-face techniques to control the time intervals of a few seconds would be too disruptive.
- Being passive observations, extraneous factors were not always filtered.

1.2 Online Assessment Systems

On the other hand, advances in ICT have led to the development of online assessments of student learning. Computerized test systems and their applications for e-learning (Johnson and Davies, 2012) have proliferated, becoming increasingly sophisticated and ubiquitous (Fucella, 2007). Some levels of individualization have been introduced with adaptive tests, which allow different pacing to more difficult questions depending on the student's responses. However, the teacher or the instructional designer usually determines what constitutes "difficult" subjectively, drawing on past student performance, i.e. scores, on similar questions.

We report here the preliminary results of applying an online assessment system to correlate student think-time with the difficulties of the questions in homework exercises and in tests in tertiary courses.

2 Wait-Time Control System

Our system for online exercises and assessments, which we call the "wait-time control system", is a client-server hardware system. The application software system consists of two modes: teacher control mode and student control mode.

For both modes, questions may be multiple choice questions (MCQ), short answer or long answers. The total time taken by a student for each question is segregated into 3 parts (*R* being the read time, *T* being the wait-time or think time, and *A* being the answer time). In order to resolve the think time more precisely, we have isolated the read time. This is important for questions with a long lead-in such as a descriptive scenario, particularly for students who take more time to understand the lead-in. Exclusive of the lead-in, the question statement is designed to be brief so that its reading would not be a significant portion of the think time.

The delineation of *R*, *T* and *A* is achieved as follows:

(1) The lead-in, which can consist of one statement or several paragraphs, is firstly shown to explain the scenario. When the student has finished reading, he clicks the "next" button, which the computer recognizes as the end of the read time. This determines *R*.
(2) The question is then shown, with or without the lead-in. The question may or may not include showing the multiple choices in case of MCQs, depending on the assessment designer. The student clicks "next" when he has finished thinking, indicating that he is ready to answer. This determines *T*.
(3) The answer section would consist of the multiple choices in scrambled order, so that the student can check next to his choice quickly but lessens the chance of cheating. For short answers or long answers, this would include his typing of the answers. When he clicks "submit", the system records the time he has taken to answer, which is *A*. Note that for MCQs, *A* should be short. If it is not, the data should not be included in the analysis as the student would have taken the answer time to think. The assessment designer can also limit *A* so that it would not become part of *T*; this of course should be stated clearly at the beginning.

In the teacher control mode, the teacher subjectively predetermines the wait-time. In the student control mode, students can take as much time as they need before responding: the teacher's "wait-time" is the student's "think time". These 3 durations for each question were recorded automatically on the server side.

3 Trials

Our preliminary trials, run in the student mode, were as follows:

(1) Homework exercises consisted of engineering calculation problems. The lead-in statements explained the scenario, followed by several MCQs being

the steps constituting the whole solution. Students were expected to solve each MCQ using pencil and paper, click on the "show choices" button, and pick his choice promptly. We therefore treated the think time as T+A. The overall time for the exercise was not preset.

(2) Tests consisted of MCQs with all the students sitting in computer-equipped classrooms under supervision. The overall time for the test was preset by the teacher, and the student could not change his answers once submitted. Table 1 shows the parameters of the 4 tests in our trials.

Table 1. Cases in our trials: four MCQ tests in different level subjects

Case ID	Subject level & area	Number of students	Number of questions
Case 1	Year 1 General Education	52	50
Case 2	Year 3 Science	39	20
Case 3	Year 3 Science	40	20
Case 4	Year 3 Science	28	20

4 Results for Trials with Exercises

The trials with homework exercises were conducted for four courses at the 3rd and 4th year university level. The numbers of students in each class ranged between 20 to 45. As the students were unsupervised and the exercises were not compulsory, the response rates were only 50-70%. A number of submissions were unreasonable and were discarded as extraneous. For example, in one course, the teacher estimated the exercise should take around 90 minutes. Those that took less than 20 minutes and over 180 minutes were discarded.

The teachers classified each question subjectively on the Biggs 5-level SOLO taxonomy scale (Biggs and Tang, 2007, pp. 76-81); they ranged from Levels 1 to 3. While the think time *T* showed correlations with the taxonomy scale levels in all cases, the sample sizes were too small so that the correlations were only marginally statistically significant.

5 Results for Trials with Tests

Being supervised with all students sitting together, the tests were well controlled so that there were no extraneous data. In addition to the usual frequency distribution charts showing the number of students vs. score ranges, we have investigated the think-time distributions as follows:

5.1 Total Test Time

Figure 1 shows the total test time for each student vs. his total score frequency distribution of mean think times for the four trial cases. With the exception of the highest scoring student in Case 1 taking a significantly shorter time to complete the test, there were no correlations found between total test time and student score. The correlation coefficients were -0.042, -0.117, 0.215 and -0.358 for Cases 1-4 respectively. This confirms previous findings reported by many researchers (Paul and Rosenkoetter, 1980, Manwaring *et al*, 2009).

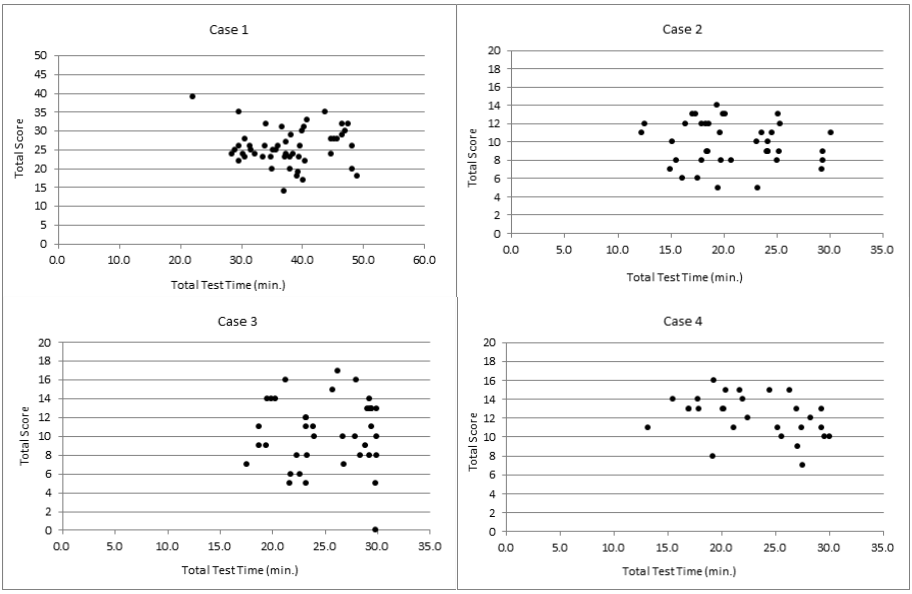

Fig. 1. Marks vs total time for 4 tests

In contrast, Weber *et al* (2012) reported that there appeared to be some modest correlation between the total time taken and the test scores for 3 out of 42 samples. They explained that their samples might be due to a sample size effect or nonlinearities. That our sample sizes are also small in comparison with theirs may likewise explain why we do not find any correlations.

5.2 Mean Think Time for Each Question

We separate the results for those students who answered correctly and those who answered incorrectly and label them as *C* and *I* respectively in Figure 2.

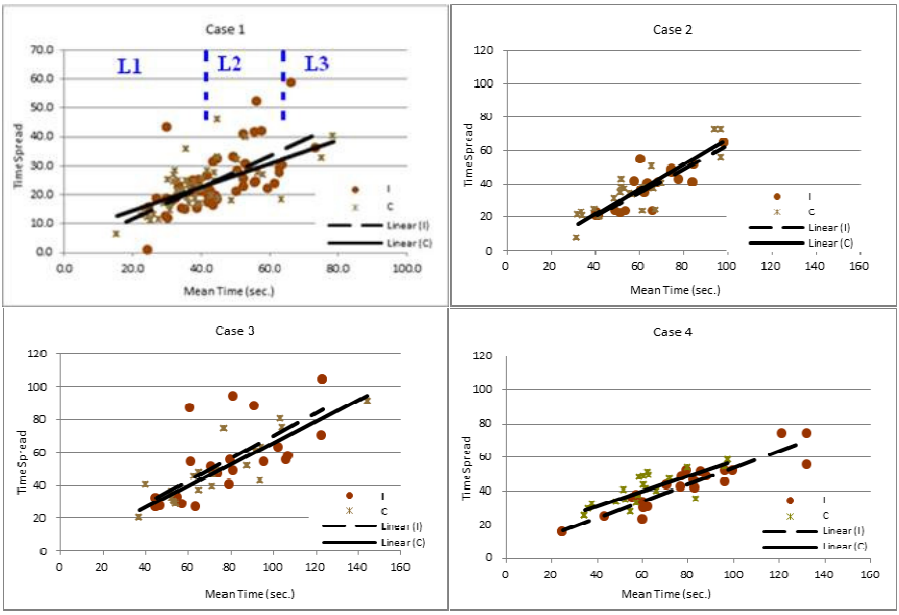

Fig. 2. Mean time vs time spread for each question for 4 tests. For Case 1, the SOLO levels L1, L2 and L3 assigned subjectively by the teacher are indicated.

Table 2. Mean Time

	Correct (*C*)			Incorrect (*I*)		
	Min.	Mean	Max.	Min	Mean	Max.
Case 1	15.5	38.9	78.7	18	44	73.5
Case 2	32.0	56.0	97.4	40.5	65.1	98.3
Case 3	36.8	73.6	144.2	44.8	79.7	123.1
Case 4	34.5	61.5	97.4	24.8	76.8	132.2

Table 3. Time Spread

	Correct (*C*)			Incorrect (*I*)		
	Min.	Mean	Max.	Min	Mean	Max.
Case 1	6.1	22.0	45.6	0.71	24.7	58.8
Case 2	7.2	33.8	72.8	20.6	38.0	64.3
Case 3	20.5	48.7	91.2	26.8	55.5	104.1
Case 4	25.2	40.8	58.0	15.7	42.3	74.2

For each question i, the mean t_{mi} (sec.) and standard deviation σ_i (sec.) of students' think times are computed.

Mean Think Time for Individual Questions. We observe that in all 4 cases, t_{mi} shows a wide range. We see clearly that students took a shorter time to answer the "easier" questions.

As in the trial with exercises in Section 4 above, the teachers who made up the questions were asked to classify them subjectively by assigning a SOLO level to each question. These ranged from Levels 1 to 3. In some cases, one of his peers was also asked to classify the questions independently. In all such cases, the two teachers agreed on level assignment, giving some assurance on their accuracy. The levels are marked for Case 1 in Figure 1.

It was found that in all cases, Level 1 questions correlated with the lower 60% of the ranges of T_{mi}, Level 2 questions with the upper 50%, and the Level 3 questions with the upper 10% of the ranges. That there is an overlap and not a clear demarcation should be expected as think time is a continuous scale and would not align exactly with level classifications which are discrete. In each of present four cases, only 2-3 questions were classified by the teachers as Level 3, and indeed, the students took the longest time to answer these questions on the average.

While all four cases show similar trends, direct comparisons are not possible since the sample sizes and student mix of Case 1 (the GE course) are very different from those of Cases 2-4 (science courses).

Spread of Think Times for Individual Questions. When we examined the distribution of think time of individual students for single questions, we found that there is a larger spread for questions that have a larger t_{mi}. To test this hypothesis quantitatively, we used the standard deviation σ_i as a measurement of this spread. In all cases, there is a positive correlation between t_{mi} and σ_i for both *C* and *I* student groups. The correlation coefficients are 0.66, 0.84, 0.61 and 0.89 for Cases 1-4 respectively, and are statistically significant. Furthermore, a linear least-square line can be fitted through the points with a significant positive slope. Given that this is a first attempt to quantify and explore relationships between think time and learning parameters, we can only conjecture that the slope should be related to differentiation of student abilities.

Brothen (2012) advocated that the time limit on tests should be re-examined and the 1-minute rule for MCQ tests should be updated. Our findings here reinforce this by demonstrating that higher level questions should be given more think time.

By timing online question responses using the system he developed, Fuccella (2007) found no correlation between correctness of responses to length of time taken for single questions. Our findings also confirm this, as both the *C* and *I* groups show similar think time distributions. Since we also found that almost all students take up almost the entire total test period to complete the test, it follows that different students take shorter time on some questions while spending longer time on others, irrespective of ability. This may relate to test-taking strategies. It would not be surprising if analyze our data further to find that more able students answer the first questions faster and take longer on the later questions.

6 Conclusion

Learning taxonomies have been commonly used as a measure of learning. However, they are subjective classifications and are difficult to quantify. As well, learning assessments to gauge depth, student ability or effectiveness of learning activities have also depended mostly on correctness of responses.

By using wait-time (or equivalently think time) as a quantitative tool, we have added a new dimension of measurement. Preliminary trials reported here indicate strong correlation of wait-time with widely accepted classifications, while providing a tool of higher resolution.

We also show that students can be differentiated on this new dimension. For assessments where discrimination is desired, controlling the length of think time for questions of different difficulty levels previously measured for the similar student groups would lead to fairer and more accurate assessments.

From the learning perspective, students should be matched to their own paces to provide motivation and improve engagement. Instruction designers can use individual or group wait-time profiles to enhance the efficacies of learning tasks and materials.

Being a pilot study, we have opted for single or few trials in different environments. Except for the GE course which had a good student mix, the results of the science courses may not be applicable to social science courses. Further experiments in other subjects would be interesting to explore whether the relations found here are more universally applicable.

Acknowledgments. The work described in this paper was partially supported by a Teaching Development Grant from CityU (Project No. 6000358).

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Facilitating Knowledge Sharing in Distance Learning

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Abstract. The integration between knowledge management (KM) and e-learning is a new trend in higher education. In this paper, we introduce our experiences in facilitating knowledge sharing (KS) in e-learning through new information systems. Based on the analysis on the research trends on the KM/e-learning linkage, we discuss the requirements in KM and some impact factors in the university. We make our experiments in facilitating KS with two systems, one is learning management system, and another one is private cloud-based document sharing system. By integrating across over terminal, document sharing, knowledge dynamical representation, grouping and interaction, the new e-learning environment improve KS to some degree in distance learning in the university.

Keywords: knowledge management, e-learning system, knowledge sharing, integration, distance learning.

1 Introduction

Although knowledge management (KM) and e-learning are two different research fields, the integration of KM and e-learning has attracted some interest from the academic community in recent years (Jay et al., 2011)

Walid (2011) investigates the integration of e-learning system and KM technology to improve the capture, organization and delivery of both traditional training courses and large amounts of corporate knowledge. Lee and Segev (2012) present a method for automatic creation of knowledge maps which shows promise as a tool for e-learning environment. Murugaboopathi (2012) deals with the importance of KM and the need of e-learning tools which have a great potential in creating, sharing and reusing knowledge in academics, institutions and organizations. Theodore (2011) thinks that university is a place where KM intersects with e-learning in the 21st century.

In distance education, some scholars have made their attempts to study the integration of KM and e-learning. Amy (2004) uses a probabilistic machine learning method to model and analyze online knowledge sharing interactions, and to support collaborative distance learners. Hong (2005) believes that the combinations of the both could facilitate the learning and improve human performance to a great extent. Meng and Dennis (2010) suggest that the environment encouraging students to share knowledge may be a useful approach to facilitating online learning. Yolanda and Francisco (2011) give a model for KM and e-learning in a virtual university. Walid

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(2011) analyze the benefits of integration of KM and blended learning system in online education.

But a few years ago, the most of the researches were conducted respectively in the two disciplines. Some researches were about application e-learning to KM. Wild et al. (2002) developed a framework for e-learning as a tool for KM. Marshall et al. (2003) designed a system with KM techniques in a learning environment. Barker (2005) advocated KM for e-learning whereby effective KM exists within the context of ongoing educational processes, arguing that this can lead to more stable societies based on knowledge-sharing principles. Chen and Hsiang (2007) studied the importance of developing a knowledge community through e-learning as a critical element in the process of KM. They argued that e-learning can help to foster a corporate culture based on knowledge sharing. Chunhua (2008) discussed e-learning as a new approach to KM, and it can play a role in the knowledge acquisition, sharing, and application phases as well.

In another hand, some researches were about application KM to e-learning. Lamont (2003) found that KM portals could be used as gateways to e-learning, whereby integrating KM and e-learning would bring the learning experience closer to the job. Knežević et al. (2007) developed an e-learning system prototype within the integrated KM support system. Lau and Tsui (2009) discussed the effective integration of KM within an e-learning environment. Shaw (2009) showed that knowledge maps can improve one's e-learning performance.

Liebowitz and Frank (2011) analyze three research trends on the integration of KM and e-learning. The first one is learning objects design, a common linkage between KM and e-learning is the use of learning/knowledge objects, the goals of learning object design are reusability, interoperability, durability, and accessibility (WBTIC, 2009).The second one is through the incorporation of dynamic knowledge features into the learning management system (LMS), the future research and practice would involve the application of intelligent systems, artificial intelligence, and virtual reality technologies to enhance the learner's online experience. The last one is to better capture, share, and leverage knowledge for e-learning modules (Saxena, 2007), intelligent tutoring systems might be used to augment student and professor online interactions.

Specially, in higher education in China, the integration of KM and e-learning is only in the trial stage (Qian et al., 2005; Peng, 2007; Peng, 2010). In the new context of technology and society, the universities need to establish new e-learning environments and integrate new KM tools in China.

In the following sections, we will show our works in the integration of KS and e-learning to improve distance learning performance in the university. We apply some KM methods to the designing new e-learning systems to support different needs for implementing KM in the university.

2 Literature Reviews

The scope and definition of KM has evolved over the years. But based on the literature reviews, KS, information technology (IT) and information system (IS) are

common important factors in the process of implementing KM. In the first evolution stage, KS is a basic character.

KM is initially defined as the process of applying a systematic approach to the capture, structure, management, and dissemination of knowledge throughout an organization in order to work faster, reuse best practices and reduce costs (Nonaka & Takeuchi, 1995; Pasternack & Viscio, 1998; Pfeiffer & Sutton, 1999; Ruggles & Holtshouse, 1999).

For the IT perspective, KM focused on the use of various technologies to acquire or store knowledge resources (Borghoff and Pareschi, 1998). For information system (IS) perspective, it focused on both IT and organizational capability perspectives and emphasizing the use of KM systems (KMS) (Schultze and Leidner, 2002; Tiwana, 2000).

There are at least three accounts of generations of KM (Firestone & McElroy, 2003). They all have three stages and KS is a common character in the first stage. Koenig (2002) argued that KM focused on IT-driven KM or knowledge sharing, the use of IT, and tools for knowledge sharing in the first stage. Snowden (2002) proposed that KM focused on the sharing and transfer of information for decision support in the first stage. McElroy (1999) thought that the first generation focused on knowledge sharing.

2.1 Processes and Factors of KM

Based on the processes classification, the literature proposes different KM process taxonomies (Nonaka & Takeuchi, 1995; Coombs & Hull, 1998; Bhatt, 2001; Perez et al., 2002; Sun, 2010). Isabel et al. (2012) think that KM has four processes: knowledge acquisition, transfer, sharing, and creation. They are interconnected in a complex way (Alavi & Leidner, 2001; Chen & Chen, 2006). They critically depend on the creation of a positive infrastructure and on the removal of the obstructions that interfere with KM processes.

In the processes, KM has some key attributes, such as knowledge transferring, KS, knowledge creation, value creation, KM system, and culture. (Ruggles & Holtshouse, 1999; Vorakulpipat & Rezgui, 2007).In the third generations of KM, Vorakulpipat and Rezgui (2008) thought that five major factors toward value creation emerge from the literature: human networks, social capital, intellectual capital, technology assets, and change processes.

2.2 Knowledge Sharing

One of main goals of KM initiatives was improving or enabling KS across units for organizations (Bouthiller & Shearer, 2002). In terms of business competition, trading and sharing of knowledge had become increasingly important and had forced organizations to create market spaces and places to promote knowledge sharing related activities (Choo, 2003).

As one of the four processes of KM, KS can be described as ‘‘supply-side KM’’ as people can acquire supplied knowledge through KS systems (Firestone & McElroy,

2003).It also can be considered as the process of exchanging tacit knowledge, through social and collaborative processes (Nonaka, 1994; Nonaka et al., 2000). In terms of IT, knowledge sharing was defined as ''IT-based KM'' through the use of a number of tools and technologies which enhance productivity and effectiveness (Koenig, 2002).

Based on the review of KS, KS could be summarized as following five major related characters (Vorakulpipat & Rezgui, 2008):

(1) IT could enable both explicit knowledge and tacit knowledge sharing.

(2) Human interaction was the simplest approach to sharing knowledge within an organization.

(3) KM strategies might be adapted to fit with organizational culture.

(4) Motivation–, e.g. monetary rewards, recognition, and praise–could persuade people to share knowledge.

(5) Trust was an important factor in enabling knowledge sharing.

Some practical cases showed that a shared knowledge space (physical or virtual) should be provided to exchange knowledge in an organization (Alavi and Leidner, 2001), and social interactions and form informal social networks could enhance KS in an organization (Han & Anantatmula, 2007).

2.3 Common Features between KM and E-Learning

In fact, e-learning system and KM are two sides of the same coin (Elsa, 2003). There are some common features shared between the both. Their relationship depends on the learning and knowledge needs of the organization.

It is likely that many organizations will need varying combinations of current and emerging e-learning and KM (Learning Light, 2005). In one hand, e-learning supports learning and knowledge sharing, and it also can increases the value of an organization's intellectual capital through the distribution of knowledge across the organization. In another hand, the intellectual capital is collected through collaboration in the social context of community, and harvested proactively as elements of an organizational learning cycle.

Yordanova (2007) explained common characteristic which were defined in the process of e-learning system and KM system (collaboration, project development, help desk, learning objects) used for presentation of learning content and knowledge, and content management systems. Walid (2011) showed some common features between e-learning system and KM system in context of explicit and tacit knowledge exchange. They are assessment, performance support materials, live events, and self-paced learning.

Similar to the knowledge creation process, learning is an action-oriented process and a social activity. E-learning is the same. But learning management and KM share some common processes, activities, tools, concepts, components and terminologies (Chatti et al., 2007). Terminologies that are currently being applied in the learning context, such as learning management system, learning object, learning asset and learning base, are in fact borrowed from the KM field (Chatti et al., 2006).

3 Methodologies

We research the integration IT-based KS and e-learning system in distance learning with new tools in the university. The case study and findings presented in this paper are derived from the empirical research projects. Qualitative analysis method is used to the information system analysis and design. Questionnaire survey and statistical analysis are also applied in the project.

3.1 E-Learning and Distance Education

In business field and academic community, people have predicted some new e-learning trends. Yang (2013) presents some major opportunities and practices in e-learning as following: LMS, blended learning, mobile learning, micro-learning, open education, self-learning, virtual, formal learning, informal learning and other. He thinks that LMS from learning management is beginning to shift from a focus on learning management to learning, virtual learning shifts from a focus on formal learning to informal learning. E-learning is personal, social and flexible. In fact, we have found a few cases of blended learning (Le, 2011), mobile learning (Chueng, 2012), and micro-learning in distance education in China (Shen & Jia, 2012).

In distance education, there are some advantages to set up an online learning community. A community was associated with higher levels of perceived learning (Rovai, 2002; Schrite, 2004; Shea et al., 2006). In the process of distance learning, it is one of important works to create and sustain an online learning community. It has strong ties and enables people to develop social networks for collaborative knowledge sharing (Lin, 2007). Because distance learners are short of the chances of face-to-face talk, they usually form varied groups and share their experiences in the community.

Interaction is an important and necessary action to support distance learning in an online learning community (Bates, 1991; Chen, 2004). Moore (1989) divided it into three kinds: learner to learner; learner to teacher, tutor, and service worker; learner to learning content. He also thought that the depth of talk, the flexibleness of self-paced learning and the structure intension of course design affect the interaction distance. Anderson and Kuskis (2007) reviewed six types of interaction and suggest areas and approaches to research that would expand our understanding and competence in using these new and traditional distance education tools, pedagogy, and technologies.

Distance education especially needs learning support service, since distance learners usually have many difficulties (Robinson, 1981; Rowntree, 1992; Moore, 1998; Granger & Benke, 1998). The e-learning environment needs to provide some supports with information, resource, interaction, technological establishment, tutoring assistance, counseling service and personal development, etc (Gibson, 1998; Moore, 1998; Tait, 2003; Le & Qi, 2003). Sammons(2007) reviewed that the researches had shown that learners in collaborative-learning settings that include support for social, collaborative, and communicative interaction are more satisfied with their distance learning experience and are less likely to drop out (Aviv et.al., 2001;Fisher et al., 2005; Jung et al., 2002; Richardson & Swan, 2003; Swan & Shin,2005).

3.2 A Framework for Studying the Integration of KM and E-Learning

From Bransford's work (1998), a framework for studying the integration of KM and e-learning can be positioned around the intersection of three components: knowledge-enabled, learner-centered, and community-accessed.

For the first part, there are some success factors in KM systems, such as ease of use, value and quality of the knowledge, system accessibility, user involvement, integration, top management support, shared value, and convenient knowledge transfer mechanisms (Liebowitz,2008,2009; Nevo & Chan,2007). As a new learning trend, mobile learning can support individual KM (Wang & Haggerty, 2009; Liaw et al., 2009).

For the second part, e-learning shifts from directed learning to facilitating learning, and learning becomes more individualized and just in time (Connolly, 1998; Ambient Insight, 2009; Liebowitz & Frank, 2011). Flexibility, interaction, online knowledge repositories, and expert systems are used.

For the community-access, web 2.0 tools, online communities, social networking sites, business intelligence are applied to broaden and enhance the learner's knowledge base.

3.3 New Technology Trends

As outer factors, new technology trends also impact KS requirements based on e-learning platform. These trends maybe change the old information framework and designing ideas of a new e-learning system.

In 2012, Gartner provides a list of top 10 strategic technology trends for 2013 as following (Savitz, 2012): mobile device battles, mobile applications & HTML 5, personal cloud, internet of things, hybrid IT and cloud computing, strategic big data, actionable analytics, mainstream in-memory computing, integrated ecosystems, and enterprise app stores. In fact, some technology application plans have appeared in education field, such as cloud computing and some app applications in education, mobile digital library, etc.

4 System Analyses

Based on system theory, an e-learning platform integrated KM and e-learning can be viewed as an information system. Before the design and application, we need to analyze the effect factors, the characters of the factors and the system framework.

4.1 The Evolution of the University

The organizational culture is one important factor of KM system. Last years, the university has been permitted to provide distance education and bachelor degree certificate by the Chinese Central Government. It means that the university has become an independent open university. Previously, the university is belongs to the

Chinese Radio and TV university system, the whole academic management, quality standard and bachelor certification are controlled by the university system.

The new mission is providing high quality open and higher distance education, continuing education, professional education, and serving learning society and lifelong education system. The university should become much more open and dynamic to adapt to the society context. The recent key tasks include building information infrastructure, online learning resources, open education resources, learner support service system, quality assurance system, and personal lifelong learning achievement record system. The new organization mission brings about some new operation modes. The university needs building a unified e-learning and service platform. The processing of data and information is centralization. The data, information and knowledge can be sharing conveniently in the university.

In the context, we think that there should be many interactions between KM and e-learning in the university. We should use one long, systemic, and university–wide strategy to design and implement an integrated e-learning ecosystem.

4.2 Characteristics of the Distance Learners

The characteristics of distance learners in the university have some changes. Based on whole data analysis of the learner's ages in recent years, we find that the average registered ages decline from 2007 to 2013, the numbers are respectively 31,29,29,28,27,26,26.

We design a questionnaire and give questionnaire survey, send 80 questionnaires and receive 65 copies from our distance learners in Guangzhou. For the learners' age, 72% learners' ages are from 20 to 25, and 14% are from 26 to 30. 62% learners are female, 38% are male. Their subjects and their genders are relevant.

For internet access in their houses, 14% has no connecting internet, 86% have connecting internet in which 45% are WIFI, and 17% are 3G in these learners. For the internet terminal using in the most time, 66% use personal computers (PC), 34% use phones, no one choses IPAD or android Pads. For the location where online times are the longest, 55% are in house, 42% are in workplaces, and only 3% are in other places.

For the personal learning tool, 89% learners have PC, 88% have smart phones, and 14% have Pads. For the average online time a week, 63% are above 20.5 hours, 28% are under 20.5 hours, and 9% are near this time. 20.5 hours are average online time in a week for common internet users in China (CNNIC, 2013).

For the popular internet software tool, all students have a QQ account, an instant messaging tool in chinese.77% have email accounts. 80% have Webchat account, a new social software tool for mobile phone in the QQ Platform. 88% have personal virtual space.78% have twitter accounts. 37% have weblogs. 65% have e-bank accounts, 29% have e-bank account based on mobile phone, and 25% have direct mobile-payment function in their smart phones.

For some public applications, 75% have experiences in using search engine.72% have shopping online experiences in recent half a year. For general online activities, 91% are online chat and searching information; 88% are listening music; 71% are watching videos; 68% are online shopping; 63% are using online map; 54% are reading e-books, and 42% chose playing games.

These characteristics are different from those a few years ago. These dates show that digital divided still exists in our learners, but it decreases now. The some leaners have used mobile access and new internet tools. In a word, their internet access, online experiences, and the preferences have changed. We have to consider these factors as we design a new e-learning ecosystem with KM methods.

4.3 The Old E-Learning Setting

In the new context, the old platform can't support new university mission and new education trends. The e-learning setting is consisted of the university information portal, a LMS, a content management system (CMS), a student status management system, and some other auxiliary systems. We find that it is impossible for us to try to choose a single system to solve KM requirement in the e-learning environment.

Because of the designing ten years ago, the platform has some obvious shortages. It is based on web1.0 and can't support online learning community and mobile learning. It also can't support knowledge discovering, concept map and mind map using. The following functions are weak or lack: data analysis, information feedback, looking for information, instructional designing, activity organization and blended learning. These factors induce difficulties in KS in the platform.

In the beginning of this year, our fifteen teachers and techniques form a work team to tests three e-learning systems, which are used in higher and distance education in some tradition university in China. The test items have forty one functions and the index items are integrity, utility and friendliness. Since they all have introduced web 2.0 tools and some different added functions respectively, our final conclusions are that these systems need improving in KS to some degree.

Similar to our works, Wang and Yu (2010) assessed four LMS with EduToolsas following: Moodle, Sakai, Blackboard, and 4A.They think that the integration degree is lower during different systems; the more functions the system has, the lower usability the system has; the designing should be user-centered and elevate user good experiences.

5 The Improvement

Since last year, we had made some fundamental works for the integration between KS and e-learning system by building new e-learning system. One work is designing a new LMS. Another work is introducing a document sharing system based on private cloud architecture.

5.1 Designing Principles of the LMS

For facilitating KS in the LMS, some principles are abided as following: learner-centered designing, well e-leaning experiences, dynamic, just in time, interactive, online learning community, personal learning environment, feedback, data capture, data analysis, knowledge pushing, KS and KM.

The goals of the system can support self-learning, collaborative learning, blended learning, mobile learning, individual learning. In a word, the system is the integration of content, activity, community, KS and the culture.

For the technology object, the system should have some critical characters as following: reusability, interoperability, durability, and accessibility. Besides these factors, easy use, friendly interface, virtualization, and visualization are considered in the designing process. The LMS is modularization and a strong coupled system.

5.2 The New System

We introduce a LMS as our experiment system, OPEN Edutainment E-learning System. In the system, some functions can be used to support KS in the online learning environment.

Personal can write notes which can be shared to the group to read, remark, and collect. The reading numbers of the each note show the attention degree by other learners. Automated reminder function can send notices to the group via email, short message, web notice in the personal web portal as contents change, or new activities appear, or the deadline of the learning tasks is coming.

The system provides the functions of wiki, bulletin board, small group video conference system integrated whiteboard and voice communication, grouping by the teachers or students. The personal portal web also shows online status of the groups. They can help to dynamic interaction and form learning community. The important statistics show in web in real time, such as learning schedule, online time, active times, and formative assessment. These applications and statistics can help to KS in the LMS. The following figure shows the personal course homepage in the LMS.

The following functions can support initiative knowledge pushing, interaction and feedback just in time, and they can provide a KS environment in online learning community. These functions are grouping, notes sharing, information reminder with three varied modes, member online status, statistical data presentation, small group video conference system, personal information portal and ten instructional activity design tools.

Based on the fifteen availability assessment reports in the work team with 5 grade score, the average score is 3.7143 and the standard deviation is 0.48795 for the statistic function, and the grouping function score is the same; the average score is 3.4286 and the standard deviation is 0.5345 for the note function, and personal information management score is the same. These mean that the modules are available, but not perfect.

5.3 Document KS System

For the CMS, we introduce a document sharing and management service system based on private cloud, Dcampus WebLib.

The system can be across over PC, IPAD, IPhone, Android smart phone. The file format supports text, music, video, and photo. The file format can be MS-Office, pdf, and html. It also provides e-book and based-html5 e-journal.

The basic operation environments are as following:

(1) Standard services are based on Linux, or Solaris, or Windows.

(2) Storage services supports raid, cluster, storage array, and large parallel file system.

(3) Open source systems: Linux, Tomcat, MySQL.

(4) Business software systems: Solaris, Oracle.

(5) JavaEE /Web Service architecture.

(6) The integration with email, video conference system and LMS.

The following functions can support KS application. They are personal digital resource management, the digital resources sharing in groups, university-wide and multi-domain across over organizations. It can use static or dynamic user grouping strategies. App clients of IOS 6.0 and Android systems can support dynamic and mobile KS in the groups in the community. All personal files and personal knowledge repository can be stored in the cloud, and read online or offline. The system solves the problems of KS in the community and community access.

Based on the fifteen availability assessment reports in the work team with 5 grade score, the average score is 3.9333 and the standard deviation is 0.703732 for the degree of satisfaction to the document sharing function.

6 Conclusions

The synergy between KM and e-learning is a new trend in e-learning. It can bring about learning performance improvement. The integration between emerging technologies and new e-learning modes can help to use the benefits of the both. In this paper, we discuss KS since it is an important issue both in KM and e-learning. The learner character, open, dynamic, interactive, grouping, easy use, accessibility, data analysis, and community are critical factors in the process. With mobile technologies, cloud computing, KM methods and systemic designing methods, we have design an integrated e-learning system to help KS for the distance learners in the university.

The system is integrated to the LMS and the CMS. It has unified users, learning resources, documents sharing, interactive tools, flexible grouping strategies in the community, online read, offline reading, and knowledge pushing modes over different terminals.

In the experiment, we introduce two software tools to our e-learning environment as KS systems. We find that some functions can support KS, such as community, interaction, mobile access, document sharing, and member grouping. Although our works are very preliminary, the experiences are helpful for us to develop a new e-learning system integrated KM and e-learning in the university in the future.

Acknowledgements. We thank the Guangdong Province Education Science Foundation for her supporting our research project (No.12JXN034).

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Gesture-Based Interaction for Seamless Coordination of Presentation Aides in Lecture Streaming

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Abstract. This paper describes a novel lecture streaming system that has integrated gesture based interaction with a flexible coordination of presentation tools. The system aims to facilitate instructors giving a seamless lecture delivery that can focus more on engaging students. With simple to learn gestures, the instructors can conveniently call upon presentation tools such as presentation slides, student response system, and electronic whiteboard. The system can be used in an office with minimum hardware and no technical staff support, allowing the arrangement of impromptu lectures at a distance to promptly share any inspiration thought about an emerging influential event. The paper also reports some positive evaluation results.

Keywords: Lecture streaming, natural interaction, gesture, kinect, direct manipulation, distance learning.

1 Introduction

Over the Internet streaming of lectures provides opportunities for remote students to enjoy some unique benefits of attending a lecture in person. Delivering lectures with inspirational and critical thoughts are known to promote motivation (McKeachie 2002) and to facilitate development of problem solving skills, especially in computing and mathematics (Boster et al. 2006). Current learning content delivery technology have come a long way from traditional distance education, and it is now beginning to see live or delayed lecture streaming has replaced its videotape or digital versatile disc (DVD) counterparts. Several research indicated that the performance of students exposed to lecture streaming were either better than or on par with those attending face-to-face lectures (Flower & Sawa 2006; Boster et al. 2006; Buhagiar & Potter 2010).

Lecture streaming has been increasingly adopted among tertiary education institutions in the world. It costs significantly less in production and distribution (Shephard 2003). A computer device with a connection to the Internet is the only requirement for joining a highly scalable learning network that allows a wide distribution of cost associated with a distance-learning programme. There are also readily available software that allows the recording and reviewing of lecture video

J. Lam et al. (Eds.): ICT 2013, CCIS 407, pp. 108–119, 2013.

clips. These benefits, including low cost, high-perceived value, scalable operation, and broadened admission market, have convinced senior university management that lecture streaming has a promising future.

A particularly attractive usage scenario of lecture streaming is impromptu lecture at a distance. An instructor can promptly share any inspiration thought about an emerging influential event. For example, a teacher in liberal studies can speak about an ongoing political crisis or a professor in geology can discuss about a current volcanic activity. Lecture streaming can also be integrated with online discussion forums. For discussion topics that are difficult to explain with text, giving a short presentation can be a more effective solution. Lecture streaming can be coupled with video recording so that the discussion video can be made available for delayed viewing as well as real time broadcasting.

Given the increasing maturity of computing technologies, instructors should be able to begin lecture streaming from their own office in the near future. It is important that an instructor could manage the whole lecture streaming process individually. The absence of technical support staff would save cost. The instructor would enjoy the freedom of starting a lecture at any time and the convenience of not having to go to a lecture theater or a production studio.

1.1 A Gesture Controlled Lecture Streaming System

The purpose of this paper is to describe the design and development of a prototype lecture streaming system for individual instructors' use in their office. The prototype system is the first attempt of a project that aims to investigate effective and efficient ways to deliver lectures through video streaming.

A key design concept of the system is to use *gestures* as the means of controlling various operations of lecture streaming. Gestures are movement of body parts, and in the context of communications the hands and upper limbs are usually involved. They form a crucial part of human expression and they can carry meanings beyond the capability of speech and words (Roll 2001; McNeill 1992). It is therefore not surprising that gestures play an important role in teaching and learning (Roll 2001; Lanir et al. 2008; Arnold 2012). Modern inspirational lectures use gestures cleverly to maintain student engagement (Andersen et al. 1979), coordinating interactions (Ford 1999), and facilitating concept construction (Lanir et al. 2008). Gesture-based input technology should allow a more seamless integration into lecture delivery.

With the lecture streaming system proposed, instructors can manage the whole lecture streaming session on their own. They can control various system operations with hand gestures instead of remote control devices or computer mouse or keyboard. They can call upon call up various presentation aides such as presentation slides and student response system, and arrange these items in different layout configurations in the video stream.

Our principal interest with the prototype system focuses on finding an effective design of gesture input interface. The desired objectives include identification of suitable hardware and general infrastructure support, and derivation of principles of the interaction design that does not hinder typical delivery of lectures.

1.2 Related Work

Natural Interaction and Gestures. Natural interaction describes a concept that human users can interact with a computing device based on human senses only. Current peripheral input devices such as keyboard or mouse would become obsolete if a computer user can interact naturally with a computer similar to that with a human being. Natural interaction would require significantly less learning time and effort (Wachs et al. 2011). Many smartphones have already incorporated gesture based natural interaction, and even toddlers can quickly know how to use their fingers to flip through photographs and to draw pictures. Microsoft Kinect, a motion sensing device for gesture based games, offers a low-cost natural interaction hardware support for a number of innovative applications, such as sign-language recognition (Lang et al. 2012), guided imagery based relaxation system (Lui et al. 2012), and stroke rehabilitation (Pogrzeba et al. 2012).

Gesture Based Teaching and Learning Systems. Interactive whiteboard systems were the first teaching and learning technology that incorporated natural interaction. Basically, such systems use motion sensing devices to replace the sensory on conventional physical whiteboard surface. (Bosetti et al. 2012) described a whiteboard system based on a Wiimote that could detect drawing on a conventional project screen with a pen shape special device. Ronchetti & Avancini (2011) eliminated the need for any hand-held device and developed a Kinect based whiteboard that could be drawn with a fingertip. Because of noise and other environmental factors, these systems generally suffer from precision problems, and extensive calibration process would be required for achieving a reasonable usability level. Other interesting work in this area includes the one described in (Smorkalov et al. 2013), in which the captured gestures of a lecturer are sent into a 3D virtual world for controlling presentation slides and an interactive whiteboard. Wang et al. (2004) developed an innovative automated lecture video editing system. The region of interest of a presentation slide is inferred from the gestures capture from the lecturer and accordingly a close-up view of the region is shown in the edited video.

Access to Tools and Services with Gestures. There are several approaches of how a gesture based user interface provides access to various tools and services:

- Mapping specific gestures or postures to functions. Wang et al. (2004), for example, designed a circling gesture for specifying the region of interest. There is a straightforward one-to-one mapping between a gesture and a function. If there are many functions then remembering all the gestures may be quite challenging.
- Direct manipulation. Bosetti et al. (2012) and Ronchetti & Avancini (2011) both designed a hand-controlled virtual mouse for directly manipulating tools in their interactive whiteboard system. A problem with direct manipulation is that any gesture or involuntarily movement is interpreted as input. Both systems required additional means of invoking or switching off a function with a handheld pen or a virtual mouse click.

– Menu system. A menu system can provide an effective access to a potentially large set of functions. The invoking of a function is becoming a step-by-step process, and at each step a few choices are presented for selection. A few specific gestures are now mapped to choices and do not pose a problem in remember all the gestures.

2 Method

The research objectives addressed in this paper include the following:

1. Design an effective means of accessing functions in a lecture streaming system with gestures.
2. Design and implement a prototype lecture streaming system for proof-of-concept and evaluation.

The project work began with an analysis of functional and non-functional requirements. Then an initial design of a gesture based user interface was drawn up. The prototype system was designed and implemented to allow a preliminary evaluation of the gesture based user interface. The preliminary evaluation provided useful data for refining the design of the user interface and the final prototype system.

2.1 System Design Overview

Figure 1 below shows an overview of the lecture streaming system. The software part of the system is running on a typical PC computer connected to a Microsoft Kinect, and the PC together with the Kinect form the hardware part of the system.

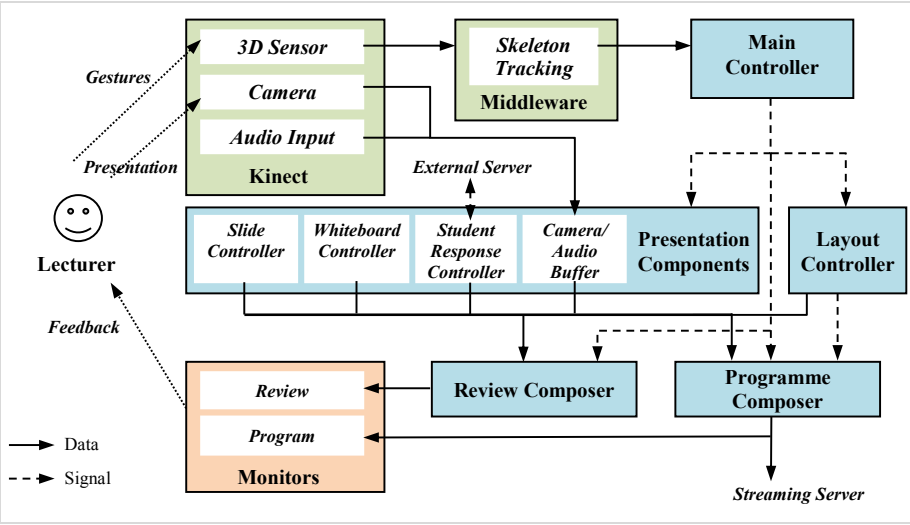


Fig. 1. Overview of the system design of the lecture streaming system

2.2 Hardware

Microsoft Kinect is the key hardware component, providing motion sensing data as well as audio and video frame capture. Therefore it is doubled up as not just a gesture input device and also a video camera. The Red-Green-Blue (RGB) camera offers VGA resolution (640 x 480) at 30 frames per second, which is more than enough for lecture streaming.

The principal Kinect feature relevant to this project is skeleton tracking. With the help of a middleware such as OpenNI[1] or Microsoft Kinect SDK[2], various joints and body features of one to four users may be tracked in the 3D space. To get into skeleton tracking, the middleware would first require the user to be posed in some particular way for skeleton calibration.

Kinect is a suitable choice for use in an office. The effective range of both the camera and skeleton tracking is 1.2 meters to 3.5 meters. The viewing angle of the cameras spans 43 degrees vertically and 57 degrees horizontally. It can be adjusted with a tilt motor.

2.3 Software

A specially designed program aims to analyze the camera and skeleton data streams from Kinect, and to produce the final programme for lecture streaming based on the desired layout configuration that specifies how various presentation aides are composed on the screen. The program has the following major components:

1. Presentation component manager. A presentation component has a visual appearance that can be part of the composition of the lecture streaming programme. Examples of presentation components include:
   - Camera (showing the lecturer)
   - Presentation slides
   - Student response system
   - Interactive whiteboard
2. Layout controller. It has built-in several standard layouts for arranging the presentation components such as split-screen, picture-in-picture, etc.
3. Review composer. It provides visual feedback when users are interacting with various tools and services using gestures.
4. Programme composer. It receives instructions from the layout controller and the main controller and generates video frames for lecture streaming.
5. Main controller. It maintains the states of the whole system and sends signals to other components according to the current state and gesture input.

[1] http://www.openni.com
[2] http://www.microsoft.com/en-us/kinectforwindows/

2.4 Gesture Based Interaction Design

Gesture based interaction is adopted for accessing various tools and services in the lecture streaming system. There are two types of tools and services: system tools and presentation tools. The two system tools include the *layout controller* described above and the *configuration manager*. The latter would allow users to control the streaming process and to change the settings of system configurations. Provision of access to the presentation tools would also be necessary. For example, moving to the next presentation slides or drawing on the electronic whiteboard would be essential in a lecture streaming session.

The gesture based interaction design for this system has a two-level structure as shown in Figure 2 below.

At the top level, there are typically four to six system tools and presentation tools that require access. Both the *direct gesture mapping* and the *menu system* approaches have been considered in the project. In the *direct gesture mapping* approach, each of the six tools is assigned a unique gesture for invocation, and the same gesture is used to close the tool (Figure 2a). On the other hand, the *menu system* approach specifies one gesture (ie. the *invoke gesture*) for switching from one tool to the next, and specifies another gesture (ie. the *exit gesture*) to exit from the tool (Figure 2b). The *menu system* approach is adopted in the project based on the negative feedback on the direct gesture mapping approach collected from the preliminary user evaluation (refer to the next major section).

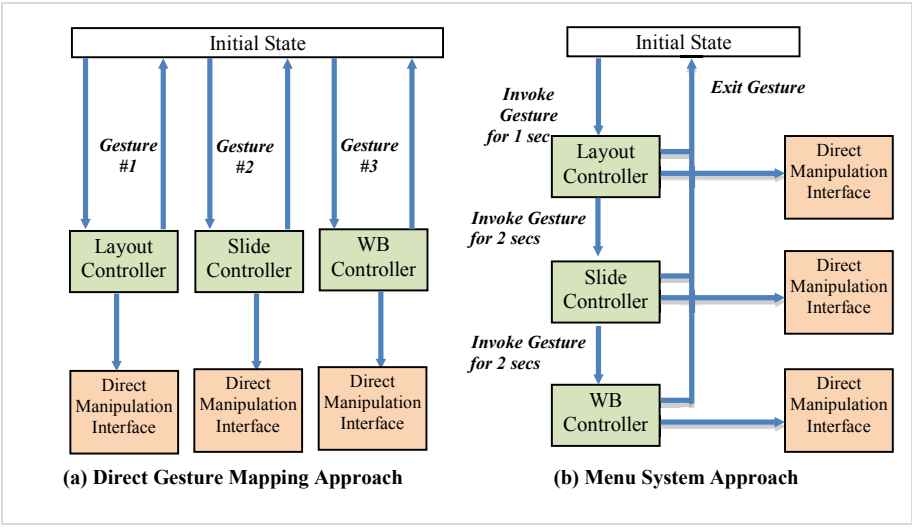


Fig. 2. The two-level gesture based interaction design

At the bottom level, each tool provides its specific user interface. The direct manipulation approach is chosen in the design because it has a universal applicability similar to a computer mouse pointer. The hand position is mapped to the pointer and a *press* action takes place when the pointer stays in a region for one second. The *review monitor* provides the necessary feedback to users.

The top level and the bottom level gesture tracking should not interfere with each other because one uses the left hand and the other uses the right hand. Figure 3 below shows in the menu system approach how the graphical user interfaces changes with holding on the *invoke gesture* for a few seconds.

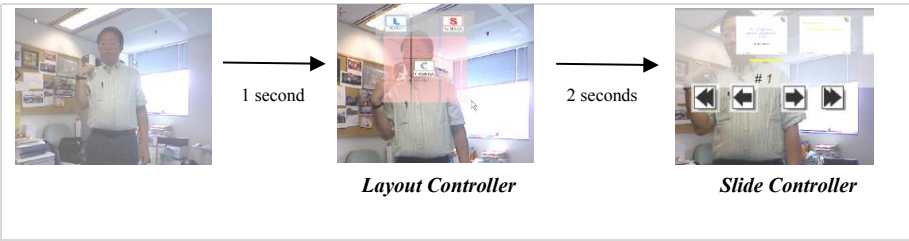


Fig. 3. An illustration of how to access the Slide Controller by holding onto the Invoke Gesture

On the actual definition of the *invoke* gesture, the principle to follow is to minimize the interference to the lecture delivery as much as possible. Table 1 lists the definitions of the *invoke* and the *exit* gestures. The particular poses are selected because they are not typically seen in teaching context. Figure 4 below shows photographs of the two gestures.

Table 1. Definition of the invoke and the exit gestures in the gesture menu system

Gesture names	Remarks
Invoke	Left hand placed near the left shoulder with the left elbow tugged in to the waist.
Exit	Left hand placed near the right shoulder with the left elbow touching the torso.

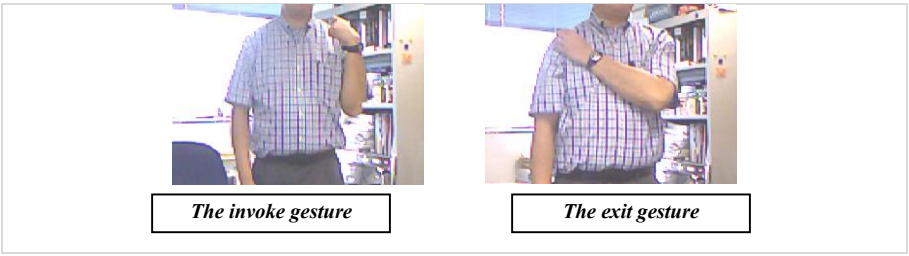


Fig. 4. Illustrations of the *invoke* and the *exit* gestures

2.5 Prototype Design and Implementation

A prototype lecture streaming system has been designed and implemented. The program part is written in Java and it has integrated the following libraries and components:

- Java Media Framework (JMF) for video processing and streaming.
- Apache POI, the Java API for Microsoft Documents, for the import of powerpoint files.
- Likeclass, an in-house student response system, which is external to the lecture streaming system and connected by HTTP and JSON.

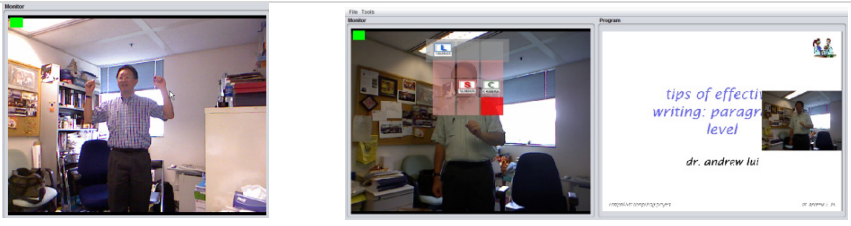
A dual-core 3.0 GHz personal computer with 2 GB of RAM was found to be sufficient for a smooth running of the system.

3 Results

The purpose of this section is to illustrate, first, that the proposed design of the gesture based lecture streaming system is feasible in the implementation and functional aspects; and second, that the gesture based interaction design is proper.

3.1 Operational Aspects of the System

Figure 5b shows the layout of the graphical user interface of the prototype system. The left and right windows are the *review monitor* and the *program monitor* respectively. The *program monitor* shows the final video stream as seen by viewers.



(a) Calibration Pose *(b) The Layout of the GUI of the program*

Fig. 5. (a) The calibration pose for skeleton tracking; (b) The layout of the program's GUI with the Program Monitor showing a picture-in-picture layout configuration

To begin using gesture based interaction, the instructor must perform a calibration pose (figure 5a). A green indicator appears if skeleton tracking is active. After that, the screen layout, system configuration, and presentation tools can be controlled by gestures.

Figure 6 illustrates how the layout of presentation components can be directly manipulated with a hand. A red square will follow the position of the hand to assist the navigation. Staying on an icon which represents a presentation component, for more than one second will pick up the component. The icon will turn yellow and will follow the hand position. After the icon is moved to the desired grid position, it can be dropped by pulling back the hand.

Figure 7 shows how direct manipulation is applied to presentation slide control. There are four buttons for moving the slide show forward or backward in two different speeds.

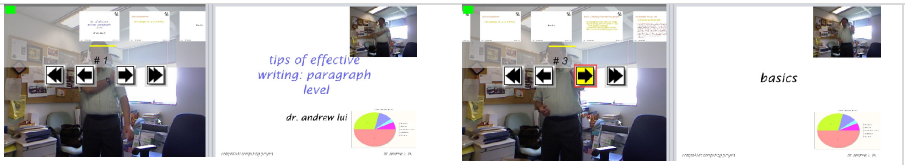
(a) The component (Slide) occupying the centre grid position takes up the whole screen. Other components are placed accordingly

(b) Placing the hand over the Slide component will select the component (turned yellow)

(c) Placing the Slide component to the left grid position has turned the layout the left-right split

(d) Student Response component and the camera are now placed to the corners

Fig. 6. Illustration of using the Layout Controller to change the layout of presentation components



(a) The four buttons for slide control are shown on the screen

(b) Pressing and holding the Forward button has moved to the slide after the next

Fig. 7. Illustration of using the Slide Controller

3.2 Evaluation

Five instructors were invited to participate in system evaluation. All five were instructors of computing courses but only two of them had a little experience with gesture based games.

At the beginning of the evaluation, a two-minute briefing was provided to explain the purpose of the prototype system. It was then followed by a two-minute explanation of how to gain access to various tools with gestures, and how to use direct manipulation to interact with the *layout controller* and the *slide controller*. A two-page tutorial notes with visual illustrations of the *invoke* and the *exit* gestures was also provided.

Study #1: Direct gesture mapping as opposed to gesture menu

The objective is to evaluate the direct gesture mapping approach, which is described in Table 2. The participants were asked to call upon the layout controller and then asked to exit the layout controller. Then they were asked to do the same with the slide controller.

Table 2. Definition of the gestures for calling upon and exiting the layout and the slide controller in the direct gesture mapping approach

Gestures	Tools mapped
Left hand placed near the left shoulder with the left elbow tugged in to the waist.	Layout controller
Left hand placed near the right shoulder with the left elbow touching the torso.	Slide controller

Three out of the five participants showed hesitation, confusion, or error with remembering the correct mapping. One participant voiced out the difficulty in remembering the right gestures and suggested a method similar to the current menu system approach. There is little semantic relation between the two gestures and the tools they are mapped to.

Study #2: Competency in controlling the layout

The participants were asked to carry out a sequence of tasks with the layout controller. Everyone completed all the tasks within a minute. Table 3 shows the average time taken for every task. It also compares the performance of participants experienced in gesture control to those without experience.

Table 3. Mean time taken to complete tasks with the layout controller

Tasks	Inexperienced (s)	Experienced (s)	Overall (s)
Pickup a component	3.7	3.0	3.4
Pickup and replace a component	7.7	5.0	6.6
Move Slide component to right position	3.3	4.5	3.8
Move Likeclass component to bottom left	6.3	3.0	5.0
Make the camera inactive	6.7	4.5	5.8
Arrange 2 components in a left-right split	8.0	9.0	8.4

Most participants were able to smoothly carry out the tasks, with the occasional hiccups, of which the most frequent one was the replace a component to a location. The performance difference between the experienced and the inexperienced was found to be insignificant. In fact the inexperienced participants showed a remarkable skill improvement within the one minute period.

Study #3: Competency in controlling the slides

The participants were asked to carry out a sequence of tasks with the slide controller. Table 4 lists their performance.

Table 4. Mean time taken to complete tasks with the slide controller

Tasks	Inexperienced (s)	Experienced (s)	Overall (s)
Move one slide forward	5.3	4.0	4.8
Move to slide #6	5.0	3.5	4.4
Move one slide backward	2.7	2.0	2.4
Move to slide #2	2.3	2.0	2.2

Only one participant showed an initial problem with controlling the slide with the hand. The performance was found to be excellent, perhaps because the participants already went through the one minute practice with the layout controller.

4 Conclusion

Zarraonandia (2012) pointed out that lectures have been evolving with technological advancements in the past few hundred years. As a new medium of instruction delivery, lecture streaming would necessitate a new lecturing method for better engage remote students and facilitate active learning. The proposed lecture streaming system introduced a novel concept of using gestures to coordinate various presentation tools and it should allow a more seamless delivery of lectures without the need of onsite technical support.

This paper described a preliminary study into the feasibility of such gesture based lecture streaming system. The evaluation results were found to support that such system is natural to interact with and easy to learn. More experiments are required to find out the perception of such a delivery medium from the viewers' perspective.

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The Design and Implementation of an Information System for Placement Programmes

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Abstract. Placement programme is now an integral part of higher education curriculums as it brings invaluable chances to integrate practice and theories. However, traditional course management systems cannot handle all the information inside a placement programme such as the input from stakeholders like employers and placement counselors. We have recently designed and implemented an information system to support the information need of our placement programme. The system provides a centralized platform for employers to post placement information; for students to view possible placement opportunities; and for placement counselor to provide placement guidance to the students. The system also provides a matching service to identify the best placement opportunities for each student and the best students for each placement job. This paper shares our experience in the design and implementation of our placement information system.

Keywords: design, implementation, placement, post-secondary, education, matching algorithm.

1 Introduction

Placement programmes are effective work-based learning opportunities. Students can have practical training at industrial setting which connects classroom theories to workplace applications. Many higher education institutions in Hong Kong have introduced placement programmes to their curriculums. For example, The Hong Kong Polytechnic University (2013b) requires students to complete a placement programme, namely, Work-Integrated Education, as a part of graduation requirements. Similarly, all bachelor degree programmes accredited by Hong Kong Institution of Engineers must include significant, relevant practical training or employment (HKIE, 2013) in their programmes.

Caritas Bianchi College of Careers (CBCC) and its sister college, Caritas Institute of Higher Education (CIHE), aim to provide holistic education to the community. The two colleges consider that placement programme is a crucial component in a holistic education (CBCC, 2011). With the financial support from Education Bureau (EDB) of Government of the Hong Kong Special Administrative Region under the Quality

J. Lam et al. (Eds.): ICT 2013, CCIS 407, pp. 120–134, 2013.

Enhancement Grant Scheme, the two colleges are integrating placement programme into their formal curriculums of different programmes.

The youth unemployment is a common problem in many countries (Li, 2009). As reported by a government study (HKSAR, 2012), most economies showed a very high level of youth unemployment rate with significant worsening over a decade earlier upon their bleaker macroeconomic conditions. A fresh-graduates employment survey (JobsDB.com, 2011) showed that only 27% of companies had hired fresh graduates in the year before the survey. i.e., 73% of companies were not willing to hire fresh graduates. 83% of companies considered that previous work experience was essential. A managing director of a major human resources company also warned that fresh graduates without proper working experiences would have difficulties in finding their first job in the marketplace (Apple Daily, 2011).

As a result, in order to equip students with practical work experiences, it is essential to integrate placement programme into higher education. Through the summer placement experiences, students have an opportunity to integrate theories with practices and to improve their practical and communication skills and their industrial knowledge. Subsequently, students' employability is significantly enhanced.

With the increasing number of placement programmes in the curriculums, a high quality information system is crucial to provide suitable placement information to different stakeholders including students, employers and placement counselors. Career information and guidance services are essential to higher education institutions and most institutions do have career information systems. However, many of them provide only a simple job search function (*JIJIS*, 2012; *NETjobs*, 2013a; *Job Board*, 2013a) or a CV publication service (*NETmatch*, 2013b), and do not provide a tailor-made service for different stakeholders that caters for individual's interests, values, and needs. For example, they may not have the functionality for placement counselors to oversee the placement applications.

In order to cope with the development of placement programme in our Institutes, we have recently designed and implemented a placement information system. This system provides to both CBCC and CIHE the functionality of (i) placement information manipulation such as registration, search, retrieval and updates; (ii) automatic ranking and matching of students and potential placement opportunities; (iii) administrative work support for placement counselors on the whole placement allocation process; and (iv) survey and report generation for reviewing of the placement project. This paper aims to share our experience in the design and implementation of this placement information system. We will describe the system's architecture, highlight the design challenges we faced, and outline our solutions.

2 System Architecture

The placement information system aims to provide a convenience and user friendly interface to different users including students, placement administrators (who are usually the placement counselors) and employers who have agreement with both colleges (CBCC and CIHE) about placement co-operation. The students can use the

system to look for placement and other full-time or part-time working opportunities. The employers can use the system to post job advertisement and look for potential employees. The placement administrators can use the system to oversee the placement application process of every student. Therefore, the system has three main panels – student panel, administrator panel and employer panel. The users interact with the Web-based panels and the user and placement information is stored in a database. The architecture of the system is as shown in Figure 1 and the use case diagram of the system is shown in Figure 2.

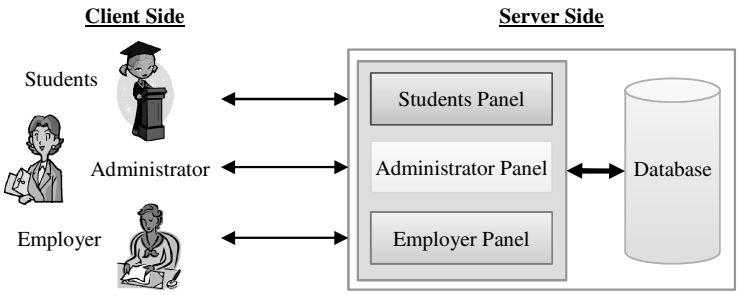

Fig. 1. Architecture of the placement information system

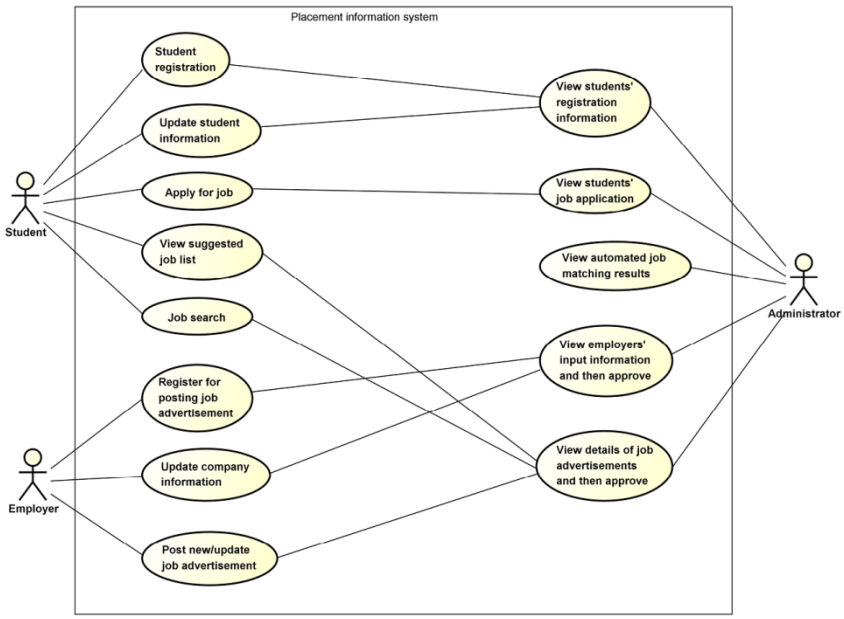

Fig. 2. Use case diagram of the placement information system

2.1 Student Panel

An important goal for the system is to let students find suitable placement or other working opportunities. In order to do so, the students can perform two main tasks on the student panel – personal information manipulation and job searching and application. Before the students can find any job using the system, they should first register to the system by providing suitable information for preparing for job applications. For example, they should provide personal particulars and past working experiences when they perform the registration. Once a student confirms the registration, a personal CV will be automatically generated according to the available information. This CV is sent to the student for his/her reference and can be used by him/her in future job applications inside or outside this system. Afterwards, the students can log in to the system to browse all the available jobs with different criteria through different filters. The students may also use the automatic matching functionality of the system to identify the jobs that the system recommends to them. If a student finds a job that he or she thinks that is suitable for him/her, the student can mark the interest to this job. Placement counselors will provide guidance through this system to this student on whether he/she is really suitable for this marked job according to their expertise.

2.2 Employer Panel

The employer panel is designed for two main purposes – company information manipulation and job advertisement posting. Like the students, before an employer can use a system, the person-in-charge of the company must first register to the system by providing relevant company information. However, in order to protect our students, our placement administrators will verify the company's information before approving the company. Only approved companies can post and edit job advertisements, and the advertisements are subject to approval again. With this approval scheme, students can trust the companies and advertisements posted through this system. On the other side, our system is designed to have a simple interface to employers on the approval so that this approval scheme will not be a hurdle for employers to post job opportunities in our placement information system.

2.3 Administrator Panel

The administrators play a very important role in this system. They have the rights of approving or rejecting employers' registrations and job advertisements. They analyze which placement is the most suitable for which student with the help of our placement information system (the auto-matching module) and refer suitable job placements to each student. They are also responsible for helping students applying for the jobs and following up any issues arising from placement allocation process. The input from the administrators is the most significant difference between our system and other job matching systems.

2.4 Automated Matching Module

The auto-matching module is another main feature of our placement information system. This module automatically associates the most suitable jobs to every student and the most suitable students to every job. The matching is defined based on the criteria set at the time of registrations. Students may provide their preferred criteria for jobs during the registration. Similarly, each job may have different requirements associated to it. We have defined 7 criteria for matching. While the matching of education level and job category are mandatory (i.e., the job and student that failed to match in these criteria will never be shown as matched), other features of the job may match with the preferences of the students. Table 1 lists the criteria we used in the automated matching module. The matching scores indicate how well a job matches with the student. The more criteria are matched, the higher the rating of matching will be. According to the matching result, the administrators can refer suitable students to employers for interview.

Table 1. The criteria used for automated matching module

Criterion	*Condition to be matched*	*Mandatory or not?*
Education level	The student's current education level is not lower than that the job requirements.	Yes
Job category	The student's studying programme has the same job category as stated in the job.	Yes
Working location	The student's living district is near to the working location of the job	No
Working experience	The student has more working experience than that the job requires	No
Language skills	The student has the spoken level of the language skill that the job requires at "good" or above.	No
Salary Range	The student's expected salary range is the same as that the job offers.	No
Employment type	The student's desired employment type (full-time/part-time/internship) is the same as that the job provides.	No

3 Scenarios of Placement Information System

In this section we will highlight some important scenarios of how different stakeholders use our placement information system. In each scenario we will describe the interaction between the users and different system interfaces by a sequence diagram.

3.1 Student Registration

When a student uses our placement information system to look for jobs or placements for the first time, he or she is required to fill in an online registration form. The sequence

of steps for student registration is shown in Figure 3. During the registration process, the student has to fill personal particulars, education and working experiences, job expectation, etc. in the online form. In addition, the student can upload other supporting materials including photos, résumé, and recommendation letters. Since there are design students in our Institute, our placement information system specially caters for them to upload the information about their design products as this is an important criteria for employers to select suitable candidates.

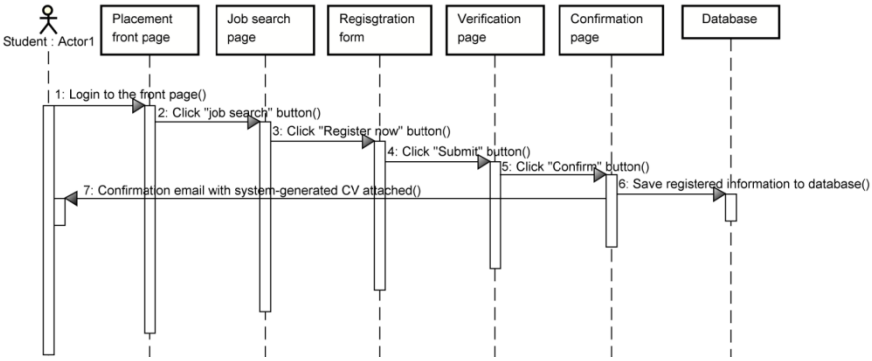

Fig. 3. Student registration process for the system

After filling the registration form and uploading necessary additional information, the student can verify the uploaded information on the verification page. If the student finds that the filled information has error, he/she can roll back to the input page and modify it. If no errors are found in the checking, the student can confirm the registration and the student information will be stored in the database. At the same time, a CV will be generated by the system according to the information filled by the student. This CV will be sent to the student through e-mail for his/her reference and further usage.

3.2 Job Searching and Job Application

After finishing the registration, a student can use the job searching function to find if there are potential jobs or placement opportunities for him/her. From the list of available jobs the student can select and apply for jobs that he/she likes. Figure 4 shows the sequence diagram of the job searching and job application processes.

The student can search the available jobs according to keywords in job titles, company and/or job descriptions, and other chosen criteria such as job categories. The details of a job can be retrieved by clicking the title of the job in the list. After viewing the details of the job, if the student thinks that the job is suitable, he/she can click the “apply now” button to initiate the application process. The placement counselor will be notified by this application request and will analyze if this job is really suitable

for the student, especially on whether this job can fulfil the placement requirement for that particular student if the student is looking for placement opportunities. Moreover, the placement counselor will follow up the application process.

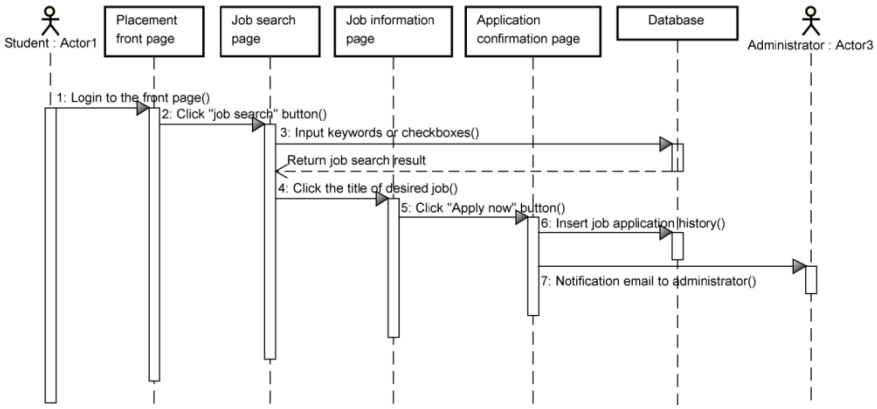

Fig. 4. Process of job searching and job application

3.3 Employer Registration

The registration process for employers is different from that for students. This is because students can authenticate themselves by using the login credentials in our student information system. However, the details of new employers must be verified by the placement administrators in order to protect our students from potential employment frauds. Therefore, after registration, an employer's account is not fully functional until being approved by a placement administrator. Figure 5 shows the steps for an employer to create and register an account in our system.

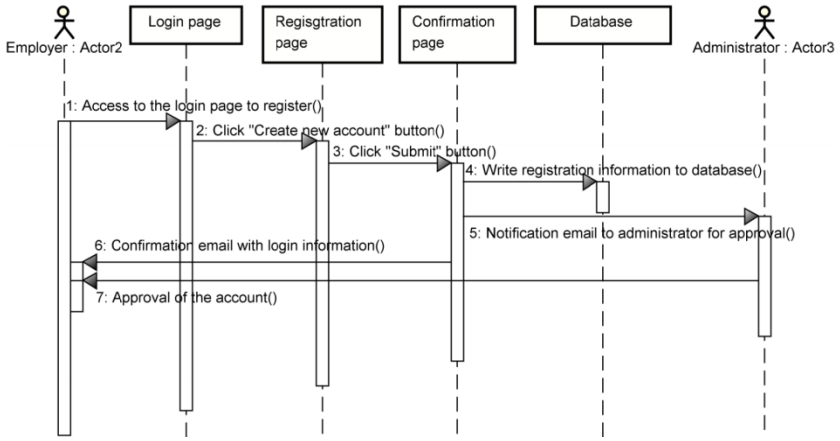

Fig. 5. Process of employer registration

3.4 Posting Job Advertisements

An approved employer can post job advertisements to the system. Figure 6 shows the process of posting a new job advertisement. The employer first logs in to the system and clicks the "new job" button on the employer panel. Then, a job vacancy registration form is shown and the employer needs to fill in the job information such as position name, number of vacancies, requirements, salary and benefits, and recruitment deadline. After the employer filling in the form and submitting it to the system, the job is still not visible to the students yet. Again, to protect our students, any advertisement posted or updated must be verified and approved by a placement administrator. The system will generate a notification to the placement administrators once a new job is posted or any crucial job information is updated. Only approved jobs are visible to the students. Our system will notify the employer about the placement administrators' decision on the job advertisements.

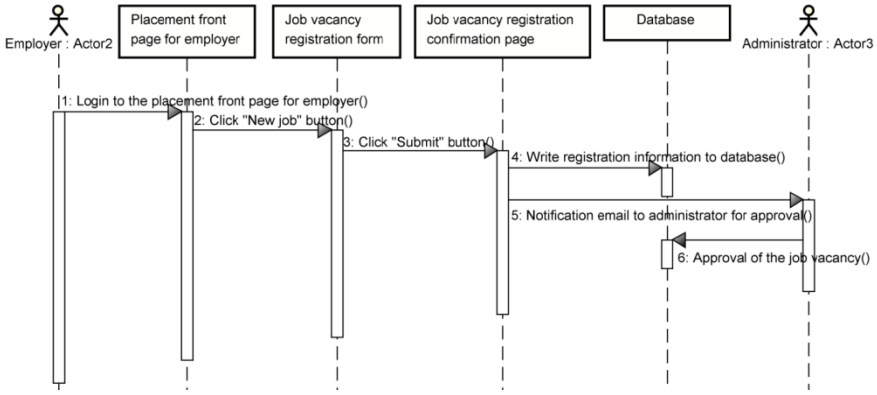

Fig. 6. Process of posting a new job advertisement

3.5 Job Matching

An important task of placement administrators is to refer suitable placement opportunities to every student who needs placement in our institute. As there are a large number of students in our institute, our placement information system aims to help the placement administrators by automating the job matching and ranking process. Figure 7 shows how a placement administrator can use our system to perform job matching and ranking.

A placement administrator can click the "job matching" button on the administrator panel. A list of all jobs, together with a list of students who are suitable for each job is shown to the administrator. For each job, the students are ranked according to the degree of matching to the job requirements. The administrator can retrieve the details of the students, including their CV and supporting information from the system and then refer them to the corresponding companies according to the matching results.

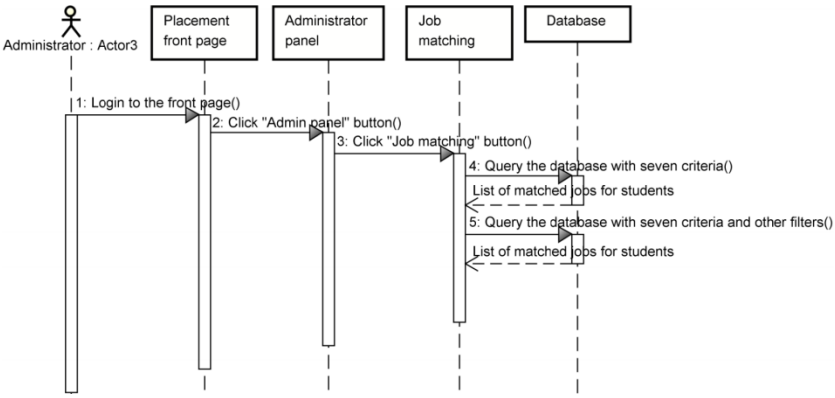

Fig. 7. Process of job matching and ranking

4 System Implementation

The system is mainly a Web-based application and is implemented by PHP on server side and JavaScript on client side. jQuery is also used to enhance the user experience and the page interactivity.

4.1 Server Configuration

Our system is running on a Linux system with Apache, PHP and MySQL installed. Table 2 shows the detailed configuration of our server.

Table 2. The server configuration

Components	*Specifications*
CPU	Intel Pentium E2180 2GHz
Memory	512 MB
OS	CentOS 5.8
Hard disk	160 GB
Web server	Apache 2.2.3, PHP 5.3.3
DBMS	MySQL 5.0.95
JavaScript library	jQuery 1.8.3

4.2 Database Design

The database of the system stores mainly the information from three directions – users, companies, and jobs. Figure 8 shows a simplified E-R diagrams for our system. We have the user table for storing the basic information (user name, encrypted password, privileges, etc.) of different users (administrators, employers and students).

When an employer registers, the company information is recorded and an account is created for this employer. The approval records of the companies are also stored. When a student first logs in to the system, a new profile is created to store the personal information related to job searching, like job preferences, working experiences, etc. Students can use different profiles for applying different jobs. When a student is successfully employed, the details of the employment is recorded so that the placement counselors can follow up the placement progress of the student.

Our system supports multi-languages and is supported by databases. Users can have different language preference settings and the menus can be tailored. To facilitate automatic job matching, we decided to unify the way for students to describe their job preferences and the way for employers to specify job requirements. Most of such entries are implemented using drop-down menus and the menu items are stored inside the database in some constant tables.

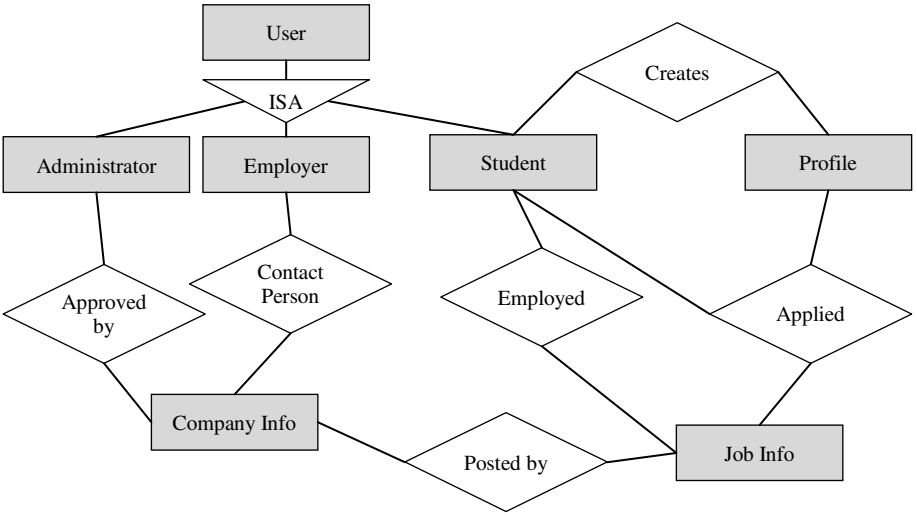

Fig. 8. A simplified E-R diagram showing the relationship sets between key entity sets

4.3 User Interface

Administrator Panel. Placement administrators have to work with the system closely to oversee the placement information. For example, he/she has to verify the employer's information during their registration and also after they post the jobs. Figure 9 shows a list of pending employers and the administrator can approve the employers he/she knows in a batch. As another example, administrators have to follow up the applications referred by them. Figure 10 shows a list of application history so that they can follow up (e.g., input the actual employment details if the student is employed).

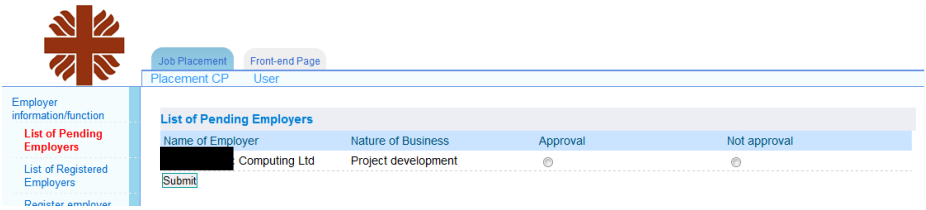

Fig. 9. List of pending employers in administrator panel

Another important task of administrator is to refer suitable placement to students. The administrators can select the placements through a filter and then the system will list out the students who are suitable for the jobs according to the matching criteria discussed in Section 2.4. Administrators can associate the placements to students by clicking the "Refer" button as shown in Figure 11.

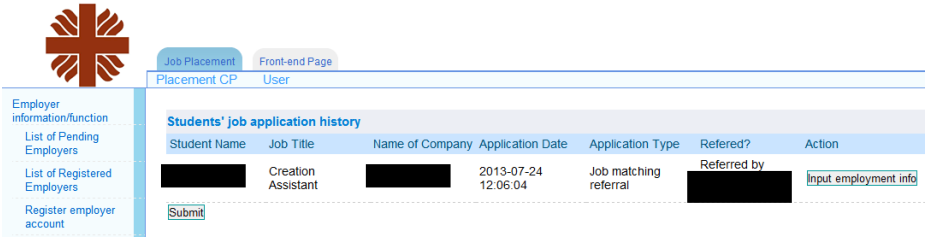

Fig. 10. The application history of the students to the jobs

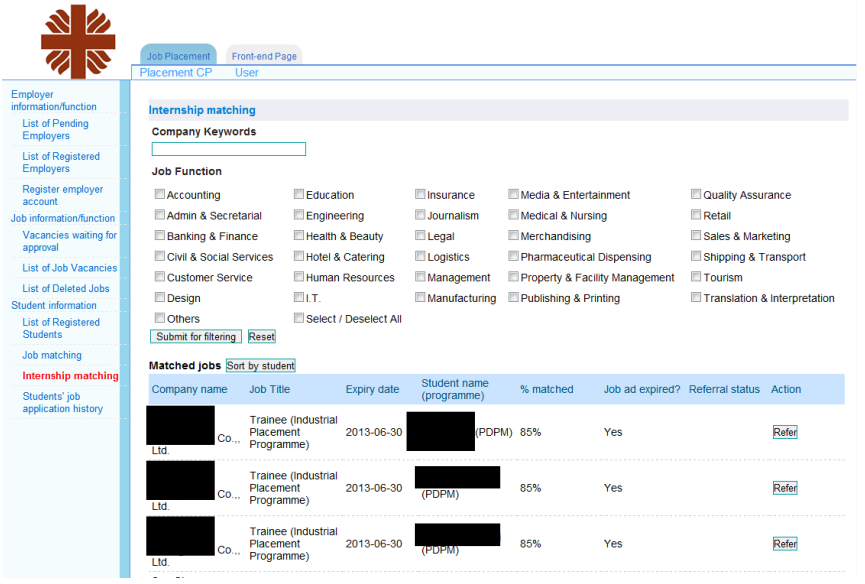

Fig. 11. List of matched students for placements

Student Panel. When a student logs in to our system, he/she sees our homepage as shown in Figure 12. This page shows a summary of the suggested jobs to the students according to his/her preferences set previously. If the student cannot find suitable jobs from this list, he/she can click the "Job search" button and goes to the job searching page as shown in Figure 13. On that page the student can browse the list of all available jobs and set filters on the jobs using keywords and/or other job attributes.

Inside the list of jobs, the student can click the title of the job and then go to the job details page as shown in Figure 14. If the student thinks that the job is good, he/she can click "Apply Now" and choose a CV profile for this application. The student may choose to use his/her current CV or update the CV with information suitable for this application. Then, the placement administrators will receive the notification and provide suitable guidance to the students on the applications.

Fig. 12. System homepage for students

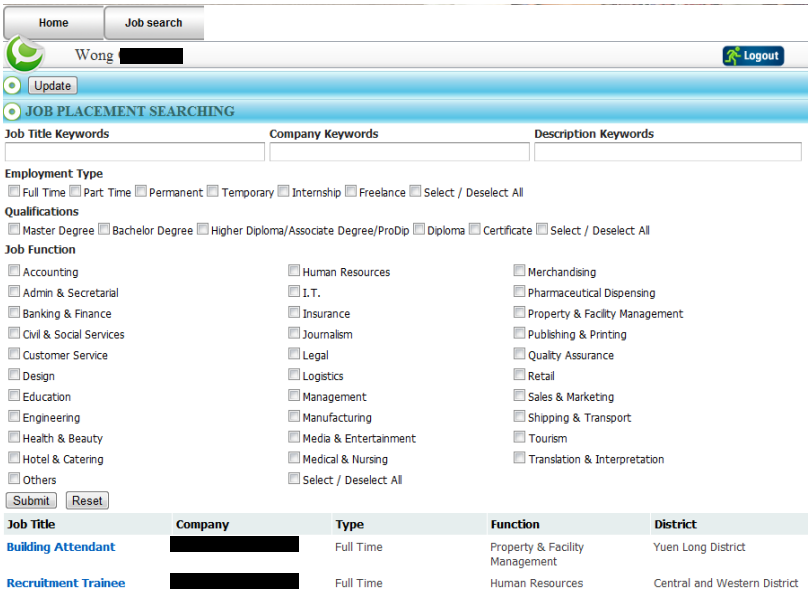

Fig. 13. Job searching page under student panel

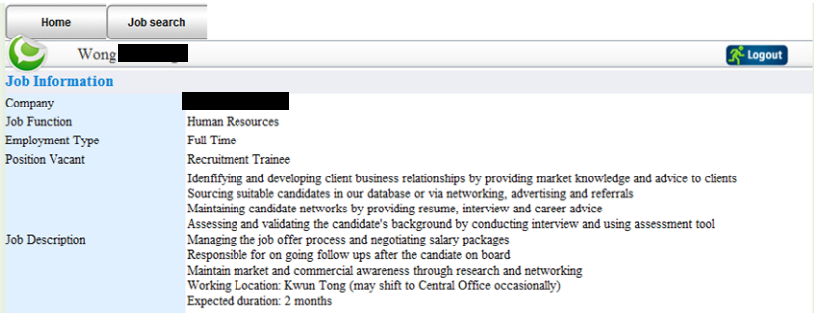

Fig. 14. Job details page under student panel

Fig. 15. Registration screen for employers

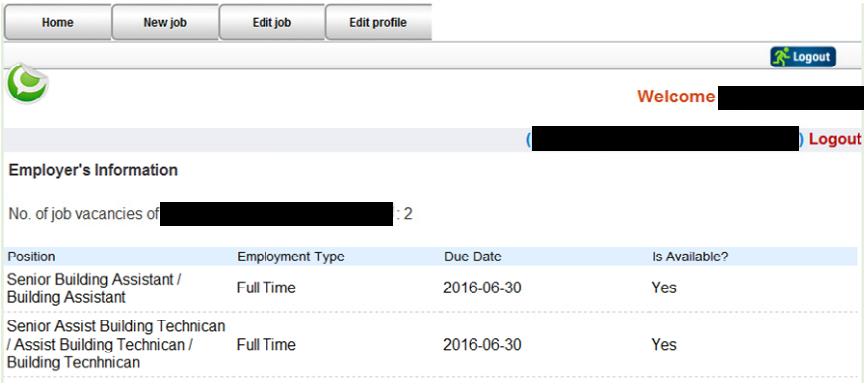

Fig. 16. Employers' home page with job status

Employer Panel. Employers can use the panel to edit their company profiles and to post jobs. Before that, they must first register to the system via the form as shown in

Figure 15. The administrator will then verify the information and activate the account. Employers can use the activated accounts to post jobs. However, the jobs must be verified by the administrator before being accessible by the students. Employers can see the status of the job in their home screen as in Figure 16.

5 Discussions

Over the implementation of the system, we faced problems in (i) designing the data format (including programme information, placement location district, etc.) for automated job matching, and (ii) generating students' CVs and convert them into PDF format. In order to facilitate automated matching between jobs and students, we decided to unify the descriptions of the matching criteria in job descriptions and students' preferences. Moreover, as different people may use different notation on the same information (e.g., district of the company and the working area preferences in student profile), we decided to make the fields non-free-text in most cases. For example, users must select the districts, study programmes, education level requirements, etc., by drop-down menus. This reduces the chances of input error, and also makes the matching easier.

CV is a very important document in job application. A clear and concise CV gives a good image to employers and is beneficial to the students. Therefore, we help the students create a CV in PDF format for job applications through the system or through other means. After entering the information, the students will receive the generated CVs in PDF through e-mails. During the generation, our system first converts the students' information into Excel format using PHPExcel for clear and organized structures. Then, the tcPDF library is used to convert the Excel object into a PDF file. As the CVs contain Chinese characters and optionally students' image, special handling was required for such conversion.

6 Conclusion

The implementation of the placement information system in our Institutes provides a platform for students to find desired placement opportunities under the guidance of placement counselors. The verification and approval mechanism in this system makes sure that the information provided by both students and employers are valid so as to prevent the job mismatches and job frauds. In order to reduce the workload of the placement counselors, automated job matching is provided to them for identifying good matches between students and placements. Placement counselors can also review students' job application history and follow up any problems the students faced in job applications. This placement information system plays an important role in the matching of students and placement opportunities and is helpful to the integration placement into programmes' requirements for providing a holistic education. Furthermore, students in the Institutes may also use the system with the guidance of placement counselors to find suitable part-time and full-time jobs so as to build up their career path.

Acknowledgement. This project *Placement Programme to Support Holistic Education* is funded by the Education Bureau (EDB) of the Government of the Hong Kong Special Administrative Region of the People's Republic of China under the Quality Enhancement Grant Scheme (QEGS).

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An Interactive Mobile Learning Platform for Teaching and Learning Chinese Language in Secondary School Environment

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Abstract. With the popularity of smart phones and mobile devices, mobile applications have been reached out to the field of education. Mobile learning not only promotes the interaction between teachers and students, but also improves the students' motivation to learn independently. This paper presents the use of a mobile learning platform to enhance the teaching and learning effectiveness for Chinese Language in a secondary school environment. The mobile application helps students get involved in classroom lessons through immediate interaction. It helps teachers monitor the learning progress and the performance of an individual student. The mobile learning platform involves a news board for announcement of updates news, a discussion board for discussing the academic issues, a quiz system for generating and delivery of multiple-choice and short questions, a scoreboard for displaying the scores of assessments and a whiteboard acted as a synchronized tool of discussion and survey page from the server.

Keywords: mobile learning applications, teaching and learning Chinese Language, secondary schools.

1 Introduction

From the 2012 HKDSE result statistics [1], there were only 49% of examinees obtained level 3 or above for Chinese Language. In other words, half of the examinees failed to reach the criteria of a passing grade in Chinese Language in the 2012 HKDSE. Students generally found that Chinese Language is a boring subject although they are using Chinese Language in their daily life. Unlike science subjects, learning language subjects are found to be difficult for students need special skill to write an article fluently, they need to think from different perspectives and give a correct interpretation, and so on. These skills cannot simply be transferred from the teachers, the students have to read a lot of different learning materials, go through discussion with their classmates and get related experience from their daily life. To learn Chinese well, students need to understand the learning materials, get involved

J. Lam et al. (Eds.): ICT 2013, CCIS 407, pp. 135–147, 2013.

and participate in classroom discussion. Students have to read more books and practice writings in their leisure time. Students should keep their passions and motivations to learn independently. In a classroom setting, teachers may find it difficult to arouse students' interests in learning Chinese Language.

There are some existing e-learning websites, such as "A Passage A Day" [2] and "EnglishBuilder" [3] in which different types of exercises are provided for students to supplement their day-time learning. These kinds of e-learning websites just include some academic information for students' self-learning and exercises [4-5]. Although these websites may be useful in teaching and learning, they cannot bring any interactions between teachers and students. Since interaction plays an important role in classroom teaching, another type of learning comes up to fill the gap of e-learning, it is commonly known as mobile learning (or m-learning) [4-9]. Mobile learning is a kind of education which is ideal with the current situation by using mobile devices like tablets and smart phones. It allows learning can be done at anytime and anywhere.

This paper presents the use of a mobile learning platform to enhance the teaching and learning effectiveness for Chinese Language in a secondary school environment. The mobile application helps students get involved in the classroom lessons through immediate interaction. It helps teachers identify the learning progress and the performance of individual student. With the provision of different kinds of class activities, the classroom lesson will become more attractive and interesting.

The mobile learning platform involves a news board for announcement of updated news, a discussion board for discussing the academic issues, a quiz system for generating and delivery of multiple-choice and short questions, a scoreboard for displaying the scores of assessments, a whiteboard acted as a synchronized tool of discussion and survey page from the server.

The application was tested and evaluated by a class of secondary school students. It was found that the mobile learning platform can drift effectively from the traditional teacher-centered into student-centered learning and motivate students to learn Chinese Language in a more interesting way.

This paper is organized as follows. Section 2 describes the design and architecture of the platform. Section 3 presents the implementation of different functions of the platform. Section 4 shows the evaluation results of the platform. Finally, conclusions and future work are shown in Section 5.

2 Design of the Mobile Learning Platform

2.1 Architecture of the Application

This learning platform is based on a client-server architecture, which is shown in Figure 1.

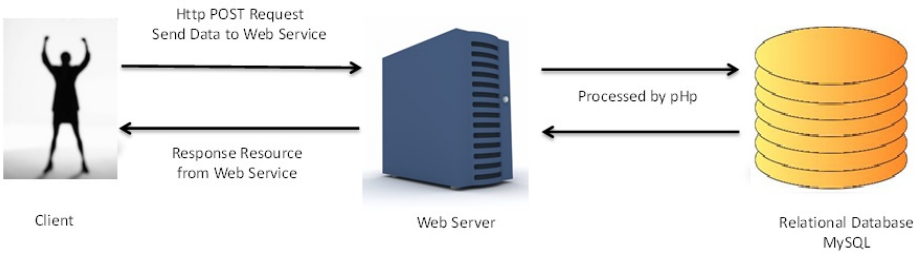

Fig. 1. Client-Server Architecture

The client side will send the HTTP request by post method to the web server. The server side will handle the HTTP request called by clients. MYSQL will be running as the relational database to store the users' information, teaching and learning contents. PHP will be used as the server side language which processed in this development for dynamic web pages and support MYSQL database. All of the functions in this platform will adopt this architecture to send and receive data. However the data in the application are added by the teachers through the web administration page. The architecture of the administration page is shown in the Figure 2:

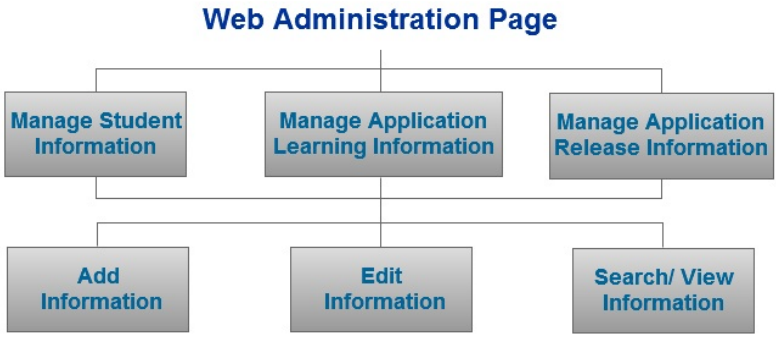

Fig. 2. Architecture of Web Administration Page

Teachers are required to log into the web administration page. After the validation, they can carry out the activities indicated in Figure 2. However, the web administration page is mainly used by teachers only.

2.2 Functions of the Mobile Application

This platform aims to achieve student-centered, efficient and interactive learning, the platform also aims to increase learning motivation and promote self-learning capability. Figure 3 shows the functions of this application.

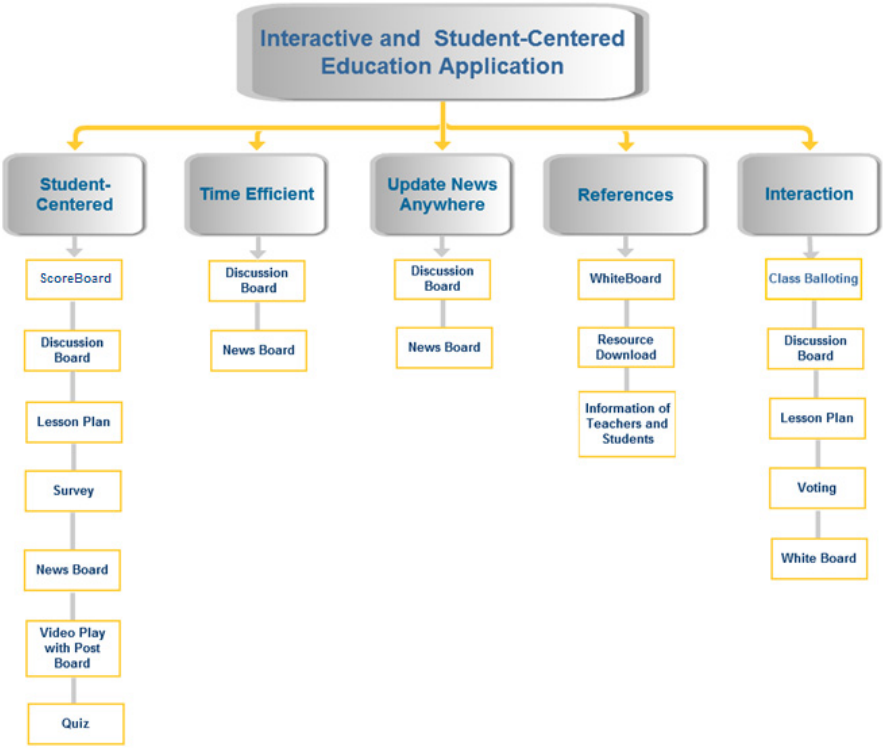

Fig. 3. Functions of the mobile learning platform

Basically, the platform involves a news board for the announcement of updated news, an immediate post board with video playback function for students to ask questions and get participation in the lesson, a discussion board for discussing the academic issues, a quiz system for generating and delivery of multiple-choice and short questions, a scoreboard for displaying the scores of assessments, a whiteboard acted as a synchronized tool of discussion, a content lesson plan with the allowance of downloading related source files and survey page from the server.

3 Implementation of the Mobile Learning Platform

In this section, the main functions of the learning platform will be discussed and some screen captures of the mobile application will be shown. The functions basically are divided into three categories: “lesson”, “communication” and “exercises” to fulfill the needs of teaching and learning.

“Lesson” is to allow teachers and students join the activities together in the lesson, for instance draw mind map, create notes by the synchronized tool, and express opinions when watching video.

"Communication" is to provide tools for teachers and students to update news, go through discussion and provide questions and answers about academic issues.

"Exercises" is to deliver writing task, short questions and multiple choice quizzes to students. For short questions and quizzes, the answers will be automatically marked for students.

Once the user is logged in the platform, the following screen (Figure 4) will be displayed. The user can select the functions like "news board", "lesson", "exercises", "discussion board", "survey", "setting" and "logout".

Fig. 4. Menu page of the mobile application

In the following section, some of the selected functions will be discussed. They are "Writing Task", "White Board", "Video Play with Post Board", "Quiz System" and "Short Questions".

3.1 Writing Task

Writing is one of the important components of learning Chinese Language. Nowadays, students are confused with writing because different articles require different styles. In the application, writing task is developed for students to write articles upon teacher's requirement and it is under the exercise page. It is aimed to provide a clear format of a specific type of articles to students before they start writing. After they finished the writing, they can go to the related page and read the articles written by the other students. Figure 5 shows the flowchart of writing task.

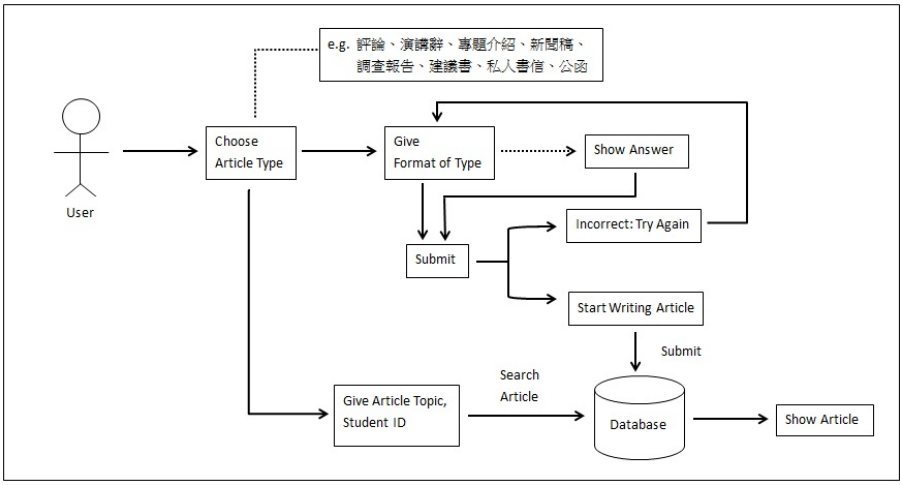

Fig. 5. Implementation of Writing Task

Once the student selected the type of articles, he or she can start writing in the given format as shown in Figure 6. After the writing practice, students can read some pieces of work which are shared by other students.

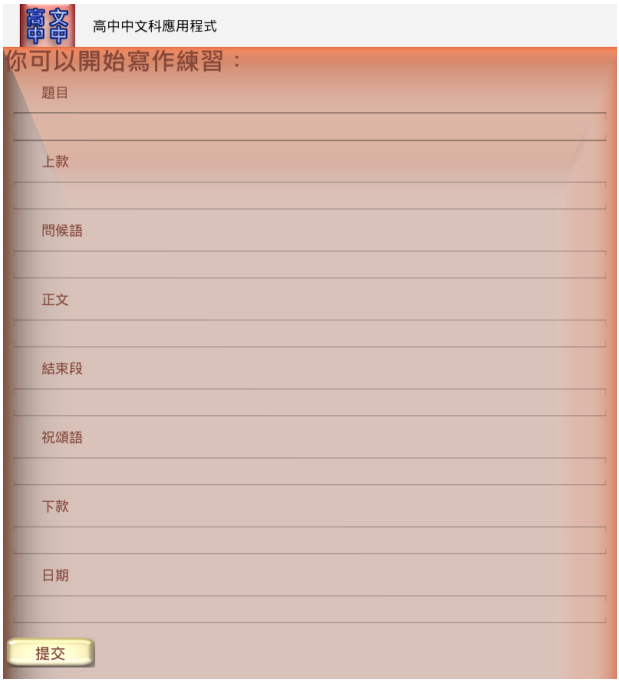

Fig. 6. Screen capture of Writing Task

3.2 White Board

Drawing of a mind map is a common lesson activity in learning Chinese Language. In traditional lessons, a few students may be invited by the teacher and draw a mind map on the blackboard one by one. However, it is not so effective and efficient. An electronic whiteboard is proposed, which can increase the number of students to join and share their work to others. It is one of the tools that improve the lesson interactivity between teachers and students.

The implementation of this function is shown in the following figure (Figure 7):

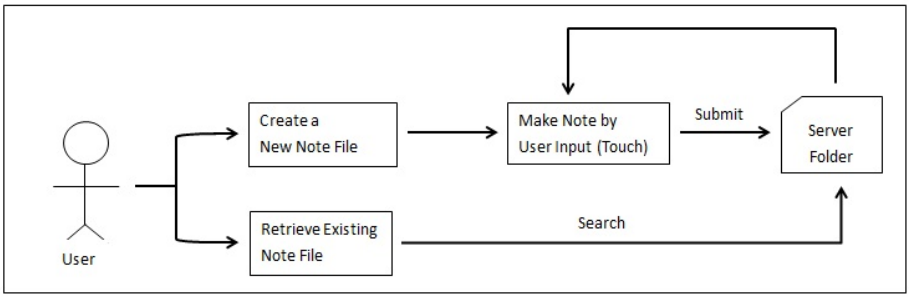

Fig. 7. Implementation of White Board

Figure 8 shows how the conversion of image that uploading to the server through Android application:

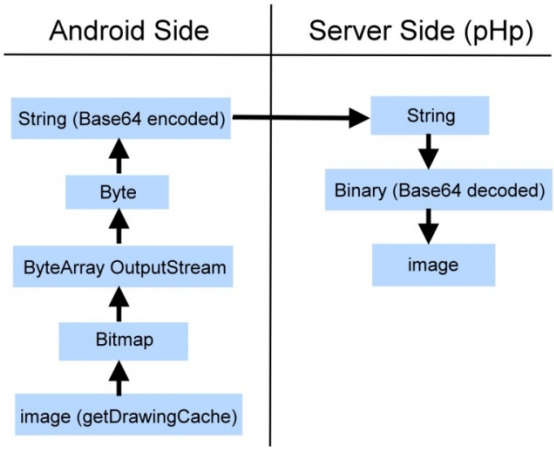

Fig. 8. Conversion of Image

Figure 9 shows the whiteboard in which the words are written by different students in a synchronous way. All other students joining the whiteboard can also see the image simultaneously.

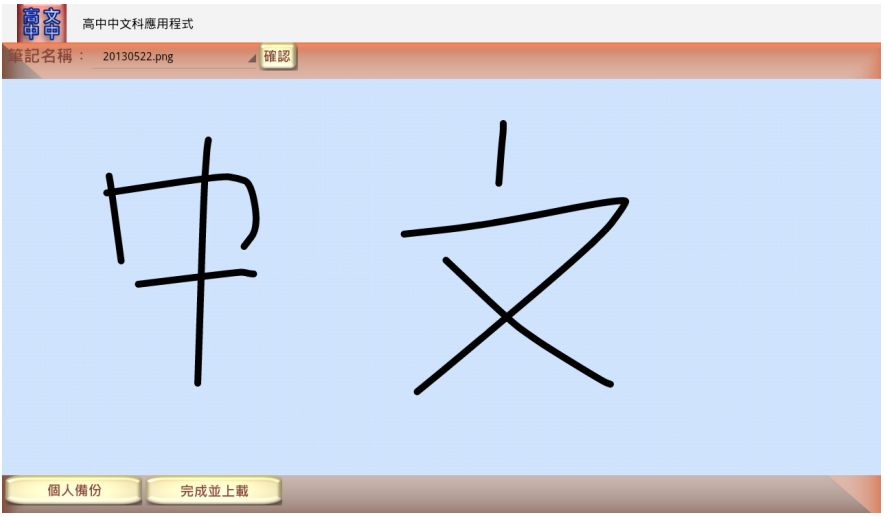

Fig. 9. White Board: words written by different users

3.3 Video Play with Post Board

Listening and speaking are the difficult parts for students to practice in schools. Because of insufficient practice, some students got poor results on the listening and the speaking papers in public examination. Teachers may not put much time on listening and speaking. Although teachers will give chance to express opinions after listening of a record, only one to two students can be able to join this activity. Expressing opinions can also be a way for students to learn Chinese Language.

The implementation of this function is shown in the following figure (Figure 10):

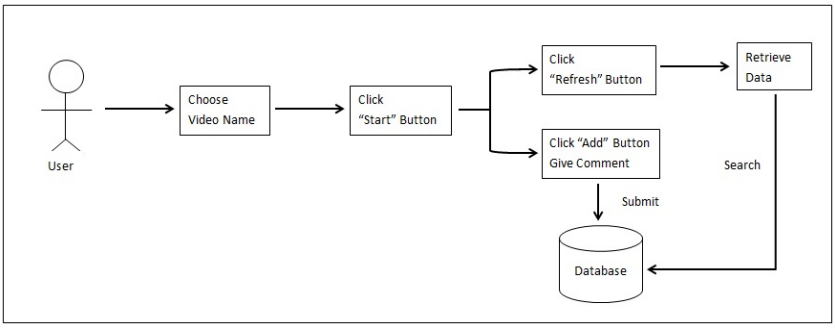

Fig. 10. Implementation of Video Play with Post Board

Figure 11 shows the screen capture of video play with post board. When the video is playing on the left hand side of the screen, students can carry out discussion on the right hand side simultaneously. This function arouses more discussion in the classroom.

Fig. 11. Video Play with Post Board

3.4 Quiz System

Self-revision is very important for students, especially senior form students, since it can address whether they understand and quickly remember the concept. Although multiple choice questions are seldom used in Chinese Language, it can still play a role. This quiz system can mark the answers automatically and students can redo the quiz as revision. Students can use their spare time to do revision without teachers' help. Figure 12 shows the implementation of this function.

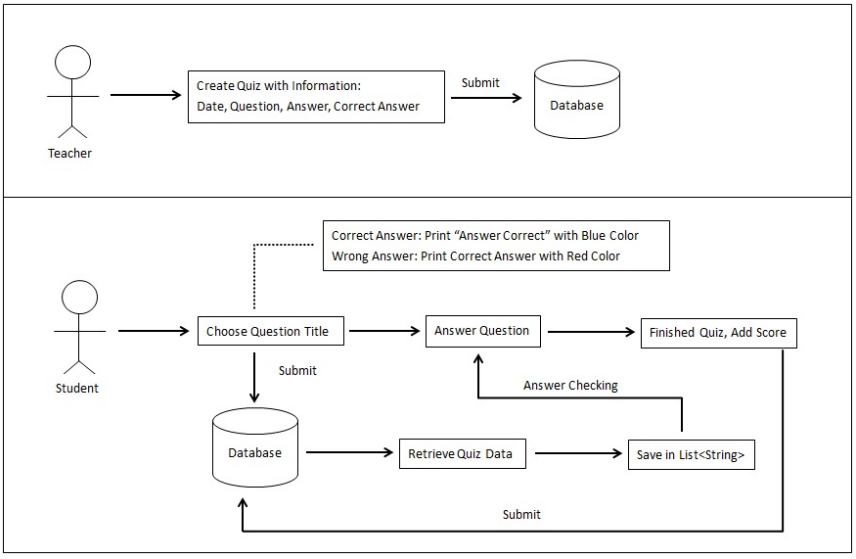

Fig. 12. Implementation of Quiz System

Figure 13 shows the screen dump of the Quiz System, in which the questions will be marked automatically and answers will be given to student for revision purpose.

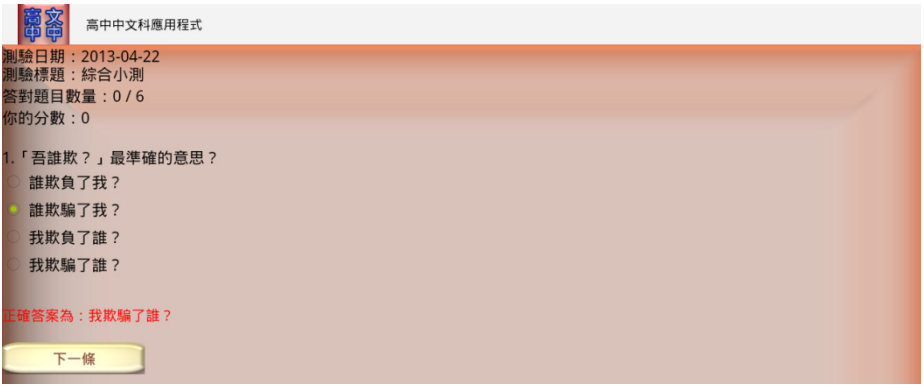

Fig. 13. Quiz System: Incorrect Answer

3.5 Short Questions

Other than multiple choice questions, this application also provides short questions for students to practice during their leisure time. Students find difficult to know the key points or keywords needed on the question, they are usually given a bulk of words but do not address the concept of the question. This function is to address the key words from the students' answer, students can learn from the answers and the provided keywords. Figure 14 shows the implementation of short question.

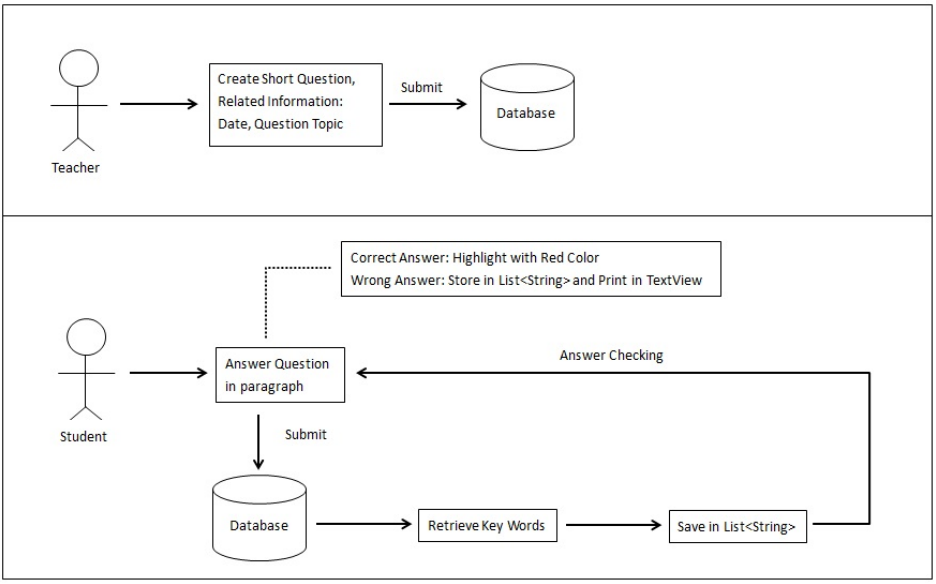

Fig. 14. Implementation of Short Question

3.6 Other Functions

Besides the above five functions, the platform also includes other functions such as Class Voting (Figure 15), Discussion Board (Figure 16) and Score Board (Figure 17), etc.

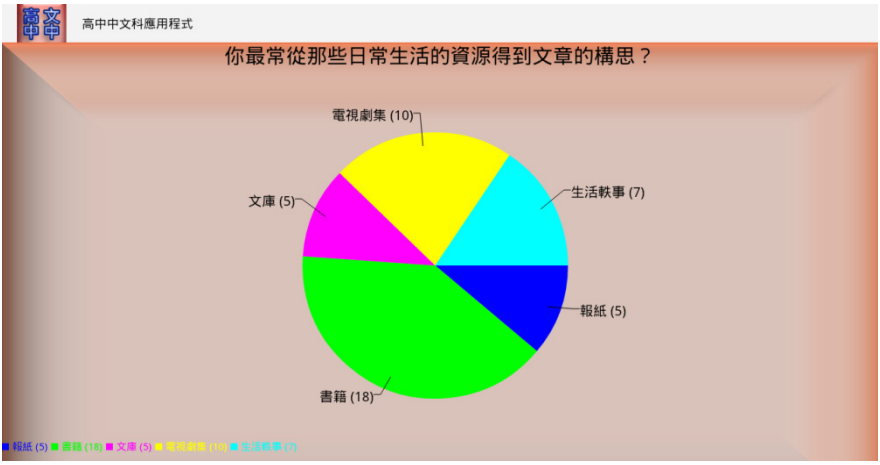

Fig. 15. Class voting

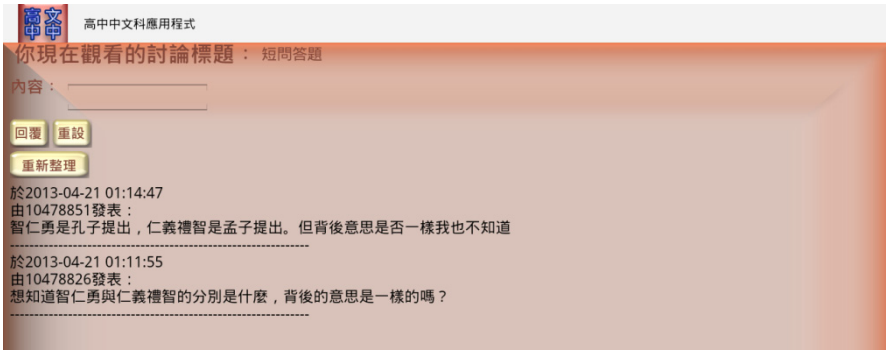

Fig. 16. Discussion Board

Fig. 17. Score Board

4 Results and Discussion

Section 2 describes the design and architecture of the mobile platform and the web platform, some of the functions in the application are mentioned in Section 3. This mobile learning platform was evaluated by the staff, teachers and students from a secondary school in Hong Kong called Christian Alliance S W Chan Memorial College. There are eighteen people invited to evaluate the application and fill in the questionnaires. Among these eighteen people, four of them are the technical staff and programmers, eight of them are teachers and the remaining ones are the students from the same secondary school.

Questionnaires were given to the users to obtain views and suggestions of the mobile learning platforms. The purpose was to recognize any improvements or modifications which can provide a better application to the users. Users were needed to fill the questionnaires which are divided into three areas: achievement of purpose, functions and satisfaction.

The first six questions are related to the aim and objectives, users can choose one answer from four given choices, they are "Yes", "No", "No Comment" and "Others".

Table 1. Results from Question 1 to Question 6 in Questionnaires

	Question	Yes	No	No Comment	Others
1	Can the platform successfully increase the interactivity between teachers and students in the lesson?	15 (83%)	1 (6%)	2 (11%)	0 (0%)
2	Do you think students have rights to express opinions to teachers?	15 (83%)	0 (0%)	2 (11%)	1 (6%)
3	Can this application improve the students' motivation of students?	10 (56%)	1 (5%)	3 (17%)	4 (22%)
4	Can this application increase the students' opportunity of self-learning?	11 (61%)	1 (6%)	2 (11%)	4 (22%)
5	Can this application successfully provide a learning platform anywhere and anytime to discuss academic issue?	18 (100%)	0 (0%)	0 (0%)	0 (0%)
6	Do you think the functions in this application are enough for teachers and students to use in lessons?	12 (67%)	3 (17%)	2 (11%)	1 (5%)

From the above table, it is found that 100% of the users agree this application can provide a learning platform to discuss academic issues at anytime and anywhere. Also more than 80% of users believe this application can increase the interactivity and be more student-centered in the lessons. However, nearly less than 60% of users believe this application can increase the students' motivation to learn and provide an opportunity for self-learning.

5 Conclusions

From the evaluation results, the users generally agreed that this mobile learning platform was a student-centered, efficient and interactive application for teaching and learning Chinese Language in a classroom setting. However, from the users' evaluation, the application can only partially increase the learning motivation and self learning capability of the students. Future development works of the learning platform include increasing the interactivity level in the lessons with discussion board, class voting results, opinions expressed during the video play. The overall layout of the application can be improved to be more attractive and fully use the space of the screen.

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An Interactive Mobile Application for Learning Music Effectively

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Abstract. This paper introduces a mobile application that allows users learn music in a funny and effective way so as to arouse students' interests towards music, and provide a convenient means to students' learning and playing music through the mobile devices. The mobile application enables users to know their learning progress. Students can learn music effectively through game-based quizzes and exercises. The mobile application provides an elementary level e-learning platform for music learners. It serves as a stepping stone for them to further develop their interests in this field. The application is divided into three parts: fundamental musical theory, educational games, and practical use of musical instruments. The musical activities includes introducing different musical instruments, reading scores, listening to different notes, writing and recognizing treble clef, calculating the tempo of a song and playing notes from a keyboard with the sounds of different instruments.

Keywords: mobile learning, applications of mobile devices, learning music.

1 Introduction

Music is a form of art. It plays an important role in the development of a child's brain. Recent research found that music affects the growth of a child's brain in four ways: academic, physical, emotional and spiritual affairs. It is no doubt that music should be included in a balanced education [1-2]. Research concerning the preferences of music activity for pre-school children suggests that children are spontaneous to enjoy musical activities in a supportive environment [3]. By learning in different environments, like schools and home, it strengthens children's concentration and enjoyment in music [4]. In reality, not every individual child can have a proper training in music and musical instrument due to the expensive educational cost. In addition, the current learning method in a classroom may not be interactive to arouse the children's interests in music.

As learning with a smartphone is totally different from learning in the classroom, a new aspect of the study has come into shape, called mobile learning. Mobile device applications (i.e. apps) can be treated as a kind of study aids where

J. Lam et al. (Eds.): ICT 2013, CCIS 407, pp. 148–157, 2013.

students can learn music through the device in an interesting and interactive way at anytime and anywhere [5-6]. The mobile applications allow students gain access to different resources, which can play a supplementary role in the education part [7]. For those who do not have proper training in music, they can start their own learning journey using the mobile application at their own pace. Learning music is not only for children. This claim is supported by the research conducted by Wristen that adult students seek quality, which includes passion for music and knowledge of music [8].

There are a number of mobile applications for learning music in the market, like Music School for Toddlers[9], Music Tutor Sight Read Lite [10] and Piano [11]. Music School for Toddlers provides the sound of five musical instruments such as piano, guitar, drums, percussion and xylophone. Music Tutor Sight Read Lite teaches how to read and write staff. Piano provides a piano keyboard for users to play. These applications only provide one or two focus functions. They do not include complementary music courses for learning music effectively and interactively.

This paper introduces a mobile application that allows users learn music in a funny and interactive way. It provides a convenient means to students' learning and playing music through the mobile devices. The mobile application enables users to have their own learning journey in music. Users can learn music in an interesting way through game-based quizzes and exercises.

The mobile application provides an elementary level e-learning platform for music learners. It serves as a stepping stone for them to further develop their interests in this field. The application is divided into three parts: fundamental musical theory, educational games, and practical use of musical instruments. The musical activities includes introducing different musical instruments, reading scores, listening to different notes, writing and recognizing treble clef, calculating the tempo of a song and playing notes from a keyboard with the sounds of different instruments.

2 Design and Methodology of the Mobile Application

This mobile application is divided into three parts: "Start to Learn", "Music games" and "Musical Instruments". The first part ("Start to Learn") is to learn some basic knowledge in music. The second part ("Music games") includes game-based revisions and quizzes. The contents of the questions are based on the knowledge from "Start to Learn". The third part ("Musical Instruments") is to allow users encounter different musical instruments such as violin, flute, trumpet and piano. The functions provided in the application can be found in Figure 1.

The design and methodology of each part of the application will be discussed in this section in details.

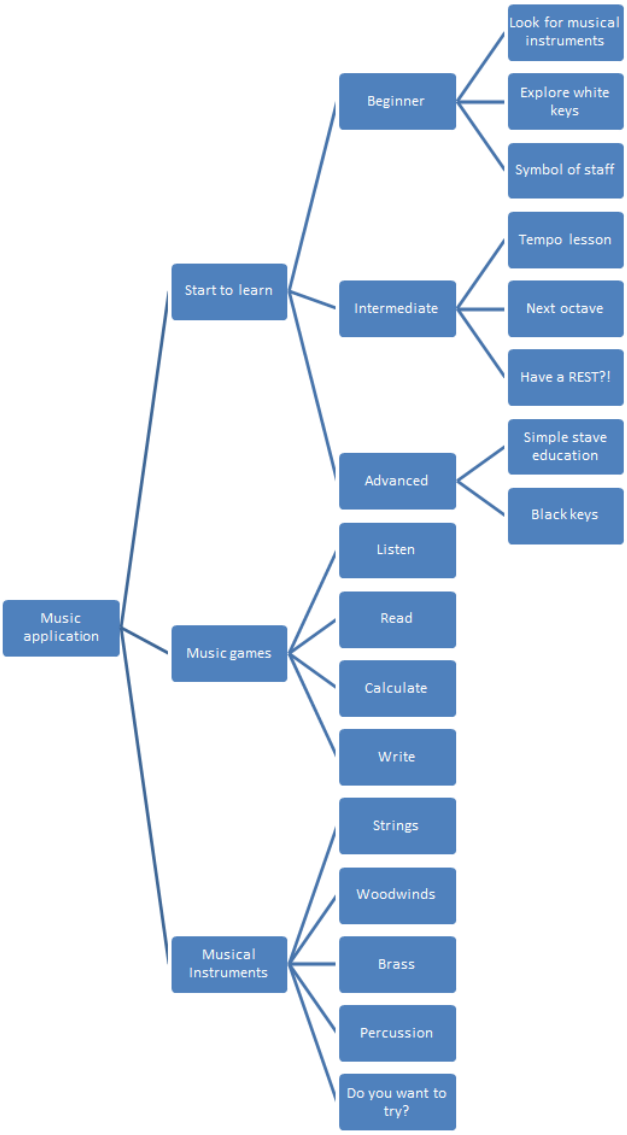

Fig. 1. Functions provided in the mobile application

2.1 Start to Learn

For the first part "Start to learn", the learning journey is divided into three stages - beginner, intermediate and advanced. Users can learn different musical instruments and the positions of different notes on a keyboard (Figure 2).

Fig. 2. The piano keyboard

There are different audio formats to be used in the application, such as midi, mp3 and ogg. After comparing these formats, it was found that the ogg format gives the best performance, the provided sound can be played in a gapless way. The comparison of using different file format can be found in Table 1.

Table 1. Comparison of file formats used in the application

	.midi	**.mp3**	**.ogg**
Error occurs	None	Frequently	None
No. of times that the song can be played	Played once	Played many times, an exception throw	Played many times
Speed of performance	Average	Slow	Fast

For the midi format, the sound of the notes can just play once even if you touch the keyboard many times, there will be no response afterwards. For the mp3 format, the application runs slowly, it easily gets an error with frequent touches of the keyboard, and it has a slower response. For the ogg format, it gives the best performance among the three formats without error and quick response. Therefore, the ogg format is used as sound source for this application.

Musical instruments are classified into strings, woodwind, brass and percussion. Users can then learn how to read staff, calculate the tempo and listen to the sound of the musical notes immediately. Once the users click on the staff image, the application will show users how to draw a treble clef. Users can follow the arrow to learn the ways to draw a treble clef (Figure 3).

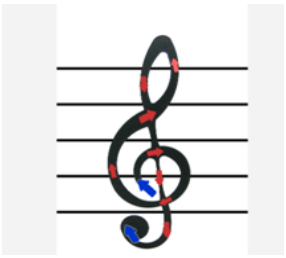

Fig. 3. Writing of a treble clef

Users can have a "Tempo Lesson". The sound and the tempo of that musical note will be played once the users pressed the selected button (Figure 4).

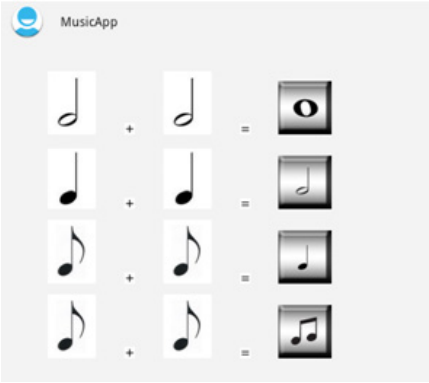

Fig. 4. The Tempo lesson

2.2 Music Games

In the second part of the application ("Music games"), there are different games and exercises to reinforce what they have learnt. The games are divided into reading notes, listening to the notes, writing the treble clef and calculating the tempo.

For the reading game shown in Figure 5, users need to read through a staff including the musical notes which generated randomly and recognize the note (e.g. Middle C). Seven buttons as the name of notes for event handling are included as users' input.

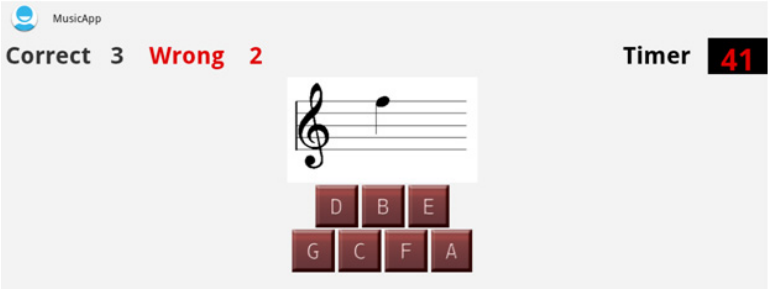

Fig. 5. The Reading game

For the writing game (Figure 6), users need to draw the treble clef. This part used the Android gesture builder. The way of drawing the treble clef is initially drawn and stored at the development stage. By comparing the users' input (i.e. gesture) from the tablet with the one initially developed, it can be checked the accuracy of the users' drawing.

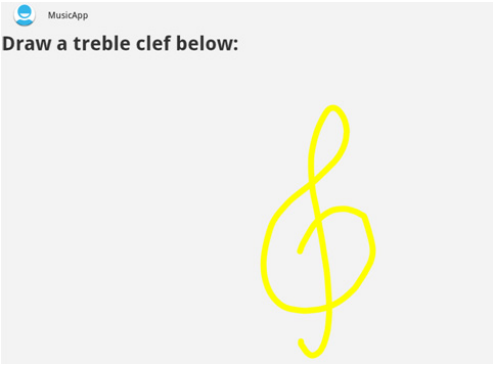

Fig. 6. The Writing game

The listening game shown in Figure 7 is about the sound of a particular musical note, which will be played and the users need to listen carefully. The sound will be generated randomly through the program. Sound is not like text. If the users miss the sound, they will miss the information. Once the users cannot listen to the question clearly, there is a repeat button for users to play the sound again.

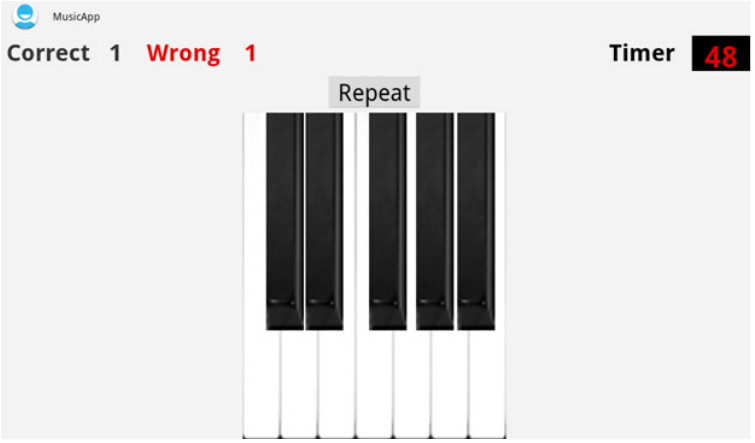

Fig. 7. The Listening game

For the calculation game shown in Figure 8, those questions which are drawn as images. It will generate randomly. There are four answers for users to choose. Those answers appear as images too. Drag and drop feature is used. Users need to drag and drop the answer image to an area in order to answer the questions. The screen size of tablet will be obtained. The x, y-coordinates of the answer image and x, y-coordinates of the answer area are compared to check for the correctness. If the users do not put the answers into the answer area, the answers will restore to the original x, y-coordinates position. Once the x, y-coordinates of both are matched, the answer image is needed to check if user selects a correct answer image. If yes, one mark will be added. If not, one mark will be subtracted at the end of the game.

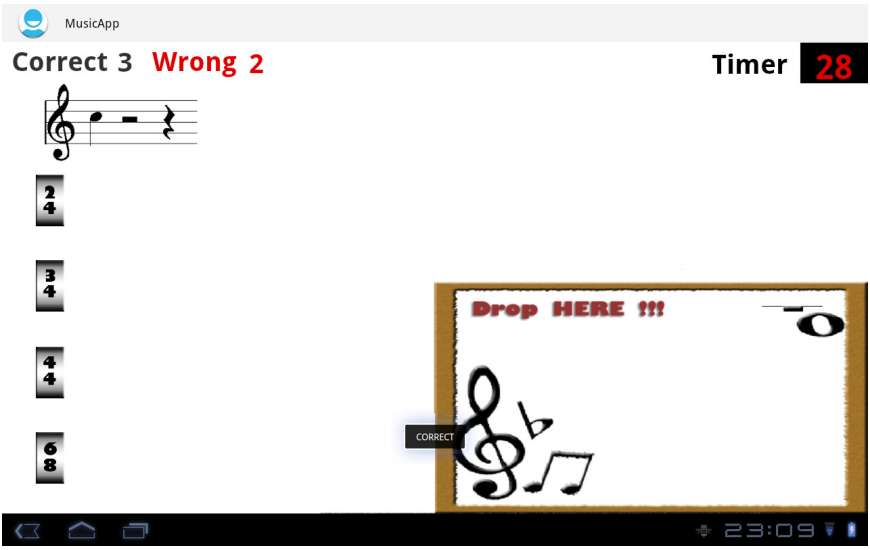

Fig. 8. The Calculating game

Users need to answer the game-based test to achieve higher marks. The marks will be stored and accumulated. Users can check for their total marks after finished playing the game in an alert dialog. The chronometer is used for counting down in the reading, listening and calculating game. The time allowed is set to one minute for each game.

2.3 Musical Instruments

In this part, users can have entertainment through playing the musical instrument, like the piano. The piano music keyboard had used absolute layout. But, there is a problem that the keyboard varies in different sizes of screen. The problem is solved by using the relative layout. The Piano keyboard is thus fixed. Besides, the piano music keyboard is added with the sound of different pitches. There are totally three octaves. The sound source of music is obtained from Overture4.0 in midi format. However, the MediaPlayer in the Android OS cannot play the midi format smoothly. By converting the midi format into ogg format, the problem is solved.

The sound effects with respect to different musical instruments are added. A page of all musical instruments will be displayed for selection. They are sorted according to different type of musical instruments. Once the image button of that particular music instrument is pressed, a piece of music performed by that musical instrument will be played. When the user touches the button again, the music is paused and the image is changed slightly. This is to recognize that the musical instrument is pressed. Figure 9 shows the piano keyboard with the selection of the sound of different instruments.

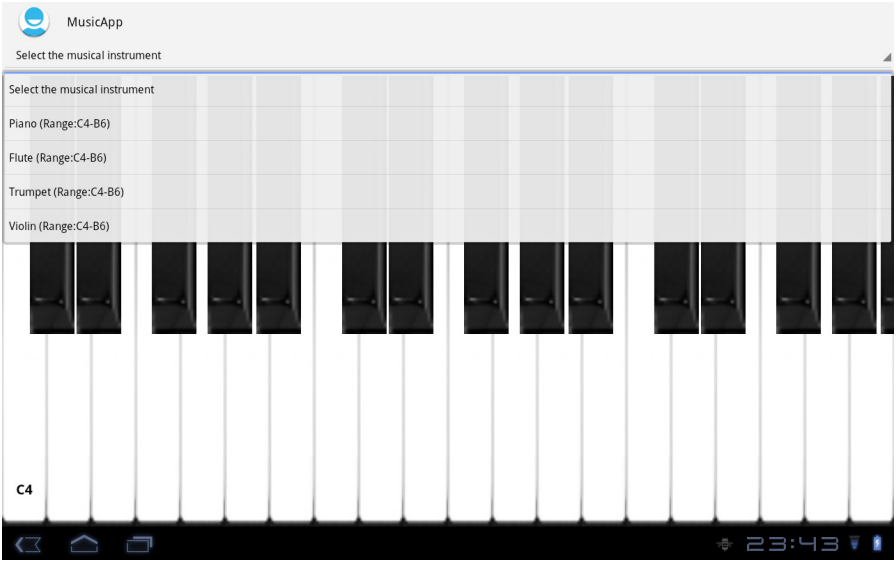

Fig. 9. Piano keyboard with different instruments

3 Results and Discussion

In order to test the effectiveness of this mobile application, an evaluation was carried out for 29 different users. Four of them are technical staff from the Educational Technology and Publishing Unit (ETPU), The Open University of Hong Kong. Users need to learn music using the application within a week. After that, users are required to fill in a questionnaire and give feedbacks. In the questionnaire, there are 11 questions listed in Table 2. Users can choose the marks in 5 (Strongly agree) and 1 (Strongly disagree). Another part in the questionnaire is the overall rating of the application (out of 10). Users can also write comments on the application on the questionnaire.

Table 2. List of questions in the questionnaire

1. The application layout is clear.
2. I learn more about the music instruments.
3. The games are attractive.
4. I think the application helps to enhance my music knowledge.
5. The application makes me easier to understand the music concepts.
6. I enjoy playing the application.
7. The application is attractive.
8. The application is useful.
9. The application is colourful.
10. The application motivated me to learn music.
11. I love the application.

The results of the questionnaire will be shown as below in Figure 10. Most of the users enjoy using this application, the average mark is 3.92 out of 5.

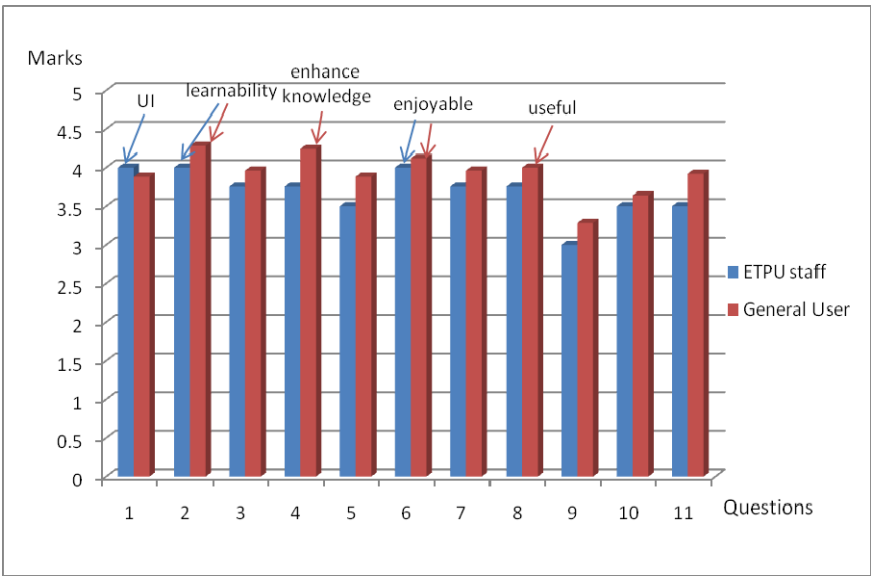

Fig. 10. Summary of evaluation results

Other comments from users include:

- "I want a colourful background."
- "The game generated by the app can be improved by adding 1 second waiting time between the player's input and the next tone generated."
- "The interface can be more colorful, it can attract more children to download the app."
- "Easy to learn and play, very good for music beginner."
- "It is ok if more colorful and clear instructions are included."
- "UI layout needs to be consistent. Good to have many graphical icons"
- 'Should have consistent design of UI for similar functions."
- "The presentation is clear. It got lots of content in different areas. It would provide great help to those who would like to learn music as a beginner."

From the above comments, it can be concluded that the application is not colourful enough. Other comments such as adding waiting time of the listening game have been incorporated into the new version of the application.

4 Conclusions

As compared with the existing applications in the Android market, this mobile application provides an all-in-one feature for users to learn music in an effective way. The application can arouse users' interest towards music. Users can learn, play, and

practice music through the application. This fulfills the needs of the learners to learn at their own pace. Sounds of other musical instruments such as violin, flute and trumpet are provided for users to enrich the application. The application has been evaluated by a group of different users including teachers, potential students and technical application developers. They all enjoyed the learning experience with this mobile application and they agreed that the application can effectively enhance their musical knowledge.

In the future, more researches should be carried out to understand the difficulties in learning music in a deep way. It can include a much higher learning level and implement a game-based revision. The games can be defined in stages as well. In addition to the treble clef, the bass clef can also be taught. More graphics can be included in this application.

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A Mobile App for Learning Japanese

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Abstract. Mobile devices have become relatively inexpensive. Many students have their own mobile devices nowadays. Students are even being taught to use mobile devices in elementary schools. Free educational software applications are available to help students learn Math, English, and other subjects. The authors have developed an Android app to help students learn Japanese. The vocabulary of the app is based on a published textbook used by the authors' institution. After downloading the app into their mobile devices, students who are using the textbook can review the vocabulary using virtual flashcards and multiple choice quizzes without Internet access.

Keywords: mobile apps, software development, language learning aids, Android devices, Japanese.

1 Introduction

Technology has been used for assisting teaching and learning for many years. Cassette players and televisions were used in classes as learning aids. Nowadays, computers are widely employed. The connection to the Internet generates a collaborative or independent learning environment in which learners can practice and learn using tools such as blog, social networks and video conferencing. Recently schools are embracing mobile learning because it offers teachers and students a more flexible approach for learning.

Students today are also special. They are "no longer the people our educational system was designed to teach" (Prensky, 2001) because today's students are the first generations that grow up with new technology. Prensky described these students as "digital natives," for they are "native speakers of the digital language of computers, video games and the Internet." Students are now surrounded by electronic devices and they spend hours of their times learning new information from their devices, so they think and process information fundamentally differently. For example, students are now more likely to turn to the Internet for information. They are less likely to read the manual for a software. Instead, they expect the software to teach them how to use it. Robledo (2001) pointed out that "embracing mobile devices in classrooms can empower students in the learning process." However, some adults believe that mobile devices distract students from learning, so students must power down their devices while they are in a classroom. Therefore, teachers and students must learn to take advantage of mobile devices and use them as learning tools instead of banning them devices altogether.

J. Lam et al. (Eds.): ICT 2013, CCIS 407, pp. 158–166, 2013.

On the other hand, most students are visual learners. Visual tools are important for them to succeed in school. Mobile learning technologies are visual and auditory, so these technologies are expected to be greatly beneficial to student learners. Research has been conducted on mobile learning technologies. For example, PBS KIDS (2010) suggests that after the students used apps in learning a language, their vocabulary improved by as much as 31% comparing to not using such technologies. A similar study conducted by Nihalani and Mayrath (2010) shows that students who used a statistics app understood the content better, and they "were more motivated to do well when using the app."

2 Learning Aids on Foreign Languages

Learning aids are essential tools for language courses because they help students to develop language skills. In the Japanese courses offered by the authors' institution, instructors conduct numerous learning activities and use different tools. For example, students are given crossword puzzles where they can read the clues and then fill in the blanks with the appropriate vocabulary that has been taught. In another activity, students are asked to identify the missing words in a dialogue. These tools and activities are interactive and fun ways that help students to memorize new words effectively.

Online learning tools are already available. For instance, students used Quizlet (Quizlet, 2012) to create flashcards based on vocabulary from textbooks. Online flashcards work like real-world cardboard flashcards where each card has a prompt side and an answer side. Students can also share their flashcards with everyone using Quizlet. The greatest advantages of online flashcards are audio clips and images. Quizlet allows student to create their own flashcards, but its flashcards are not for portable mobile devices. As a result, students cannot carry the online flashcards wherever they go.

Learning tools can be found in mobile apps. For instance, Kanji Recognizer (Elenkov 2013) is a handwritten Japanese Kanji app, which helps users identify their handwritten Kanji characters. This app also provides stroke guidelines and stroke order hints, so users can practice writing Kanji correctly. Another app is JA Sensei – Learn Japanese (Raphae, 2013). This app provides interactive exercises to learn Japanese vocabulary and important Japanese phrases for trips. Users can also listen to audio clips and draw Kanji to answer questions.

Although mobile apps based learning tools are available, apps specifically work with textbooks are rare and can be useful for language courses. Students are more likely to focus on the vocabulary from their textbooks, so it is preferable for learning tools to be based on the content of a textbook. This paper introduces an Android app designed for students who are learning Japanese using a textbook titled GENKI: An Integrated Course in Elementary Japanese (Banno, Ikeda, Ohno, Shinagawa & Tokashiki, 2011). This app uses flashcards and multiple choice questions to help students learn the vocabulary of the textbook. The app is fun and interactive and provides an interesting way to learn Japanese.

3 Graphical User Interface Design

The graphical user interface of the application was designed using a markup language called Extensible Markup Language (XML). There are six interfaces in this application. The interfaces are designed in such a way that they can work with phones that have small, normal and large screens. The main interface consists of two buttons called Flashcards and Multiple Choice Quiz. The two buttons lead the users to a secondary menu interface where they can select items from a dropdown list before the application can generate the flashcards or multiple choice questions.

When the Flashcards button is pressed, a menu interface appears which requests the user to select a lesson numbered 1 to 12 from a dropdown list called a spinner. There is another spinner for the user to select the type of words to appear on the front of a flashcard. The options from this spinner are Japanese characters and English Translation.

The flashcard interface has three text views at the center of the screen. These text views are used to display the Japanese characters, Kanji and English words. Two buttons let the users navigate to the previous view and the next view. The user presses these buttons to move through the deck of flashcards. The Show/Hide button is used to reveal the front or the back side of the flashcard.

When the Multiple Choice Quiz button is selected from the main interface, a menu appears which requests the user to select two inputs. Similar to the Flashcards interface, the user is required to select a lesson and a type of question. The Multiple Choice Quiz interface contains a text view, which reveals a question word. The user has to select an answer among the four answer buttons. For example, if the app reveals a Japanese word, the user has to select the corresponding English word in order to score a point.

3.1 Use Case Diagram

The use case diagram (Fig. 1) indicates the relationships between the use cases and the actor. The actor is a student who wants to review vocabulary. The actor has two ways to review vocabulary. A student can review the vocabulary either using flashcards or a multiple choice quiz.

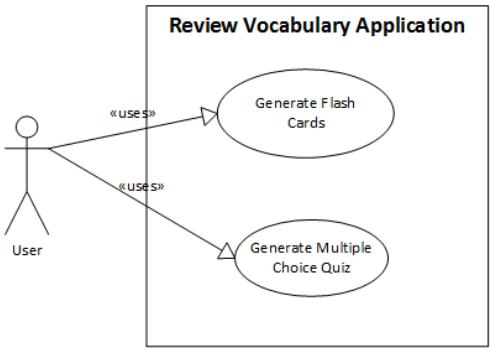


Fig. 1. Use case diagram

3.2 Flow Chart

The flowchart (Fig. 2) shows that users are required to enter two requirements which are lesson and question type before the app can generate the flashcards. The app retrieves the lists of vocabulary and displays a question on the front side of the card. Users can navigate through the deck of cards, and if users want the answer, they can flip the card by press the Show button.

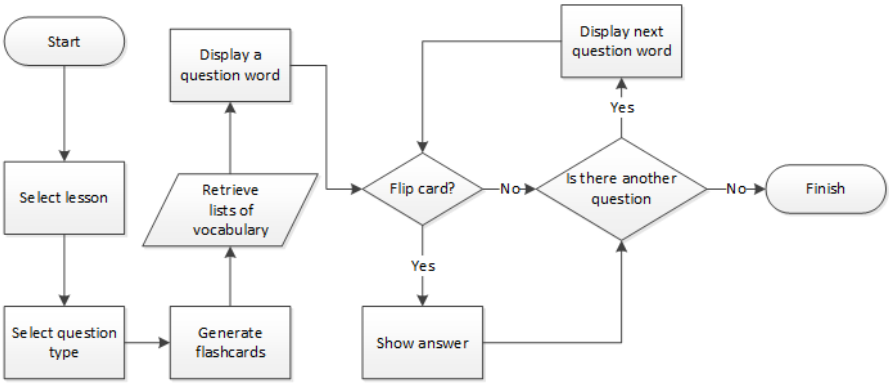


Fig. 2. Flow chart for flashcards

The flowchart for Multiple Choice Quiz looks similar, but unlike Flashcards, Multiple Choice Quiz (Fig. 3) requires an additional input, which is the answer type. The app then checks if the inputs are valid before it retrieves the lists of vocabulary the same way as Flashcards. Multiple Choice Quiz then displays a question along with four choices. When the user selects one of the answer choices, the app lets the user know if the choice is correct or not.

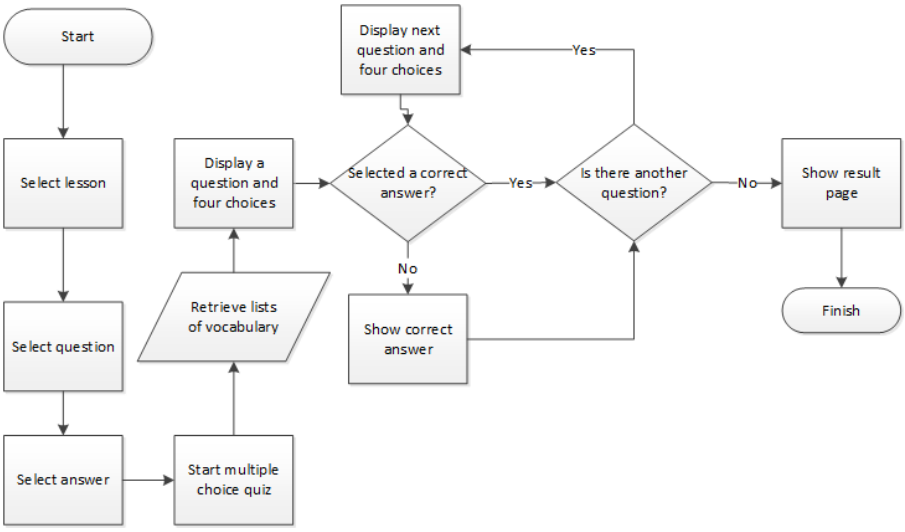


Fig. 3. Flowchart for Multiple Choice Quiz

4 Implementation

The app was implemented using the Eclipse IDE. Eclipse is a free open source software. This software is compatible with Windows and Mac operating systems. Eclipse is installed along with the Android Development Tools (ADT). ADT is a plug-in for the Eclipse that gives developers the integrated environment to build Android apps. ADT is free to download, and it provides the necessary tools to develop Android apps for all platforms.

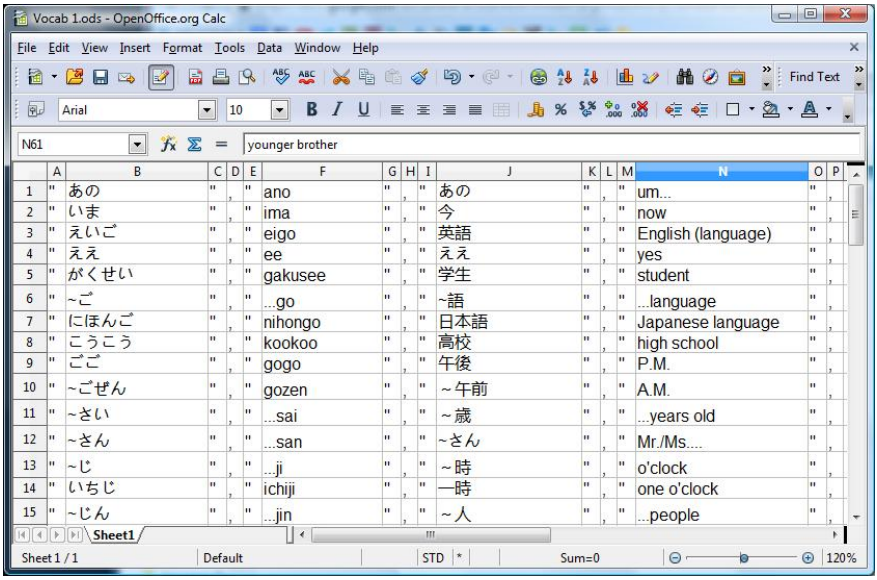
According to the data collected during a 14-day period ending on January 3, 2013, Android 2.3 is still active on 47.4% of devices that have accessed Google Play. Therefore apps should be developed using Android 2.3 or lower. The app of this paper is developed using Android 2.2, so it is compatible with most Android phones. The app is built using the Java programming language. The app interface is built using XML. The app is then tested on a virtual machine which emulates an Android phone.

```
//Greetings 18 words
String[] hiraganaGreetings = new String[] {
" おはよう " , " おはよう ございます " , " こんにちは " , " こんばんは " , " さようなら " ,
" おやすみ(なさい) " , " ありがとう " , " ありがとう ございます " , " すみません " ,
" いいえ " , " いってきます " , " いってらっしゃい " , " ただいま " ,
" おかえり(なさい) " , " いただきます " , " ごちそうさま(でした) " , " はじめまして " ,
" よろしく おねがいします "
};

String[] romajiGreetings = new String[] {
" ohayoo " , " ohayoo gozaimasu " , " konnichiwa " , " konbanwa " ,
" sayoonara " , " oyasumi(nasai) " , " arigatoo " , " arigatoo gozaimasu " ,
" sumimasen " , " lie " , " ittekimasu " , " itterasshai " , " tadaima " ,
" okaseri(nasai) " , " itadakimasu " , " gochisoosama(deshita) " , " hajimemashite " ,
" yoroshiku onegaishimasu "
};

String[] englishGreetings = new String[] {
" Good morning " , " Good morning (polite) " , " Good afternoon " ,
" Good evening " , " Good -bye " , " Good night " , " Thank you " ,
" Thank you (polite) " , " Excuse me / I'm sorry " , " No / Not at all " ,
" I'll go and come back " , " Please go and come back " , " I'm home " ,
" Welcome home " , " Thank you for the meal (before eating) " ,
" Thank you for the meal (after eating) " , " How do you do? " ,
" Nice to meet you "
};
```

Fig. 4. Arrays of Kanji, Romaji, English translations

The app reads data from arrays in a Java file. Before arrays are created the data are organized using Microsoft Excel or Open Office Calc. The data are vocabulary from a Japanese textbook. There are 12 lessons and 573 words in total. Each word has

Japanese characters (Hiragana), Kanji and English translation. Some words are even written in Romaji. It is difficult to keep track of different types of words. So Microsoft Excel is used to keep the data organized in four columns. These are columns for Japanese characters, Kanji, Romaji and English translation. Once the four columns are created, columns of quotations and commas are inserted between the four columns to make them valid Java strings. Fig. 4 shows the columns in Open Office Calc. The columns are then merged into one column creating a list of words with quotation with the words separated by commas. The list is then copied and pasted to the Java file. Fig. 5 shows the arrays of words of lesson 1.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	"	あの	"	,	"	ano	"	,	"	あの	"	,	"	um...	"	,
2	"	いま	"	,	"	ima	"	,	"	今	"	,	"	now	"	,
3	"	えいご	"	,	"	eigo	"	,	"	英語	"	,	"	English (language)	"	,
4	"	ええ	"	,	"	ee	"	,	"	ええ	"	,	"	yes	"	,
5	"	がくせい	"	,	"	gakusee	"	,	"	学生	"	,	"	student	"	,
6	"	~ご	"	,	"	...go	"	,	"	~語	"	,	"	...language	"	,
7	"	にほんご	"	,	"	nihongo	"	,	"	日本語	"	,	"	Japanese language	"	,
8	"	こうこう	"	,	"	kookoo	"	,	"	高校	"	,	"	high school	"	,
9	"	ごご	"	,	"	gogo	"	,	"	午後	"	,	"	P.M.	"	,
10	"	~ごぜん	"	,	"	gozen	"	,	"	~午前	"	,	"	A.M.	"	,
11	"	~さい	"	,	"	...sai	"	,	"	~歳	"	,	"	...years old	"	,
12	"	~さん	"	,	"	...san	"	,	"	~さん	"	,	"	Mr./Ms....	"	,
13	"	~じ	"	,	"	...ji	"	,	"	~時	"	,	"	o'clock	"	,
14	"	いちじ	"	,	"	ichiji	"	,	"	一時	"	,	"	one o'clock	"	,
15	"	~じん	"	,	"	...jin	"	,	"	~人	"	,	"	...people	"	,

Fig. 5. Arrays for vocabulary of Lesson 1

5 Test Results

When the app software starts running, it loads the main interface. The user has two options on the main interface which are Flashcards or Multiple Choice Quiz. If Flashcards is chosen, the app loads a menu for flashcards, which requires the user to select a lesson and a question type. Figure 6 shows that the user selected Greetings vocabulary and the Japanese question type. When the Start button is pressed, the app retrieves the Japanese characters, Romaji and English arrays, and then the app shuffles the arrays. Since the user selected the Japanese question type, Japanese characters are printed on the front side of the card as shown on Fig. 7. On Fig. 8 the user presses the Show button, which flips the card and reveals the answer. In other words, English and Romaji words are displayed below the question word.

Fig. 6. Flashcards Menu

Fig. 7. Front side of card

Fig. 8. Back side of card

Multiple Choice Quiz uses the same menu has Flashcards, which requires the user to select a lesson, the type of question. For this example, the user selected Lesson 1 and Japanese as question (Fig. 9). When the Start button is pressed, the database class retrieves data by looking for the lesson number. Within Lesson 1, there are four arrays called Hiragana, Romaji, Kanji and English. Since the user selected Lesson 1, the app copies the Hiragana array to the question array and copies the English array to the answer array. Users can also test themselves on Romaji or Kanji by selecting the Lesson 1 Romaji or Lesson 1 Kanji.

The quiz begins once user pressed the Start button. The app displays the lesson number on the top of the quiz interface. Below the lesson number is a word which the user has to match with its translation. The app selects four words from the English array and displays the words on the four buttons. Only one of the buttons is the

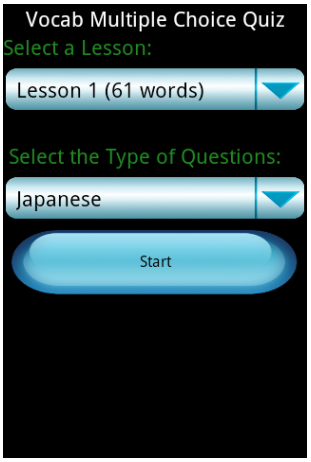


Fig. 9. Multiple Choice Menu

Fig. 10. Correct Choice

Fig. 11. Incorrect choices

correct translation. If the user selected the correct translation, a message appears, informing the user that he or she has selected the correct answer (Fig. 10). If user selected the wrong button, the button will change color. On Fig. 10 shows the user has selected two wrong buttons. Whenever the user selects the correct button without selecting one of the wrong buttons, the app adds a point to score. The app also shows the number of questions unanswered.

When the number of remaining questions reaches zero, the app sends the user to the result page. The user can access the result page through the menu option without completing the remaining questions (Fig. 12). This makes the app more convenient, since most lessons contain over 40 words, and the user may not want to review all the words. The results page (Fig. 13) shows the user's score in percentage, which is the number of correct answers divided by the number of answered questions.

Fig. 12. Menu button gives quick access to main menu and result page

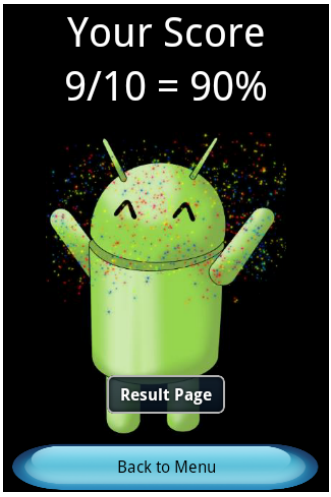


Fig. 13. Result page

6 Development and Test Runs

The app was first developed to generate multiple choice questions from a lesson. The test runs showed that the app could randomize the list of words properly and kept track of the user's correct and incorrect answers. Next, the app was developed with a menu page, so users could select a different lesson of vocabulary and the type of words they wanted to be tested on. The test results indicated that app could retrieve the correct list of vocabulary and displayed question words and choices properly according the user inputs. Later test runs were focused on the appearances of the app. The buttons were adjusted to reduce font size if the word length reached a certain size. This way it could prevent buttons from doubling its height to show words containing 25 more letters.

The app was tested by the students in the language course (class size 35) and numerous other students in the IT program. It was also presented in the institution's 2012 Open House and the 2013 Science Fair. Faculty and students were able to test the app and the comments received were positive.

7 Conclusion

The authors have developed a portable learning tool for students who are studying Japanese. This learning tool contains vocabulary from a textbook that students are using at Kwantlen Polytechnic University (KPU). Most KPU students found this learning tool very helpful. However, not all students have Android phones. Since this app works only on the Android operating system, the authors plan to make this app available for other mobile operating systems. The authors also plan to add audios so students can practice pronunciation while reviewing vocabulary.

Acknowledgements. The authors would like to thank Mr. Wayne Tebb, Dean of the School of Business, and Laurie Clancy, Divisional Business Manager of the School of Business, Kwantlen Polytechnic University, for their support.

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From e-Knowledge Sharing to m-Knowledge Sharing: A Theoretical Framework

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Abstract. The adoption of mobile devices has been rapidly increasing in recent years. Therefore, researchers have been exploring the possibilities of using various types of mobile technologies such as Location-based Services (LBS) to facilitate learning and knowledge sharing. There is an enormous amount of studies concern about those technologies individually, but there is no or very few of them aims to integrate them to establish a comprehensive mobile learning or sharing system. In this study, Centre for Cyber Learning of HKU SPACE proposed an theoretical framework that facilitates the integration of an existing e-learning system and mobile technologies. This paper also reviews several mobile technologies and applications that shed light on the proposed framework, specifies the architecture and components, introduces the new features, as well as discusses how the proposed features could enhance learning experience.

Keywords: e-learning, location-based service, knowledge sharing, mobile learning, iOS, Android.

1 Introduction

Mobile devices and their related technologies are ubiquitous and they have been permeated through almost all aspects of our daily life (Mifsud and Mørch, 2010). Mobile phones and tablet devices have become indispensable gadgets or tools to many people, especially young people who use them as a collaborative platform for sharing information. According to the demographic data of a research with learners as subjects, there was 100% ownership of mobile phones among the 502 subjects (Beng Lee, 2013). In Hong Kong, the number of mobile service subscribers was boosted to 15.95 million in 2012, and total mobile data usage recorded a remarkable surge to 6,347 Terabytes per month, or an average of 666.9 Mbytes per mobile user in a month (HKSAR the Information Services Department, 2013). This implies that people not only consider mobiles device as leisure gadgets, but also, to a certain extent, seriously use them as an Internet communicator, or even a desktop computer replacement. The tremendous amount of mobile device adoption attracts more and more parties to spend efforts in developing mobile apps and have shifted their attention from the

J. Lam et al. (Eds.): ICT 2013, CCIS 407, pp. 167–177, 2013.

conventional desktop computing environment to the new mobile environment. As young people are a frequent mobile user group, some Universities have started delivering part of their courses in mobile form (Cavus, 2010; Morris, 2010) and research indicated that learners have become more accept the use of mobile devices for learning over the past years (Stockwell, 2010).

In education, although the trend of converting conventional or web materials to mobile formats is increasing, most of the conversions only catered the form factors such as screen size and resolution, very few of them tried to make use of the unique features of modern mobile devices. Those features or technologies, including Quick Response (QR) Codes, Location-based Services (LBS), Augmented Reality (AR), Near Field Communications (NFC), and so on, have been widely and maturely adopted for entertainment or commerce purposes. If they are properly integrated with existing learning resources, learning and knowledge sharing may become more effective and interesting. We are currently managing a web-based e-learning system called SOUL 2.0, and this theoretical discusses the feasibilities of enhancing and expanding the functions of the e-learning system through adopting the latest mobile technologies. This paper reviews those technologies and their applications in education and knowledge sharing. It then describes how those technologies could be integrated into the current e-learning platform and discusses how the enhanced and new features could be beneficial to learning and knowledge sharing processes.

2 From e-Learning to m-Learning to u-Learning

In the past decade, e-learning or e-knowledge sharing has been widely adopted in education institutes and organizations for knowledge sharing and teaching purposes. It was also arguably one of the most powerful responses to the growing need for education (Zhao et al., 2010). In general, e-learning is commonly known as the use of multimedia and information and communication technologies (ICT) in education. In practice, e-learning or e-knowledge sharing could be conducted asynchronously or synchronously. Asynchronous e-learning is commonly facilitated by media sharing such as files, e-mails and discussion boards, where the learners and instructors do not need to participate simultaneously. Therefore, asynchronous e-learning makes it possible for learners to log on to an e-learning environment at any time, and download documents or send messages to instructors or peers. Learners may spend more time refining their contributions, which are generally considered more thoughtful when comparing with the synchronous one (Hrastinski, 2007). In contrast, Synchronous e-learning is commonly supported by real-time media such as video-conferencing and chat room, such that learners and instructors experience more social connection and could avoid frustration by asking and answering questions in real time. This kind of real-time interaction is believed to be an advantage over the asynchronous one. It is because isolation can be overcome by more continued contact, particularly synchronously, and by becoming aware of themselves as members of a community rather than as isolated individuals communicating with the computer (Haythornthwaite and Kazmer, 2002). As both asynchronous and synchronous e-learning modes cannot replace each other, for the two widely used Learning Management Systems (LMS) for

e-learning, namely Blackboard Inc. (or its predecessor, WebCT) and Moodle (Yau et al, 2009; Unal and Unal, 2010), they both consist of modules that support the two e-learning modes, such as virtual classroom, whiteboard, resource sharing, etc. As the e-learning platforms were targeted for desktop or laptop computers, when they run in mobile devices, their user interfaces may not be fit in the relatively smaller screen; buttons, links and text may be too tiny to be navigated with; and some resources such as Adobe Flash may not be accessible. Therefore, developers of the platforms have started to create mobile compatible versions. For example, Moodle version 2.5, which was just released in May 2013, is the first version that supports mobile apps.

One limitation of e-learning or e- knowledge sharing is their immobility. Therefore, mobile learning (m-learning) was evolved from e-learning in order to facilitate learners and instructors who equipped with mobile devices to access learning resources through various wireless technologies such as Wi-Fi and cellular networks. Although m-learning is often considered as an extension or conversion of e-learning, its usability and quality depend on developers' awareness of the limitations and advantages of mobile devices (Parsons and Ryu, 2006). To learners, m-learning offers higher flexibility because electronic contents could be delivered to them anytime and anywhere when Internet connectivity is available to their mobile devices. Recently, a new concept of m-learning called "ubiquitous learning" (u-learning) was introduced (Zhao et al., 2010). It could be regarded as a subset of m-learning and emphasizes context awareness, such that learning environments can be accessed in various context and situations (Mandula et al., 2011). Conventionally, instructors are the primary sources of the knowledge resources, but in u-learning, learners also have the opportunity to access extra resources that may or may not be prepared by their instructors, where the context of the resources depends on the locations of the learners. For instance, Mandula et al. (2011) implemented a u-learning system that is equipped with Near Field Communication (NFC) technology. When a learner who carries a mobile device and comes in proximity of a location, say a library, the device displays the information about the latest journals, newsletters, and books.

In order to implement quality m-learning or u-learning, the adoption of mobile technologies is essential. Researchers have been attempting to explore the possibilities of using various types of mobile technologies to facilitate learning and knowledge sharing, including Quick Response (QR) Codes (Lai et al., 2013), Augmented Reality (AR) (Kamarainen et al. 2013; Yuen et al., 2013), Location-based Services (LBS) (Clough, 2010; FitzGerald, 2012), and so on. However, most of them are individual or small-scale projects. Having the experiences on customizing and maintaining an e-learning platform, we believe that if those technologies are applied and integrated into the existing e-learning platform that is mature and already rich of resources, the consequential benefits and potential is countless. Just imagine if the above-mentioned NFC system is linked with a platform that stores the learner profiles and learning materials. When a learner walks near the library, the information shown on his or her device is the reference materials that the learner is really interested in, and the device is capable to suggest the articles according to his or her learning progresses of the subjects that he or she is currently studying. A step further, the device can show the nearest locations of the suggested books and journals so that the learner can save time

and focuses more on his/her study. Before discussing the feasibilities of the integration and the applications, the underlying mobile technologies are described in the subsequent section.

3 Mobile Technologies in Education

With the advancement of hardware and software, mobile devices nowadays could act as computing tools, and even provide some functions that an ordinary computer cannot provide. Few years ago before smartphones became popular, it was hard to imagine such tiny devices can embed so many technologies inside, where those technologies may change the future of our learning patterns and styles. This section presents some of those technologies and how they are used in education.

3.1 Quick Response (QR) Codes

QR codes are two-dimensional barcode symbols. Although Denso Wave Incorporated owns the patent rights on QR code technology, it is free of any license because the company decided not to exercise the rights. Depending on the versions used, a QR code symbol can store up to around 2,900 Bytes (Denso-wave, 2012). Moreover, providing that no more than 30% of a QR code symbol is damaged, the information stored in the symbol is still decodable (Lai et al., 2013). QR codes are popular in mobile applications because this technology only requires using a built-in camera, which is almost a standard component of todays' mobile devices. As generally a QR code symbol do not store much data, in common practice it is used to encode a web address (or URL), short text, or an identifier. For example, Figure 1 shows a QR code that represents an URL to Centre for Cyber Learning of The University of Hong Kong, School of Professional and Continuing Education. Interested readers may use the "Goggles" function of the "Google" app or other QR code apps to scan the symbol. One advantage of QR codes is that it can redirect mobile app users to resources precisely, without the hassle of typing long texts by using the relatively small virtual keyboard of mobile devices.

Fig. 1. A QR Code Example

There are few contributions that adopted QR codes for outdoor learning. For instance, Lai et al. (2013) implemented an outdoor education information system that combines natural and cultural environment information using QR codes. The learners

participated in the study equipped mobile devices, and maps that is printed with QR codes. When they arrived at the locations as specified in their maps, they used their mobile devices to scan the related QR codes, and then their devices downloaded the learning resources and information that are associated with their current locations. In another study, Chin and Chen (2013) proposed an Android-based mobile learning support system that allows learners to receive teaching materials on mobile devices, and control learning paces by themselves. When a learner uses the mobile app to scan a QR code, the content learning function decodes it and downloads the corresponding teaching materials or tasks. The app also uploads the learning progress and outcome to the centralized database when any task is completed.

3.2 Augmented Reality (AR)

AR is a growing phenomenon on mobile devices. According to the New Media Consortium Report 2011, AR is the highest-rated topic by its advisory board, with widespread time-to-adoption being only two to three years (Johnson et al., 2011). However, AR is not a very new technology. Over a decade ago, Azuma et al. (2001) already defined AR as the combination of virtual and real objects in a real environment; a system that aligns/registers virtual and read objects with each other; and that runs interactively in real time. AR is believed to have a huge impact on mobile devices because users are no more constrained to a desktop computer that is located at a static location. Instead, mobile AR apps could be dynamic and across contexts. As FitzGerald et al. (2012) suggested, mobile AR brings in new aspects to learning, it fosters the mobility of users, their geographical position the physical place where learning to can occur, and it enables formal learning to connect with informal learning. Research also revealed that using AR for education can appeal to learners at a much more personal level, promoting engagement and motivation amongst its users (Luckin and Stanton Fraser, 2011). For knowledge sharing, AR could also bridge the gap between digital and physical world through the concept of "AR books". An AR book is a physical book that consists of visible or hidden AR markers on its pages, when the camera of a mobile device captures a marker, the AR book app will display a corresponding 3D model or animation. For example, a learner reads an AR book that teaches how to make puppets. If the learner intents to see a virtual 3D puppet, he or she can point the camera of a mobile device to the book. On the screen of the mobile device, a virtual 3D puppet, which is viewable in different angles, overlays on the AR book (Figure 2). In reality, of course the learner sees nothing on the book page but virtually, on the screen of the device, he or she sees a 3D puppet stands on the book page, which is helpful for understanding concepts immediately. This example confirms the definition that "AR is the combination of virtual and real objects in a real environment". Yuen et al. (2013) introduced some interesting AR books such as "The Future is Wild: The Living Book" and "MagicBook", as well as few AR games for education purposes.

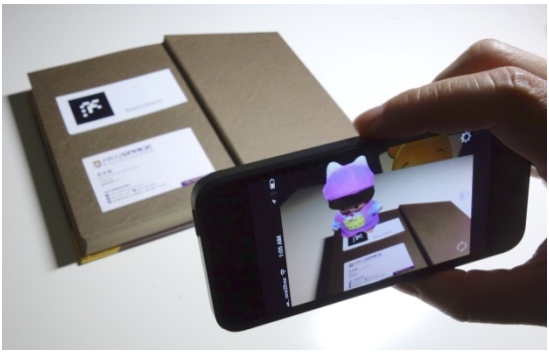

Fig. 2. An AR Example

3.3 Near Field Communications (NFC)

NFC, as its name implies, is a short-range wireless communication technology that used to capture the data of remote objects. Its operation is based on the Radio Frequency Identification (RFID) technology that allows fast exchanges of small amount of data between mobile devices (or computers) and objects with RFID tags. Although NFC is emerging as the leading standard for mobile payments, it is believed to have wider applications because of the "touch to exchange information" feature (Mandula et al., 2011). One successful NFC application is the Octopus card that was firstly introduced in 1997 (Octopus Hong Kong, 2013). It is a smart card that stores values for authentication purposes and making electronic payments, where the adoption rate is currently over 95% of Hong Kong population. NFC is built in most Android mobile devices today. For other mobile systems such as Apple iOS, NFC can be achieved by plugging external readers to the devices. For education, in addition to the study of Mandula et al. (2011) (described in section 2), there are more examples. In an u-learning project called "TRON", the researchers intended to increase the intelligibility of total food chains by embedding RFID tags onto foods (Sakamura and Koshizuka, 2005). Learners can learn relevant information about foods by accessing the tags by using a device with RFID tag scanning capability. Similarly, Ogata and Yano (2004) developed a "Tag Added learNinG Objects (TANGO)" system, which makes use of the location of a learner to detect various real-world objects associated with RFID tags in order to provide educational information. For outdoors education, Huang et al. (2010) developed a mobile plant learning system that allows learners to access the information about different plants with tags embedded, and other relevant information according to the positions of the learners.

3.4 Location-Based Services (LBS)

LBS are quite unlike the above-mentioned technologies that are implementable on both mobile and stationary devices, and could be more usable on mobile devices. Instead, a LBS is rather meaningless for stationary computers such as desktop or laptop computers because the system of a LBS have to know the geographical positions of the devices using that service. This is achieved through the use of positioning technologies, such as

global positioning system (GPS), transmitters locations of cellular networks, and Wi-Fi (FitzGerald, 2012). Moreover, most LBS provide dynamic contents according to the geographical positions of the users, even some stationary computers are capable to identify their fixed geographical positions, they cannot utilize the potential of LBS as the contents are also remain stationary. One of the well-known LBS applications is map such as Google Maps, which is available for every mobile device nowadays. Those map applications could locate user positions and indicate nearby information that would interest the users. LBS are also the indispensible ingredients for social media apps like facebook that connects users around the world. The LBS features including "Status", "Photo", "Check In", and so on, allows users to record their current locations and make information sharing become more interesting. With LBS, researchers also have been contributing some interesting studies. For example, a GPS-enabled treasure hurt activity called "Geocaching" was being explored for the possibility of informal learning (Clough, 2010). Participants hide Geocaches at particular physical locations that are accessible to the general public, and provide clues on where to find it. Learning opportunities were found to be both intentional and accidental, as participants would sometimes find out information about a local area as a by-product of seeking out the cache. In addition, there was a project called "MyArtSpace", which encouraged learners to visit art galleries or museums (Vavoula et al., 2009). The learners can record their experiences using mobile devices through the collection of tags in galleries and museums, and enable their own creation and uploads of multimedia materials such as images, sounds, and text. Then the uploaded digital materials were accessed and discussed in a classroom setting. Thus the LBS and other underlying technologies bridged informal and formal learning in that study. For more theoretical information for creating LBS in knowledge sharing, FitzGerald's authoring framework is worthy to refer to (FitzGerald, 2012). The framework has been designed to guide the authoring of user-generated content so that it can be used for informal learning about learners' immediate surroundings.

The mobile technologies discussed above are not the exhaustive list of all mobile technologies nowadays but they could be the most popular technologies that are used for the studies of mobile or ubiquitous learning and knowledge sharing. However the importance of other mobile technologies such as push notifications, multi-touch controls, varies of sensors like accelerometer and gyroscope, etc. should not be neglected as they may be useful for learning and knowledge sharing and make the process more attractive and lively. The next section presents a theoretical framework for integrating some of the said mobile technologies and discusses some feasible applications of the proposed concept.

4 The Theoretical Framework

We are currently maintaining and enhancing an e-learning system called SOUL 2.0, where the development is based on Moodle, a widely adopted open source course management system (moodle.org). One important feature in Moodle is its openness and therefore there are hundreds of plug-ins and add-ons available to be downloaded for free. Moodle's openness does not only make Moodle highly customizable, but also offer possibilities to implement innovative functions. Inspired from the reviewed

studies and our experiences, we believe that, with careful refinements and proper add-ons, the existing e-learning system could be evolved into a mobile or ubiquitous learning and knowledge sharing system. Figure 3 illustrates the framework that integrates the Moodle-based system with mobile technologies.

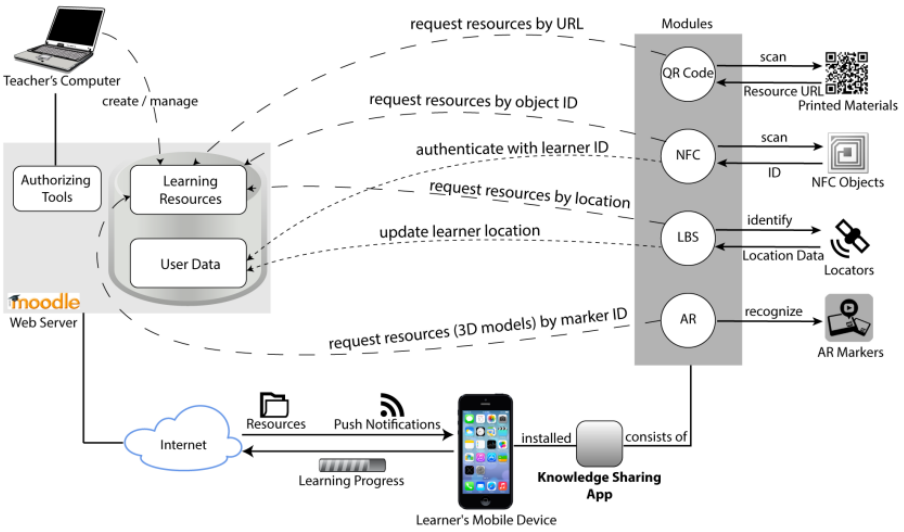

Fig. 3. The theoretical framework for m-knowledge sharing

On the left hand side of Figure 3, there is a web server installed with Moodle software (version 2.4 or above). It is basically a large database that contains user data and learning resources (or called course data officially), as well as offering a suite of authoring tools for instructors or contributors to create learning activities. As Moodle is open for developing software plug-ins to it, it is possible to communicate with any mobile devices. Fortunately, this part has not to be implemented from scratch because starting from version 2.4, Moodle officially supports mobile apps so that the basic features of Moodle are ready to present on mobile devices. At the bottom of the diagram, there is a mobile device for learners, which is already installed with a knowledge sharing app. On one hand, as depicted on the right of Figure 3, the app consists of some software modules that manipulate the mobile technologies introduced in the previous section. On the other hand, the app communicates with the web server using the secure web services infrastructure, aims to receive resources and push notifications, as well as sending back any learning progress. It is worthy to describe push notification briefly here. In contrast with "pull" technologies like website browsing, where the users have to visit a website to see if it has any update actively (i.e., users "pull" information from server), push notification is a service that information update is initiated by the server so that users do not need to perform any regular check (i.e., server "push" information to users) (Charland and Leroux, 2011).

For the mobile modules, their underlying technologies and relevant applications are discussed in the last section. Notably, the dash lines in the diagram represent logical

interactions such that the more complicated physical paths (e.g., AR module -> app -> mobile device -> Internet -> web server…) are simplified for a clearer representation. Most importantly, this framework suggests that each module could be used in a standalone fashion, or collaborates with each other in order to provide more tailor-made and enjoyable learning experiences to users. Take a scenario as an example, the app always knows the geographical locations of learners through *LBS* and updates the location data with the server time-to-time. When a learner walks near a museum, the server *pushes* the information about the museum and suggestions that really interests the learner by analyzing his or her profile: the museum has a section showing the history of dinosaurs and the learner has to do a coursework report about the evolution of creatures. The learner sees a dinosaur skeleton and would like to know how the dinosaur looks like when it is alive. He or she points the camera of the mobile device to the *AR* marker that is placed next to the skeleton, and the screen shows a virtual 3D dinosaur standing next to the real skeleton. After interacting with the virtual dinosaur, the learner scans the *QR codes* that were printed on the information board, and then he or she can view videos, photos, and any text contents that are not shown on the board. Finally the learner could share those materials to the server so that other interested learners are also benefited from this learning progress. Noteworthy, this example does not only describe the interactions between the software modules, but also brings out the concept that in this mobile age, knowledge sharing is multi-directional and multi-dimensional such that a knowledge receiver is also a knowledge provider, and the knowledge sources could be conveyed in varies formats.

The proposed framework could also enhance the current e-learning and campus experience. For instance, most lecture materials are prepared in digital format (e.g., PDF), but many learners still like to print hardcopies for better readability. From this transition period until the day of totally paperless, reference contents of a handout, such as photos and long articles could be presented in small QR codes. This does not only decrease the number of pages and provide more variety formats of references, but also keeps track of the viewing logs as part of the learning progress. Those viewing logs may consist of “who”, “what”, “when”, and “where” information, which could be valuable for refining course materials or even evaluating learners’ learning behaviors. For NFC usages, tags could be placed on library books so that learners could obtain summary and table of contents of a book before taking the book off the shelf; tags may also be attached on laboratory apparatus so that learners could see the usage guides before using them to conduct experiments. If the learner ID card of a campus is a smartcard, it is also feasible to login the system by placing the learner ID card on a NFC ready mobile device. It may sound useless because typing username and password is fast even using the tiny virtual keyboard or a mobile device. However if we are considerable with visually impaired learners, this authentication method becomes meaningful. Content-to-speech is popular so those learners can hear the learning materials, but how can they login the system themselves? How about face or voice recognitions? Those technologies are not yet reliable and insecure. How about fingerprint? There are very few mobile devices having this feature and the campus has to handle one more privacy issue. Last but not least, since AR is capable to visualize three-dimensional objects and scenes, it shall be especially useful for academic subjects that rely on graphical presentations such as architecture and mechanical

engineering. Since one AR marker can be recognized by many mobile devices simultaneously, each learner of a group can see the same 3D object in different angles on their devices. The group discussion becomes more engaging and interactive as the learner could share their observations and comments from "different point of views".

5 Conclusions

This paper presents a theoretical framework for integrating mobile technologies and a mature e-learning system to form a mobile or ubiquitous learning and knowledge sharing system. Although several applications of the proposed frameworks are introduced, they are just the tip of the iceberg. With the advancement of mobile technologies such that more and more features will be embedded in such a small device, the possibilities for mobile learning and knowledge sharing are countless. And with this trend, the boundary between e-learning m-learning, and even u-learning will be more blurred. Therefore, for parties that implement e-learning, it is worthy to spend efforts to investigate those possibilities now. It is hoped that the purposed framework could act as a useful reference for them.

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Changing Direction: Mobile Technology in Russian Higher Education

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Abstract. The purpose of this study was to investigate the examples of using mobile technology in higher education in Russia. We have identified the main barriers in development of mobile learning in the region. Also we offered possible solutions to improve the situation in the future. We analyzed more than 30 Russian-language sources about the development of mobile learning in Russia. We found that many Russian universities are implementing projects on the use of mobile devices in education. Nevertheless there are still a number of problems that hinder the further development of mobile learning. Today Russian education community is divided. Some teachers are actively using mobile devices in the classroom, but many educators are in skepticism about mobile learning. We have determined the apparent contradiction between how active students are using mobile technology in everyday life and the inability of teachers to exploit this potential for educational purposes.

Keywords: mobile learning, mobile technology, higher education, ICT, Russia.

1 Introduction

Today many Russian educational experts are discussing the need for the use of mobile technology for improving the quality of education. The process of implementation mobile learning was started about five or six years ago, but the tangible results of the use mobile technology in higher education could not be detected. The main reason of this situation is a low technological readiness of universities to use modern technologies in higher education. Many of mobile learning projects were not implemented on a larger scale.

According to the report of Bilbao-Osorio *et al.* (2013) Russian Federation has 54 rank out of 144 countries on networked readiness index. Mobile network coverage in Russia is totally 95%, the index of mobile phone subscriptions is one of the highest in the world (179.3%), but the index of individuals using Internet is only 49%. These results show that Russia is ready to use mobile technology in system of education, but there are some difficulties in realisation of mobile learning initiatives and projects.

One of the most challenging technological problems is still the high cost of mobile Internet and its low penetration in province. According to The Wall Street Journal (2013) Russia has a lot of rural areas that are in the “digital gap”. Russian government plans to deliver next-generation mobile phone services such as LTE to rural areas in the next five years.

J. Lam et al. (Eds.): ICT 2013, CCIS 407, pp. 178–185, 2013.

However, the efforts of government are still not enough to reverse the situation. Today it is necessary to reconsider new approaches in higher education. However, over the past three years, we can observe changes in direction of the use mobile technology in higher education system. More and more Russian scientists and teachers are trying to improve the quality of education by using new technologies in learning. Mobile learning is becoming popular and widespread in Russian universities. In this article we have tried to analyse how universities use mobile technology to improve education in Russia.

2 Organisational Structures and Language Learning

Over the past three years mobile assisted language learning (MALL) is the main direction in development of mobile learning in Russia. However, there are some attempts of Russian scientists to describe and create organisational structure for mobile learning at the universities. In this section we considered some successful examples in implementation of mobile assisted language learning and the use of mobile technology for organisation of learning process.

2.1 Organisation of Mobile Learning

The majority of Russian researchers point out importance of integration mobile learning with online courses for access to virtual learning environment. For example, Ogneva and Mayorova (2012) argue that mobile learning provides a lot of opportunities for online learning in Russia. One of them is the use of smartphones on Moodle courses. Other Russian researcher Novenko (2012) created the "mobile interactive complex" and showed the directions of its use in the educational process. Gnitetskaya *et al.* (2012) have defined the aspects of structuring educational material for mobile learning. These aspects are based on a new model of "intrasubject" links created for mobile devices.

Some researchers identify the importance of the use different types of mobile devices in organisation of mobile learning. For example, Ruban, Kabanov and Korovkina (2012) reported on their research about organisation of learning activities with the use Tablet PCs. Another researcher Yesenina (2011) considers that the use of portable game consoles can improve the educational process at university. The author has analysed the ways of the technical capabilities of game consoles in teaching students with disabilities.

Russian scientists are paying special attention on development of mobile applications that help to organise mobile learning in higher schools. For example, Aytchanov *et al.* (2012) presented the method of studying programming language C++ with the use of mobile technology at universities. The authors developed special mobile application that was based on principles of micro learning. Other group of scientists, Ismoilov *et al.* (2013) has identified the main approaches to development of mobile applications for learning. The authors created application for mobile learning system that is using for learning students of petrochemical courses. Kareev and Kurochkina (2012) examined the prospects for the use mobile devices in Russian

tourist education. The authors described the advantages of mobile application "Audio Guide: Moscow" that was developed for outdoor learning. Some Russian researchers describe the use of advanced technology on mobile devices of students. For example, Stupin *et al.* (2012) examined the opportunities and prospects of the use Augmented Reality (AR) technology in Russian education. The authors identified technological and pedagogical problems that can be solved by applying AR technology and main characteristics of AR-supported applications in education.

In our study, we also looked at the various organisational structures of mobile learning at Russian universities. For example, Afzalova (2012) describes the experience of students' independent work in courses based on mobile technology. These courses were presented as small blocks for comfortable using on mobile devices. The results of experience showed that the use of mobile devices allowed students to create learning environment for independent work and productive interaction between all participants of the educational process. Moreover, Merkulov (2012) identified new structure for mobile learning in higher education. This structure consists of four functional levels: (1) applications for mobile learning; (2) Infrastructure for mobile learners; (3) mobile protocol and (4) mobile network. The author argued that knowledge management and learning community are two main issues in mobile learning. New mobile learning structure is described by Travkin (2013), who examines the definition and general characteristics of “mobile campus”. This campus consists of combination of formal and informal social channels in learning activities. The author argues that the most important element of mobile campus is intelligent algorithms. The author examines the connection of mobile campus with academic community, personal learning network and electronic profile of each learner.

2.2 Mobile Assisted Language Learning

The study of foreign languages is the main direction in the use of mobile devices in Russian universities. Many teachers are actively implementing mobile devices into the learning process. For example, Gerasimenko, Kovalchuk and Mokhova (2013) studied the use of mobile technology in learning a foreign language at universities in Russia. The authors argue that mobile learning becomes an integral part in the process of learning a foreign language and makes this process informative, personalised, comfortable and flexible. Also, the authors estimated that mobile learning can not replace the traditional system of language learning, but can be used as additional and convenient form of learning. For example, the students of Moscow State University of Economics, Statistics and Informatics constantly listen to BBC (The British Broadcasting Corporation) podcasts and use language learning resources on their mobile phones.

Other Russian researcher Avramenko (2012) carried out a study in which he examined the methods of using mobile applications in the classroom. The author described the experience of integration audiocast and videocast in teaching of foreign languages. The author concluded that the use of mobile applications helps to activate and improve speaking skills of students. Also Livskaya (2013) analysed the feasibility of using mobile technology in the process of foreign language learning. The author

investigated the criteria of effectiveness mobile learning in improving speaking skills of students. A study carried out by Sidorenko and Shiptenko (2013) in Russian higher schools described some specific ways of using mobile phones for support and enhance students' motivation in learning a foreign language. The authors argued that the use of mobile phones makes learning more interesting and varied for students.

Titova and Avramenko (2013) analysed the difficulties and advantages of mobile learning as a means of modernising formal teaching. The authors conducted the student survey at Faculty of Foreign Languages of the Moscow State University. The results of survey demonstrated psychological and technical readiness of students to the use mobile devices in the classroom. Despite a number of potential problems of using mobiles in education (such as high cost of calls, messages and Internet connection) many Russian researchers considered these devices as new teaching tools.

3 Problems and Features

The introduction of new types of learning is often accompanied by a variety of problems in Russian higher education. The main problem is low technological readiness level of teachers to use mobile technology in the classroom. Also, implementation of mobile learning in higher education depends on technical and psychological willingness. In this section, we try to identify main problems in the use of mobile devices at Russian universities and psychological readiness of students to mobile learning.

3.1 Psychological Aspects in Using Mobile Devices

The psychological readiness of students to use mobile devices in learning is one of the main directions in research works of Russian scientists. For example, Golitsyna and Polovnikova (2011) pointed out that despite the widespread of mobile phones among students, mobile learning practices poorly distributed in Russia. The authors analysed technological and psychological readiness of students to use mobile technology. The authors argued that most of students consider mobiles as new possibilities for learning.

Another research team Romanovskaya, Nikitina and Chitayeva (2012) showed the results of comparative analysis of ECAR (Educause Center for Analysis and Research) survey. The survey data demonstrated the students' willingness to use mobile devices for learning. Molokanova (2012) presented the results student survey conducted at Moscow State Regional University. This survey determines students' readiness for the use of mobile technology in the learning process. The findings showed the interest of students to create educational content for mobile devices.

In addition, some Russian scholars proposed to study Psychology course on mobile devices. Kiseleva, Miroshnik and Latun (2011) looked at successful mobile learning project to create training programs on psychology, conflict resolution, cultural and creative pedagogy. These programs known as "hobby courses" helped students to gain new knowledge on selected topics for their professional growth.

Also, a number of Russian scientists considered in their work the psychological aspects of teaching and student-centered approach in mobile learning. For example, Doronina (2012) pointed out that mobile technology contributes the formation of professionally oriented teacher who knows how to establish effective relationships with students. Yanenko (2012) analyses psychological conditions for integration of distance learning technologies and mobile devices in teaching. Trefilova and Kamalov (2013) proposed to use mobile technology for student-centered learning. The authors argue that the main difference of mobile technology is that students have free access to educational resources and educator controls the execution of tasks by using mobile device.

3.2 Problems of Using Mobiles at Russian Universities

The implementation mobile learning in Russia is faced with several problems. These problems are mainly due to different standards of education with new approaches of informal learning. For example, Gurevich (2012) considers the prospects of using mobile technology for development of Russian professional education. The author argues that mobile learning in Russia slowed by number of problems associated with non-systematic approach in implementation.

Svirsky (2012) looks at the social and educational problems in imperfection of mobile learning that remain relevant for many Russian researches. The author argues that study of mobile learning possibilities allows developing appropriate methodology for mobile learning in Russia.

Titova (2012) underlines the importance of conditions for successful integration of mobile platforms in teaching foreign languages and discusses about negative aspects of mobile learning. The author suggests that negative aspects of mobile learning contain administrative, organizational and methodological problems. Firstly, there is difficult to convince both teachers and administrators that mobile learning helps to optimize educational process. Mobile phones are usually prohibited in schools and universities for using in the classroom and mobile devices can be used as electronic cribs. Secondly, the teachers have not (as opposed to students) appropriate level of ICT competence, which would allow them to introduce mobile technologies, use mobile educational applications and provide interactive support of learning process. Thirdly, mobile resources are not developed for different specialties, but there is a great variety of mobile applications, grammar tests and games for English language learning. Fourthly, many teachers say that the lack of well-developed methodological mobile learning framework slows the use of mobile devices in the classroom.

4 Conclusion

Today the system of higher education in Russia is becoming an integral part of world education. However, global changes in Russian higher education require new forms of learning and teaching. Over the past ten years mobile learning has become one of the cutting-edge areas in the development of higher education in Europe, North America,

Asia and Africa. However, the countries of the former Soviet Union are not sufficiently involved in the process of implementation mobile learning. Russia is one of the leaders in the region that implemented pilot mobile learning projects. On the other hand, mobile learning in Russia is facing a number of problems that can be solved only at the system approach.

The rapid development of mobile Internet in recent years can dramatically change the direction of the use ICT in Russian higher education. Some universities have started to use mobile technology in educational process and have replaced desktop technology in the classroom.

Nevertheless some attempts of Russian researchers to find own organisational structures and frameworks for mobile learning based only on own empirical studies, without regard to big experience of foreign countries and universities. The same approach can be observed in organisation of mobile language learning. As a rule, teachers and students use mobile devices for study English language, although mobile technology could also be used for learning the endangered languages of national minorities of Russia.

In our opinion, in Russian studies of mobile learning, too much attention is paid to psychological aspects of using mobile devices. It would be important to pay attention to sociological, economical and political aspects of the use mobile technology in higher education. We think that Russian system of higher education is overly bureaucratic and often deprived of proper funding for innovation and new forms of learning and teaching. We hope that in this decade, we can observe the strengthening of mobile learning in improving the quality of Russian higher education.

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An Example of Online Resources Sharing in Accounting Courses

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Abstract. A lot of e-learning materials have been developed for the blended learning courses nowadays and those features of accessibility and reusability should be taken into account. In this paper, we review the use of online learning resources from our part-time based accounting course in a full-time based accounting course. A survey was conducted to investigate the students' perceptions on the shared online learning resources. Furthermore, this paper compares our previous survey results collected from the part-time accounting students with the current survey results and discusses the differences in students' perception towards the shared online resources. Finally, we discuss the limitations and suggestions of online learning resources sharing based on the comparison results. The paper pinpoints the importance and awareness of online resources sharing for blended learning courses in an appropriate way by adopting the concept of knowledge mangement and instructional design.

Keywords: share online resources, knowledge management, blended learning, instructional design, online learning, e-learning.

1 Introduction

Blended learning has already been the next step towards our future as its benefits have been well recognized and proved in enhancing learning experience for learner-centric pedagogy (Macdonald, 2006; Naidu, 2003). Nowadays, most of courses are supplemented with various of online learning resources, likes audio or video podcast, online practicing exercises or quizzes, course discussion forums, etc., which are beneficial to both teachers and learners (Lam, Chan, & Yan, 2012). Coursera (Coursera, 2013), edX (https://www.edx.org/) & Open Learning Initiative Website (http://oli.cmu.edu/) are some popular examples. With these online learning resources, traditional face-to-face classroom learning has been transformed to a more practical, up-to-date and efficient blended learning context. Besides, the blended mode of learning has proved that it can extend students' learning continuum with the online learning components, such as integrating online learning resources into pre-class, in-class and post-class activities (Lam, et al., 2011).

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J. Lam et al. (Eds.): ICT 2013, CCIS 407, pp. 186–199, 2013.

In the meantime, a lot of online learning resources have been developed and these resources certainly should be maintained with proper regulation or methodology. Andreas (2005) states that blending of e-learning and knowledge management functionality can help improve learning experience. Therefore, it is important to adopt appropriate ways to make use of knowledge management to share online resources so as to establish a long-term efficient and maintainable online learning environment.

This paper aims to evaluate the effectiveness of the use of shared online learning resources in two accounting courses (one is part-time and the other is full-time mode) as supplementary materials in our institution. A survey was conducted at the end of the semester for both courses. For the part-time courses, the survey results have been reported in a paper (Lam, Chan, & Yan, 2012). In this study, we collected students' feedback on their online learning experience from the full-time based course "Introductory Financial Accounting". By comparing the two survey results, the differences in students' perceptions and the level of their engagement in the blended mode of learning were discussed. Moreover, the results also helped to review the limitations and suggestions to improve the process of online resources sharing in blended learning application.

2 The Significance of Online Resources Sharing in Blended Learning

Typically, a diverse range of online learning materials have been created and planned for re-use among courses within an institution. However, those online resources may not be a universal solution to courses of a subject. Thus, the issue of accessibility and reusability of those shared online resources should be taking into account. Priya Matta (2012) states that e-learning and knowledge management are closely coupled domains, as e-learning depends on knowledge management for "data dissemination". In other words, knowledge management is capable of bringing a qualitative change for the use of shared online resources in the way that the information is collected, processed, transformed and delivered (Matta & Singh, 2012). On the other hand, apart from the nature of data dissemination, the assurance of delivering content is another key component of online resources sharing. According to OCHA (2011), data dissemination means that data are standardized to share and can reach the widest audience with least effort on all parties involved. In the aspect of "content assurance" of shared online resources, it is necessary to provide students with valued-added content based on their demands and interests (Stehr. C, 2009). Therefore, data dissemination and content assurance are vital to achieve successful online resources sharing in a way to optimize the level of students' perceptions and engagement in each blended learning course (Fig. 1).

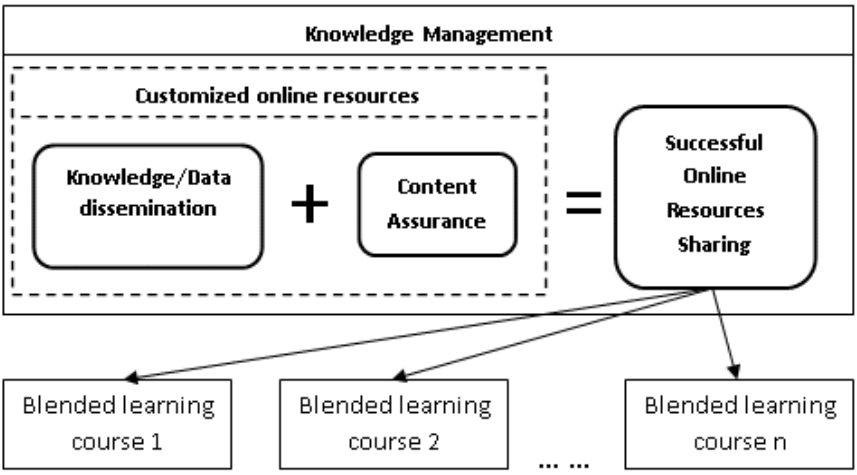

Fig. 1. The component of Online Resources Sharing

Zhang (2011) points out that specifically designed and developed e-courses are the most important elements in blended learning. The process of sharing online resources must ensure that knowledge is disseminated and value-added content is delivered in a flexible and accessible way. Shared online resources should be reviewed and evaluated by teachers and students respectively with proper procedure, such as knowledge management. In other words, online resources sharing is a subset of knowledge management and therefore, the appropriate process of sharing online resources becomes an essential element in deploying blended learning pedagogy.

3 Delivery of Blended Learning Course

3.1 Information about Blended Learning Accounting Course

In this study, the course "Introductory Financial Accounting" of Higher Diploma in Business programmes under the HKU SPACE Po Leung Kuk Community College is being investigated. These programmes are offered to full-time business students for acquiring basic accounting concepts. To provide a more enriched learning environment, blended mode of learning was implemented with the direct use of online learning resources developed for "Basic Accounting" of the Advanced Diploma in Accounting part-time programme under HKU SPACE (Lam, Chan, & Yan, 2012). The online resources were delivered through the same online learning platform, SOUL 2.0. The students were provided with the same sets of course materials, streaming courseware and interactive learning courseware as supplementary learning materials, including Chapter Summary, Chapter Quiz, Self-test Question, etc. For communications, students were encouraged to make use of the Discussion Forum and Q&A Corner to share their views and inquire on the learning topics. Other SOUL 2.0 built-in functions such as Announcement, Calendar, Grading and User Activity

Report were also provided to students. User support for online learning services including 1-minute demos, FAQs and user guides could also be accessible in the online learning platform.

The Chapter Summary offered summarizes the content of each chapter and illustrates points with multimedia demonstration. Besides the content summary, it also includes some accounting real cases illustration. From the previous survey (Lam, Chan, & Yan, 2012), respondents reflected that it helped to deepen their understanding of the learning topics and served as a supplement to cover the insufficiency of other online materials.

The Chapter Quiz consists of 10 MC questions for students to review the levels of knowledge acquired in each chapter. From the previous survey (Lam, Chan, & Yan, 2012), the respondents stated that the Chapter Quiz helped them to get familiarize with the taught topics.

The Chapter Exercise consists of practical exercises with different accounting real cases. It has been proved itself as a useful online material to students in improving the comprehension of course content (Hung et al., 2011). From previous survey (Lam, Chan, & Yan, 2012), respondents stated that it did play an important role to reflect learning mistakes and helped them to drill answering technique.

4 Survey Results and Findings

Five classes of full-time accounting students in "Introductory Financial Accounting" were offered to access the online learning resources as supplementary materials via SOUL 2.0 during the 3-month lecturing period. At the end of the course semester, students were invited to a survey in December 2012. A total of 234 student responses were received, constituting a response rate of 70.7%.

4.1 SOUL 2.0 Access Information

From September 15 2012 to January 11 2013, students could access the shared online learning resources via the HKU SPACE learning management system, SOUL 2.0. A total of 265 out of 331 enrolled students had accessed the course on SOUL 2.0, with an access rate of 80.1%.

4.2 Summary of Survey Results

The survey comprised three parts of questions covering Online Course Design, Online Course Materials and Overall Comments. Same as the previous conducted survey, a screening question was asked to check whether the respondents had accessed the online learning resources on SOUL 2.0. A total of 168 out of 208 respondents (80%) had accessed the shared online resources (Fig. 2). Students who had not accessed the learning resources stated that they had not learnt about the provision of these resources online.

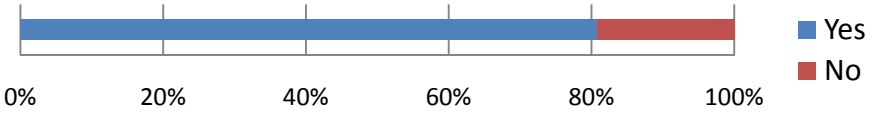

Fig. 2. Percentage of students who have been accessed the shared online resources

A. Online Course Design

Regarding the course setting, only 28% of respondents agreed that the course website and instructions in each activity were very clear or clear (Fig. 3). Around 31% responded that the online course materials were easy or very easy to navigate (Fig. 4).

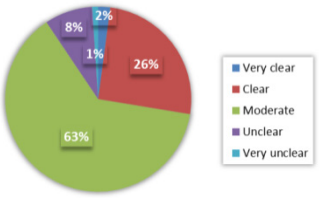

Fig. 3. Was the course website clear to meet your expectation at the start of the course?

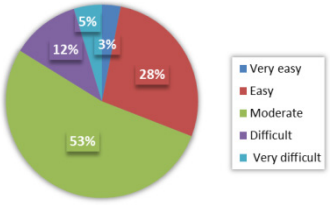

Fig. 4. Was it easy to navigate online resources materials?

B. Online Course Materials

In this section, students were asked about their perceptions on the online learning resources and whether the resources were beneficial to their learning process. Around 27% of respondents strongly agreed or agreed that the Chapter summary helped consolidate and deepen their knowledge (Fig. 5), while 32% agreed that the narration was clear and easy to follow (Fig. 6).

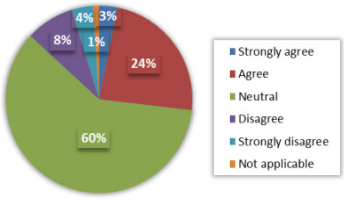

Fig. 5. Chapter Summaries helped consolidate and deepen my knowledge

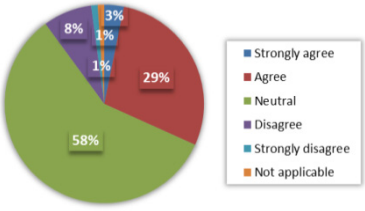

Fig. 6. Narration was clear and easy to follow

For Chapter Quiz, 29% of respondents strongly agreed or agreed that quizzes helped enhance their practice and only a quarter reflected that the questions were useful and allowed them to test their knowledge and skills (Fig. 7, 8). Regarding the Chapter Exercise, around the same percentage of respondents (23%) deemed that they were

practical and interactive. Only 32% of respondents showed that the online course materials helped them review the course content after class (Fig. 9) while only 27% deemed that the given workload for the online course materials was appropriate (Fig. 10).

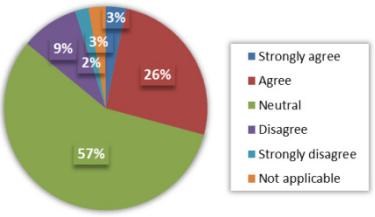

Fig. 7. Chapter Quizzes enabled me to enhance my practice

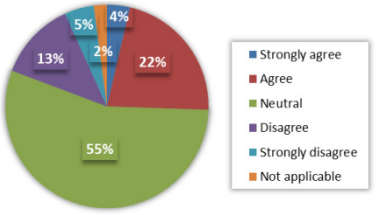

Fig. 8. Questions were useful and allowed me to test my knowledge and skills

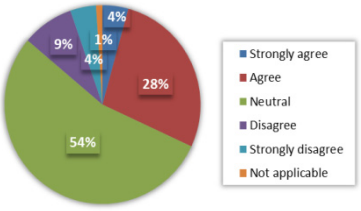

Fig. 9. The overall online materials helped me review the course contents after class

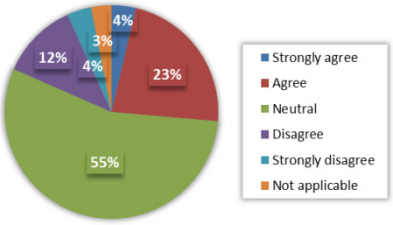

Fig. 10. My workload for online course materials was appropriate

C. Overall Comments

The latter part of the survey investigated the students' online learning experience with the shared online resources. 35% and 33% of respondents showed that the online course materials enhanced their understanding of the topics covered, and made their learning more flexible and accessible (Fig. 11, 12). 24% and 21% of respondents reflected that the online materials could enrich their learning experience, as well as made their learning more interesting and engaging (Fig. 13, 14). Overall, only 24% and 21% of respondents were satisfied with the quality of the online course materials and considered their instructor was helpful in facilitating online learning (Fig. 15, 16).

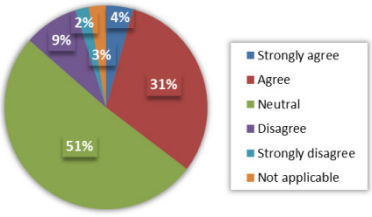

Fig. 11. The online course materials enhanced my understanding of the topics covered

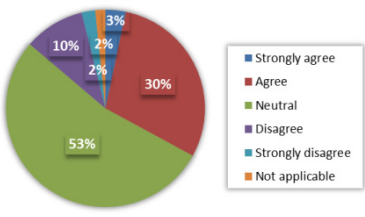

Fig. 12. The online course materials made my learning more flexible and accessible

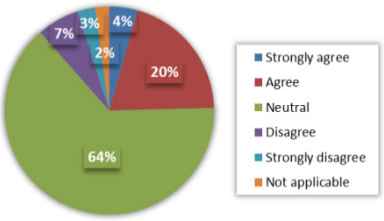

Fig. 13. The online course materials enriched my learning experience

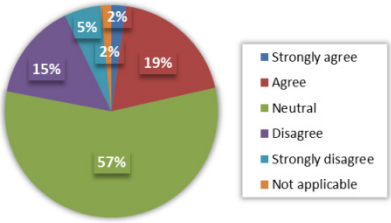

Fig. 14. The online course materials made my learning more interesting and engaging

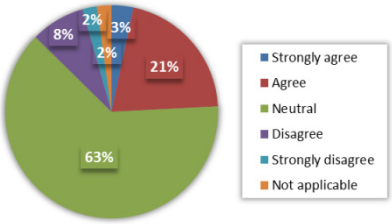

Fig. 15. Overall, I was satisfied with the quality of the online course materials

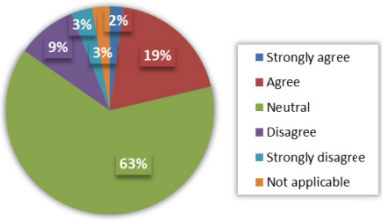

Fig. 16. Overall, the facilitation by the instructor for online learning on SOUL 2.0 was helpful in achieving my learning goals

Although a rather neutral response was received on the effectiveness of enhancing learning experience with the provision of shared online resources and on the satisfaction with the quality of resources, 85% of respondents were eager to have similar type of online learning resources in different course of the programme and 78% agreed that this type of online resources is an advantage to this programme (Fig. 17, 18).

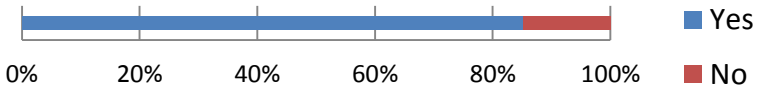

Fig. 17. Do you want the online course materials to be available in other modules?

Fig. 18. Do you think that the online course material is an advantage of this programme?

In terms of usefulness and effectiveness of online resources, students were asked to rate the types of online resources in order of preference, 43% and 36% opted for Chapter Summary and Chapter Exercise, while the rest goes to Chapter Quiz. The order

of students' preference is the same as the one collected in the previous survey on part-time students (Lam, Chan, & Yan, 2012).

From the open-end question on the resources preference, students claimed that there was lacking practical exercise during the normal classes, thus the Chapter Quiz did provide an opportunity for them to practise and evaluate themselves about the level of understanding of the chapter concepts. Besides, they also reflected that the Chapter Exercise could help them familiarize with each chapter more deeply and it was also convenient to be provided with instant feedback after submitting the answers, especially on the accounting learning nature. Regarding Chapter Summary, it was considered to be the most popular online resource among students. Students appreciated the animated content illustration with synchronized audio explanation. Last but not least, they said that Chapter Summary could effectively assist them to review and comprehend the main concepts of each chapter in a short period of time. These comments are very similar to the ones collected in previous survey.

5 Comparison of Findings

In terms of usage of the course on SOUL 2.0, the access rate of full-time accounting students is 80.1%, which is much higher than part-time students (60.9%) in the previous survey (Lam, Chan, & Yan, 2012). However the usage pattern is quite different between these two groups of students. The average access per user for full-time students is around 2-3 times per week, whereas that in part-time students is much higher, which is around 6-8 times per week (Fig. 19).

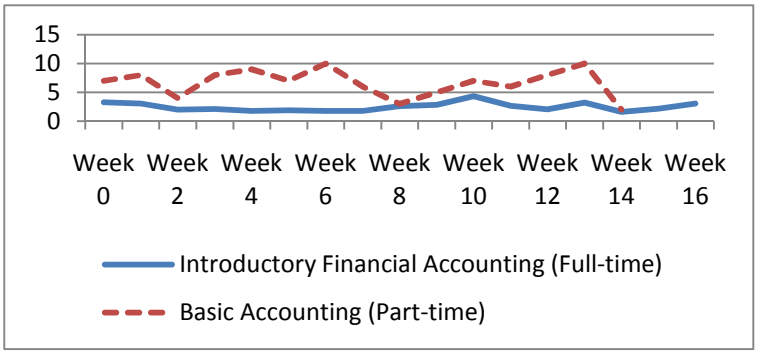

Fig. 19. Average access per user for full-time and part-time accounting students

By comparing the survey results collected with the previous survey results on part-time students (Table 1), a number of points have been noted. For the instruction in learning activities and navigation of the shared online resources, there is a 19-22% decrease in student s' perception. Moreover, a drop of 12% in perception on the usefulness of the shared online course materials for revision. In addition, in terms of flexibility and engagement related to the online course materials, there is a 16-24% decrease in students' perception.

Percentage of students who had encountered problem in using the online system decreases; 17% compared to 25% in the previous survey. Similar to the feedback collected from previous survey, the majority of students looked for an improvement in navigation, interface and user-friendliness of the system page. Therefore, a continuous enhancement and adjustment of the SOUL 2.0 system interface is needed in the future. Finally, we received none of the report from students that are related to the access or functional problem in the shared online resources. Thus, it is further proved that the overall e-learning context is running at an efficient stage.

In addition, it was found that students' preference for the general types of online resources were different between two groups of students (Fig. 20, 21). It properly related to different learning mode of the students and details will be discussed in the latter part of the paper.

Table 1. Survey results of full-time and part-time students

Survey Questions/Statements	A	B	Difference
The instruction on the course website was clear to guide you what to do in each activity.	**28%**	**50%**	**-22%**
It was easy to navigate online resources materials.	**31%**	**50%**	**-19%**
The overall online materials helped me review the course contents after class.	**32%**	**44%**	**-12%**
My workload for online course materials was appropriate.	**27%**	**39%**	**-12%**
The online course materials made my learning more flexible and accessible.	**33%**	**49%**	**-16%**
The online course materials made my learning more interesting and engaging.	**17%**	**41%**	**-24%**

A: Percentage of students who strongly agree or agree in Introductory Financial Accounting (Full-time)
B: Percentage of students who strongly agree or agree in Basic Accounting (Part-time)

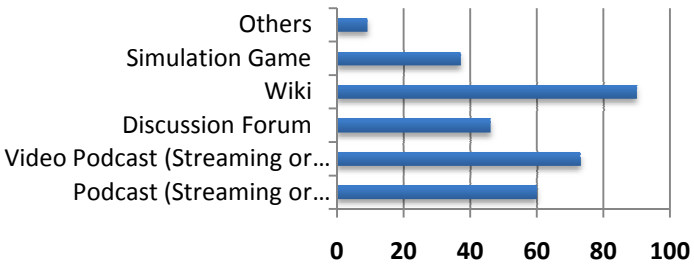

Fig. 20. General types of online learning material that helped in enhancing my learning experience

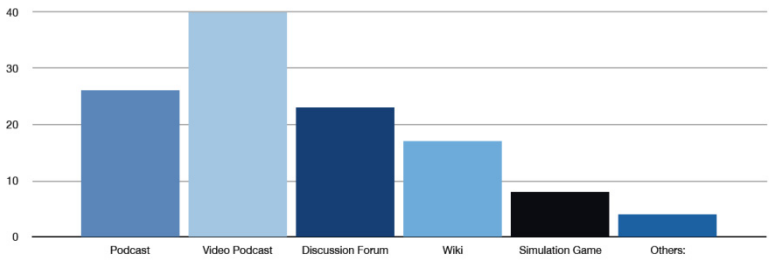

Fig. 21. General types of online learning material that helped in enhancing my learning experience (Previous survey result (Lam, Chan, & Yan, 2012))

6 Discussion

6.1 Difference in Survey Findings

The essentials for online resources sharing compose of data dissemination and content assurance. According to the above results, the shared online resources were disseminated to learners successfully with no report of access issue. In other words, the goal of "data dissemination" was achieved. However, with respect to students' perception in the overall comments, it indicates that the nature of "content assurance" of online resources sharing may need to be reviewed.

6.1.1 Learning Mode

Students studying in full-time or part-time modes of learning have different learning habits and preferences. Part-time students usually engage in daily work, therefore they may have limited time for traditional learning, such as going to library or having face-to face discussion with classmates. In this case, compared to full-time students, they will have a higher demand of the shared online resources as those resources can be accessed anytime and anywhere. Thus, it aligns with the survey results indicating that there is a higher percentage of flexibility and engagement of online course materials for the part-time students (Lam, J. & Cheung). On the other hand, full-time students usually have more time to interact with the tutors and classmates. They can get hold of tutors and classmates for assistance in learning more easily. Thus, it can explain the difference in perception on the usefulness of shared online resources between part-time and full-time students. Besides, full-time students normally enroll to more courses within a semester compared to part-time students. Therefore, the former may concern the online learning activity as an extra workload. It sheds light on the difference in the usage pattern of the online materials between the full-time and part-time students in our study.

6.1.2 Computer Literacy and Personal Preference

Students have diverse degree of information technology competency and different prior learning experiences (Yuen, Hung, Lam, Lau, & Duan, 2011). For instance, the working students usually have advanced experiences in using the computer system and they are used to navigating the desired resources according to instructions.

Similarly, students may have different learning styles (Keefe J. & Gardner, D, 1995). Thus, they will have preferences to difference types of online learning resources. In addition, different types of shared online resource may be suitable for different students, like most of the full-time students prefer to access Wiki as their favorite online learning material whereas part-time students prefer video podcast according to our surveys (Fig. 20, 21).

6.1.3 Teacher Participation

Teachers' participation and support for both teachers are an essential element in blended learning (Garrison & Kanuka, 2004). However, in our study, students were provided with the online resources only as supplementary materials without integration with the teaching plan. Quizzes and exercises were not be used in the class discussion. This may explain the decrease in the level of engagement of students in the current survey results.

6.2 Suggestions to Improve the Effectiveness of Online Resources Sharing

To ensure effectiveness of online resources sharing, a number of suggestions can be taken into account. First, we need to consider the characteristics of students to which the shared online resources to be provided, such as their learning mode, their computer literacy and learning styles and preferences. Secondly, we need to provide support for both learners and teachers in the blended learning. Thirdly, most importantly, online resources should be fine-tuned before sharing or re-using in course delivery. A feasible approach is to implement knowledge management methodology and instructional design process by academic stakeholders in advance and to refine the existed learning resources from time to time according to the evaluation results. In this paper, we only focus on the third suggestion.

6.2.1 Knowledge Management and Instructional Design

A knowledge management (KM) system is similar to an educational system in which useful knowledge is created from information or data found in available resources. One typical six-step process for KM functions is "acquire, create, synthesize, share, use to achieve organizational goals and establish an environment conductive to knowledge sharing" (Zhang, Chan, Lally, Shen, & Fox, 2003). This process can be used in the sharing of online resources among different courses.

Based on the development process for blended learning courses (Lau et al., 2011), here are the proposed steps for the reuse of shared online resources in blended mode of learning (Fig. 22):

1. *Acquire appropriate online learning resources*

Teachers and instructional designers will first acquire the target online learning resources based on the topics of the taught course.

2. and 3. *Create and Synthesize desirable learning resources by applying instructional design to the selected learning resources*

After collecting some appropriate learning resources, the teachers will then prepare the revised teaching plan and detailed lesson plan. Based on the target learning

outcome, the online learning resources are integrated into the traditional classroom learning for blended mode of learning (Cheung, Lam, Lau & Shim, 2010). In this stage, the selected online resources may need to be fine-tuned by technical developers to incorporate other relevant and recent information.

4. *Share the course specific learning resources*

The specific online learning resources will be shared to learners via the learning management system with proper facilitation from teachers.

5. Evaluate the course-specific learning resources

It is then important to evaluate and determine the effectiveness of the shared online resources according to the learning outcome.

6. *Contribute the course- specific learning resources*

The course-specific learning resources will become a new set of shared online resources in the conductive environment of knowledge management. The above process will be iterative to refine course-specific learning resources to align to students' needs and competence. (Lam, Lau, Shim, Cheung, 2013)

6.2.2 Target Learner Evaluation

Blended learning focuses on students and the online learning resources are co-built by teachers and students through appropriate and continuous research, evaluation and refinement process. It aims to establish suitable shared content for maximizing the learning experience within the course. Eventually, valuable and reusable online learning resources will be accessible and can be shared among similar courses in the future.

In short, the ultimate goal of this approach is to maximize the level of usefulness of the shared online resources for different students. In other words, students could find every piece of learning resource as useful as they expected before participating in the blended learning course.

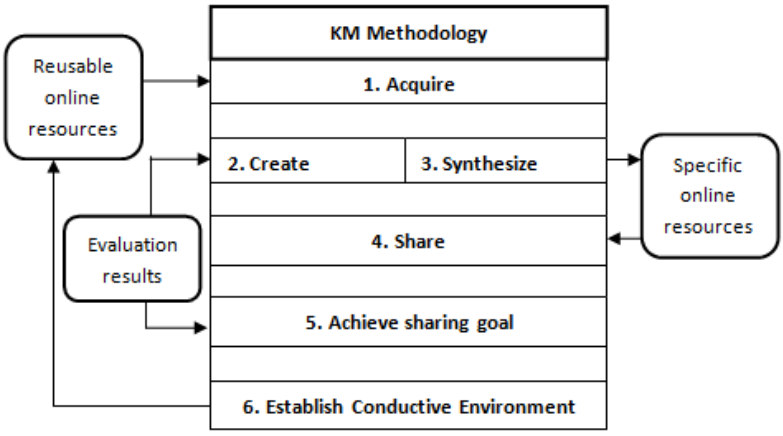

Fig. 22. Online resources sharing with Knowledge Management

7 Conclusion

From our study with full-time accounting students, a rather neutral perception on the shared online learning resources was obtained. It draws our awareness on the proper approach in the use of shared online resources in variety of blended learning courses. That is, direct re-use of online resources to blended learning courses may not be an effective approach, even the taught topics are under the same subject. It is necessary to review and refine the content of learning resources before sharing and the refinement should be align to the study mode, teaching preferences, students' needs and competence, etc.

We believe that by adopting appropriate KM and instructional design approach, the knowledge sharing in terms of assurance of delivering content and the learning experience with the sharing online resources in blended mode of learning can be enhanced. This paper lays out the awareness and corresponding suggestions of online resources sharing; it could serve as a useful reference for institutions to develop and manage shared online resources across different blended learning courses in the future.

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Learning through Blogging: Understanding Teacher and Student Perceptions towards English Writing Blogs

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Abstract. Over the past decade, there have been a number of studies on the influence of student interaction and group work on the one hand, and the employment of Web 2.0 technologies on the other, on the language acquisition process respectively. However, the use of blog, which involves a seamless combination of both group collaboration and Web 2.0 technologies, as a device of language education in the local context has not received the proper attention it deserves. The limited relevant studies focus mainly on either the primary and junior secondary school settings or teacher education at the undergraduate level, leaving a virtually empty page regarding the field of English language education at the sub-degree level. This paper describes and investigates a blog-integrated collaborative writing activity for sub-degree students at a self-financing post-secondary institution in Hong Kong. The discussion focuses on exploring students' willingness to embrace blog as a medium to learn English as a second language and the perceptions of both students and teachers concerning blog writing.

Keywords: Web 2.0, English writing, blogs.

1 Background

The findings of a number of previous researches have demonstrated that student interaction and group work help facilitate language acquisition process in the face-to-face learning environment since 1990's (Pica, Young, & Doughty, 1987; Nelson & Murphy 1993). There were also a growing number of empirical studies addressing the effect of Web 2.0 technologies on the collaborative learning in different disciplines in the western countries over the previous decade. However, the use of blog, Wiki and podcast for language instruction has not been widely reported in the Hong Kong classroom (Mak & Coniam 2008; Leung & Chu, 2009) and it is not exaggerated to say that this is still a research topic that has received slow attention in the extant literature locally so far. Though blog, the main object of the current study, has been considered as a useful tool in supporting writing instruction and collaborative learning by many overseas researchers (Dippold, 2009; Arslan & Şahin-Kızıl, 2010; Mompean, 2010), studies on its learning effectiveness in the local English language education arena are still in their infancy. Though a few attempts have been made to

J. Lam et al. (Eds.): ICT 2013, CCIS 407, pp. 200–211, 2013.

investigate the effect of blog writing on local students' writing performance, some of them were confined to dissertations by postgraduate students (Deng, 2010). Another shortcoming is that most of the existing local researches in the area of teaching and learning English language using blogging have so far been confined to the primary and junior secondary school settings (Tse, Yuen, Loh, Lam, & Ng, 2008; Mak & Coniam, 2008) or the teacher education at the undergraduate level (Deng & Yuen, 2007). None of them was designed to specifically contribute to the field of English language education at the sub-degree level. One possible reason for this may be the stagnation of development in the use of Web 2.0 in the Hong Kong post-secondary institutions in the past few years. Therefore, further investigation in relation to the learning outcome and users' perception of blog writing in the local educational setting would be significant both academically and pedagogially.

This paper describes a blog-integrated collaborative writing activity for sub-degree students at a self-financing post-secondary institution in Hong Kong. In Wong and Leung (2012a, 2012b), the authors have briefly introduced the development of the blog writing platform and the design of the system. The following discussion will be focused on exploring students' willingness to embrace blog as a medium to learn English as a second language and the perceptions of both students and teachers concerning blog writing.

2 Literature Review

Over the past few years, the use of blog in education has been expanding rapidly worldwide. Numerous attempts have been made to study the effect of blogging on students' learning, particularly on its effectiveness in enhancing their English skills. Forty-three Taiwanese student teachers were invited to participate in Yang's study (2009) to explore the use of blogs as a reflective platform to learn English as a foreign language. Positive and encouraging results were collected in this study. Evidence from the messages and comments they posted showed that student teachers were able to reflect on what they were thinking on the blogs and the discussions amongst peers were largely reflective in nature. Most of them considered blog writing as a useful learning platform for enhancing self-reflection and communication with one another.

In a quasi-experimental study done by Arslan & Şahin-Kızıl (2010) at a Turkish university, 23 students of the control group received in-class process-oriented writing instruction while 27 students of the experimental group were allowed to access web-based language and writing materials via the tutor blog after the face-to-face writing class. Based on the quality of students' final drafts, it was found that students with the blog-integrated writing instruction demonstrated greater improvement in English writing performance than those from the control group who merely received in-class instruction.

Another example that addressed the use of blog for EFL instruction was the work by Mompean (2010) in which a group of French Master's students were asked to work for a collaborative writing project in a blog-supported environment over a fifteen week period. The finding reflected that the project was successful regarding the

level of students' participation as there were more postings on average than required in the pedagogical contract. Some students even responded that the choice of theme offered in the writing blog allowed them to make good use of meaningful language for the purpose of authentic communication.

Apart from investigating the learning effectiveness of blog, researchers in this area were also concerned about teachers and students' perception, preference, and feedbacks during or after their initial exposure to the blog-supported learning environment. For example, Hsu, Wang and Comac (2008) looked into student perception of the use of audio-blogs for an English speaking and listening class in the northeast United States through a hybrid method comprising questionnaire surveys, interviews and textual analyses. It was evident that audio-blog could be used to help teachers evaluate students' oral performance in an efficient and effective way. They also confirmed that such learning technology met their instructional needs and enabled them to provide students with individualized oral feedback. Students were of the views that audio-blog could enrich their language learning experience because of its user-friendliness. They were also able to create their own e-portfolios by using audio-blogs, which to a large extent assist them to establish the ownership of learning and benefit from reflective practice.

A survey conducted by Sun (2009) on a team of Taiwanese college students about their perception of the learning experiences in a blog-integrated L2 English speaking course showed that the participating students went through a series of blogging stages as documented in the past literature, which included but not limited to conceptualizing, brainstorming, articulation, monitoring and evaluating. Some students also commented that they perceived blog writing not only as a means of learning, but also a medium to promote self-presentation, information exchange and social networking.

Past studies also showed that blog writing environment has raised students' interest, motivation and confidence in writing where they were not only able to write freely, but also learn from their peers, enrich their English vocabulary and improve their grammar (Ducate and Lomicka, 2008; Amir, Ismail, & Hussin, 2010).

3 Methodology

3.1 Participants

While the use of blog is not widely implemented in the local education setting, it has already been considered by many researchers as a useful tool for supporting writing instruction and collaborative learning. To verify and determine how far such a claim reflects reality, the authors came up with the idea of developing a blog-supported writing platform for students at the sub-degree level. The college where the authors serve is a self-financing post-secondary institution in Hong Kong, which has a longstanding tradition for providing career-oriented programmes and its students are trained to write effectively, fluently and accurately, both in Chinese and English. The rapid increase in the complexity of the globalized world and the tremendous development in information and communication technology create the need for the institute to move away from the traditional classroom-based teaching methods and

promote students' exposure to and involvement in an electronic writing platform which is accessible to them at any time and in any place. We envisage this new writing platform will spark and deepen students' interest in both reading and writing, and consequently enhance their command of English writing skills significantly.

This research was conducted during the second semester of the academic year 2011/12. A total of 105 students from a diploma programme of this institute were invited to participate in the research. They were all native Chinese speakers taking the course of "English Language" and were instructed to utilize the e-Writing Platform (the English writing blog implemented by the institute) on a weekly basis as one of the basic requirements of the course.

3.2 The Writing Blog

The e-Writing Platform was established upon a blog hosting platform named WordPress (`http://wordpress.org/`). WordPress is a free and open source blogging tool and a content management system. Its features include plug-in architecture and a template system so that the system can be built based on users' needs. In the e-Writing Platform, WordPress is used in a way of multisite network, i.e. all individual sites share the same WordPress installation, plugins and themes, and the network is sustained by a centralized maintainer. Teachers and students get access to e-Writing Platform through the course webpage in Moodle system. The following diagram shows the flow of how WordPress works in e-Writing Platform.

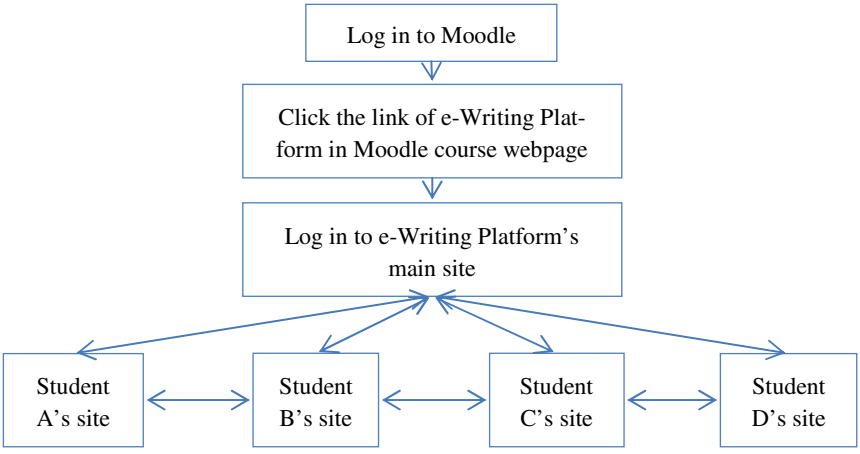

Fig. 1. The flow of browsing different students' sites over the e-Writing Platform

From the above diagram, it can be seen that after logging into the e-Writing Platform, teachers and students can go to the main site, through which they can visit other teachers and students' individual sites. This promotes the exchange of ideas through writing blog entries and giving comments among teachers and students and helps to improve students' writing skills.

The e-Writing Platform has been established for students to share their life experiences and their points of view on various issues. Needless to say, expressing personal opinions and sharing daily life with others on the Web in their first language have become a must for today's internet generation. However, writing in a second language may require more encouragement from educators. Students are therefore encouraged to write as many blog entries and comments as they wish in order to improve their English writing skills. 8 pre-set categories have been created as writing themes in the group blog, including:

- Bits of life,
- Book recommendation,
- Creative writing,
- Film review,
- Food review,
- Photo description,
- Sharing of news articles, and
- Travelogue.

These writing themes were given to raise students' interest in contributing to the Platform and to give them some ideas on where they can start. The initial design of these categories was based on the authors' observations of the trends in young people's current areas of interest, which are not meant to be exhaustive. On the other hand, in order to facilitate the writing process of users, there are a number of reference tools set on the interface of the e-Writing Platform, for example online dictionaries and thesauruses. Therefore, as a tool comprising word-processing, social networking, as well as sharing or publicizing purposes, the e-Writing Platform was targeted to meet the needs and interests of youngsters in their language studies.

3.3 Procedures/Course

All our participants came from 3 classes of a diploma course. Their ages ranged from 16- to 20- years-old, and all of them use Chinese as their first languages. They were taking the course "English Language", the contact hours of which were 3 per week, whereas writing ability was one of the main components of its learning outcomes. All students reported that they had previous experience using the Internet ranging from 2 to 9 years. The most popular types of activities were chatting and sharing news in social networks and blogs, playing online games, watching films and listening to music, searching for information, checking emails, etc. In the beginning of the captioned semester, students were given a short workshop learning how to utilize all the functions of the e-Writing Platform. They were encouraged to fully participate in it. Moreover, they were guaranteed that teachers would also participate, give comments and interact with them. In order to acknowledge their participation and performance, 10% of the academic result of the course was allocated to their performance on it.

4 Survey Instrument

We collected data quantitatively from a student-attitude survey to investigate the perceptions that learners had of the e-Writing Platform as an English-learning tool. After the semester, 78 students and 3 teachers participated in the evaluation survey, where a 6-level Likert scale was employed, as shown in Table 1.

Table 1. The 6-level Likert scale

Level of agreement	*Labels*
Strongly disagree	1
Disagree	2
Somewhat disagree	3
Somewhat agree	4
Agree	5
Strongly agree	6

The questionnaire of the survey comprises of 18 questions, falling into 4 categories, namely the general attitude towards the e-Writing Platform, the content coverage and the categories of writing themes, the functionality and technical issues of the platform, and the overall feeling towards the writing experiences. The results of the survey (except question 6) for students are shown in Table 2. For question 6, students were asked to choose which category (out of the 8 pre-set ones) they like most. Table 3 shows the 8 categories with the distribution of choices. For the feedbacks from teachers, the results are shown in Table 4, while the written comments in different aspects are shown in Table 5.

5 Results

Both feedbacks from students and teachers were collected and analyzed. Regarding the feedbacks from students, it was further divided in two parts: the first part comprised feedbacks to all questions except Question 6, and the second part consisted of feedbacks to Question 6.

For the first part of feedbacks from students, all questions with 6-level Likert scale possess middle values around 3.5. Therefore, for the questions having mean values further away from 3.5, the results are worth further discussion.

Regarding question 3, students found that teachers were able to provide adequate technical support. This helped eliminate students' difficulties in using the e-Writing Platform.

Through students' feedbacks to questions 7, 9 and 11, it can be observed that they could find topics that they were interested in writing about with great ease. Regarding question 7, students considered that there were sufficient choices of categories, which could provide more ideas for what and how to write. Moreover, the response to question 11 revealed that students found it useful to be able to include pictures and other kinds of files in their blog post. These settings provided students with motivation to write and decorate nice blog posts.

Table 2. Results of questions of evaluation survey for students

Questions	*Mean score*	*Standard Deviation*
System design		
1. I think the writing platform is easy to use.	3.71	1.11
2. I think it is easy to find the buttons I want to look for.	3.63	1.19
3. I think there is enough help from my teacher on the technical aspect.	3.78	1.06
4. I think linking the writing platform with Moodle is a good idea because we can easily access to it.	3.73	1.13
5. I like the system of the writing platform.	3.47	1.07
Content coverage		
7. I think the choices of categories given are not enough.	3.38	1.02
8. I think the topics given are inspiring.	3.63	0.85
9. I can easily find a topic that I am interested in to write about.	3.91	1.05
10. A minimum word limit can encourage us to write more.	3.62	0.93
Functionality		
11. I am glad that I can include pictures and other files in my blog post.	3.86	1.00
12. I am happy that I can change the background and choose my favourite font size and colour.	3.78	0.93
13. The "saved-draft" function is useful.	3.74	1.07
14. I think the dictionary function is useful.	3.56	1.10
15. I want to access to the blog on my smart phone/tablet.	3.64	1.10
Overall		
16. I enjoy doing this activity as part of my continuous assessment.	3.64	0.91
17. I want to continue writing on the group blog.	3.58	1.00
18. I think it is fun to write and read comments from my classmates.	3.73	0.99

From the feedbacks to question 12, it can be observed that students were glad that they could change the background and choose their own favourite font size and colour. Together with feedbacks to question 18 that students found writing and reading comments from their classmates interesting, we can see that such settings of freedom in manipulating the visual settings in the platform encouraged students to employ the e-Writing Platform to share their feelings and interact among themselves more.

Table 3. Question 6 of evaluation survey: asking students to choose the most favourite category

Categories	*Number of choices*
Bits of life	16
Book recommendation	20
Creative writing	6
Film review	22
Food review	17
Photo description	20
Sharing of news articles	11
Travelogue	16

From the responses to question 6, it can be seen in Table 3 that three of the categories, namely "Book recommendation", "Film review" and "Photo description", were the favourite of students because they are closely related to their daily life such that they could have more feelings and experience to share in these three areas. On the other hand, the category "Creative writing" was the least favourite one. The students found writing with imagination so hard that they did not have much interest in it.

Table 4. Results of questions of evaluation survey for teachers

Questions	*Mean score*
System design	
1. I think the writing platform is easy to use.	5.67
2. I think it is easy to find the buttons I want to look for.	3.00
3. I think linking the writing platform with Moodle is a good idea because we can easily access to it.	5.67
4. I like the system of the writing platform.	4.67
Content coverage	
5. I think the choices of categories given are not enough.	1.67
6. I think the topics given are inspiring.	5.00
7. A minimum word limit can encourage us to write more.	5.67
Functionality	
8. Students like including pictures and other kinds of file in their posts.	5.33
9. Allowing students to personalize their own blog page is a good idea.	5.67
10. The "saved-draft" function is useful.	5.33
11. The reference tools are useful.	4.00
12. I want to access to the blog on my smart phone/tablet.	5.67
Overall	
13. It is good to incorporate this writing activity into the continuous assessment.	5.33
14. The writing platform has increased students' incentive to write.	5.67
15. I think there is enough help from technicians on the technical aspect.	4.33

For the teachers' feedbacks, as shown in Table 4, the results were generally more positive than those of students, except that it was a little bit complicated to locate the buttons they looked for on the platform. Also, more reference tools should be provided so that students can be better assisted in using the e-Writing Platform for writing blog posts. In Table 5, it can be seen that teachers also provided written comments on various aspects. Teachers generally found the idea of e-Writing Platform welcomed by students they taught. One teacher also suggested that the platform can be developed as personal blogs for students, while another proposed that the platform can be developed as mobile phone apps in order to boost students' usage.

Table 5. Comments from teachers about e-Writing platform

	System design aspect	*Function aspect*	*Overall comment*
Teacher A	If students/teachers are allowed to make changes to the layout and design of personal pages, it may encourage the use of the system since it makes more like an actual blogging site	--	The whole idea of incorporating this writing platform into students' learning is interesting as they actually love sharing their ideas and opinions with their course mates. The platform may be used in a long term basis and should act as students' personal blog even after they finished with the course.
Teacher B	A reward system may be encouraging	RSS feed may keep students update	This idea is generally welcomed by students and they enjoy the activities a lot.
Teacher C	Mobile phone apps assessing the Platform would be a good idea to boost students' usage		All students in the class enjoyed this writing exercise very much.

6 Discussion and Suggestion

Through the feedbacks from students and teachers, it can be seen that the e-Writing Platform can provide a nice and efficient platform for students to write nice blog posts and teachers to to observe and assess the progress of their writing skills.

Judging from students' feedbacks, we can see that generally they found the e-Writing Platform user-friendly and easy to use. A friendly technology enables learners to focus more on learning tasks and less on the technology (Hsu et al., 2008). Moreover, we can say that e-Writing Platform is a success in stimulating students' interest in blog writing (Question 16, 17, & 18), with a relatively affordable cost. The equipment needed for both instructors and students is only a computer readily available for teaching and learning. Therefore, it is really an effective as well as economical mean of language learning.

Moreover, from the results of the survey we get to know that students demand flexibility in manipulating the blog environment, which allows them to show their personality and style, for example in the background they choose, in the font size and colour, and most importantly that they can freely post pictures, video clips, audio broadcasts and other files, making their blogs full of multimedia information. Many studies have shown that it can be difficult to motivate language learners when it comes to text reading (Kozma, 1991; Davis & Lyman-Hager, 1997). Studies have also shown that Internet access motivates many students to read extensively (Rodzvilla, 2002; Liaw, Chen, & Huang, 2008). Multimedia blogging integrates texts and audio-visual resources, which makes the students far more willing to read and write (Yang, 2009), and in designing their own blogs they found that writing and reading on Internet can be a fascinating and enjoyable experience.

Judging from the favourite categories ("Book recommendation", "Film review" and "Photo description") of blogging topics, we notice that students are more eager to share their daily life than use the writing platform to publish some serious and artistic or creative writings. It is a fact that most of our Hong Kong students are neither good at nor interested in serious creative writing. Still, the phenomenon is not a bad thing as long as students treat the blogs as an important social network or even a kind of community. In sharing their daily life, interests and feelings, students tend to get more involved in blogging than they do in other pedagogic and web-based environments, thus producing a stronger sense of community (Wegner, 1998; Godwin-Jones, 2008). A blog is like a small learning community (Efimova & Fiedler, 2004).

As for the teachers, their positive feedbacks towards the writing platform indicate their recognition and appreciation of the power of blogging in language teaching. What makes our writing platform more effective is teachers' active participation, since instructors' feedback regarding learners' performance plays a crucial role in the language-learning process (Lynch & MacLean, 2003; Yang, Badger & Yu, 2007). There are more vivid and real-time interactions between students and teachers, and this makes the learning process more convenient and interesting. Moreover, practically speaking, blog writing enables the teachers to measure the performance of students and to track students' learning progress. Students can also reflect upon their learning and take up the responsibility and ownership of learning (Hsu et al., 2008). This makes the students more proactive in the learning process. In terms of language teaching and learning, "language learners could use a personal blog linked to a course as an electronic portfolio, showing development over time" (Godwin-Jones, 2003, p.13). Therefore, we should conclude that blogs could be used to monitor and assess students' work as well as to encourage interaction among students and between teachers and students (Yang, 2009).

Undoubtedly, the operation of the platform still has various areas for improvement. Firstly, as WordPress is a well-developed blogging tool, the number of functions would be more than sufficient and thus, students and teachers may find it difficult to locate the buttons and links they actually need. Therefore, more extensive workshops for using the writing platform can be provided at the first one or two lessons of the courses. Secondly, students and teachers found that there are rooms for improvement concerning the reference tools. Therefore, teachers can try to provide more useful reference tools, such as more online dictionaries and essay writing tutorials for students, to facilitate their blog writing.

7 Limitations

This mini research has a number of limitations. The first limitation may be the relatively small sample size. For a preliminary study that tries to assess the viability of using blog as a language learning tool, a relatively small number of participants may be viewed as understandable because of the constraints in time and resources. However, more students should be involved in future studies regarding students' feedback after a longer use of this writing platform and find out what and how to improve further.

In the design of the questionnaire, participants only need to put down their choices and no in-depth explanations for their preferences are required. Although participants may need to take longer time to complete a questionnaire, such information would definitely give the authors a deeper understanding of students' choice. For the same reason, face-to-face interviews with the students and teachers should be done in the future in order to get more precise and comprehensive results.

Acknowledgements. This project *Online Advising Support and Interactive Study System 2.0 (OASISS 2.0)* is funded by the Education Bureau (EDB) of the Government of the Hong Kong Special Administrative Region of the People's Republic of China under the Quality Enhancement Grant Scheme (QEGS).

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Open Education: Challenges in Hong Kong

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Abstract. The advancement of information and communication technology has transformed the way of teaching and learning. As opposed to conventional education offered at education institutions, open education denotes the free and open access to knowledge for anyone, anytime, anywhere. For instance, the emergence of open educational resources is an example which offers digital learning objects freely and openly for academics, teachers and students to use and re-use for teaching, learning and research activities. The introduction of massive open online courses is another educational movement which offers access to free online courses. Indeed, open education is regarded as a revolutionary approach to the future of education, in particular higher education, around the world. This paper attempts to assess Hong Kong's readiness of taking part in open education movement worldwide. The situation of higher education in Hong Kong is critically reviewed, where the challenges in terms of cultural barriers, technological support, government and institutional policies, funding resources and copyrights issues, are identified. It is believed that open education will revolutionise the future of education and bring a new scene to higher education in Hong Kong.

Keywords: Open education, open learning, open educational resources (OER), massive open online course (MOOC).

1 Introduction

In the past decade, digital revolution has brought tremendous changes to the way of interaction. The continuous development of Information and Communication Technology (ICT) gives rise to new opportunities for teaching and learning, thus challenging established practices as of how teaching and learning are conducted.

Open education is a collective term referring to open and free access to a wide range of courses and educational materials, which are distributed, shared, and consumed through the Internet and other forms of digital media. With the objective to broaden access to the learning and training traditionally offered through formal education institutions, open education is primarily driven by institutional practices and programmatic initiatives. The availability of user-centric information infrastructure such as blogs, wikis, social networks, mashups and content-sharing sites enables open access and open content repositories. Under the Creative Commons

J. Lam et al. (Eds.): ICT 2013, CCIS 407, pp. 212–226, 2013.

licenses, dissemination and reusability of digital contents are facilitated, resulting in the rise of open educational resources (OER) and massive open online courses (MOOCs). Learners nowadays have a wide range of options for acquiring new knowledge and skills outside the context of formal education, where this demand-pull approach motivates learners and promotes self-directed learning.

While increasing number of institutions are exploring and participating in open education movement worldwide, this paper focuses on the participation of higher education institutions in Hong Kong. The challenges in terms of cultural barriers, technological support, government and institutional policies, funding resources and copyrights issues are discussed. Some concluding remarks will be given at the end.

2 Literature Review

Education can be interpreted as the act or process in which one acquires knowledge, skills and habits through teaching, training, or research. It can be in the form of formal education, informal education, or non-formal education. In the wider context of a culture of open knowledge, open source, free sharing and peer collaboration emerged in the late 20th century, educational practices are moving forward with an urge to make education accessible for everyone. By utilising the latest technologies, OER and MOOCs are made available on the Internet for access to rich materials and incredible resources worldwide. In addition to institutional practices that seek to eliminate barriers to entry, along with programmatic initiatives that offer an open curriculum, the openness of education allows learners to be curators of knowledge and reflect their intrinsic motivation in the learning process.

OER is a global trend in education especially higher education. OER is currently adopted in terms of digitalised materials which are freely accessible and sharable among learners, academics and researchers. Larsen and Vincent-Lancrin (2005) defined OER as resources for knowledge sharing which can be shared with non-commercial terms. Hylén (2006) further provided that OER can be divided into three parts including learning content (courseware, content modules, learning objects and journals), tools (applications or content management systems regarding development, online learning group and society), and implementation resources (knowledge or support in promotion of the materials, blueprint of designing a good practice and transformation of the education objects).

Downes (2007) indicated a wider view on the types and formats in supporting OER which visiting field experts, exchanges of academics, publications, and learning objects imported from different media should not be excluded. This provides us another point of view of the term. “Traditional” OER are commonly considered as tangible materials and electronic materials which are highly adopted in traditional learning environment. The static physical objects (hard materials) could be comprised of journals, papers and textbooks, while digitalised content (soft materials) includes images, multimedia, courseware, games and simulations. Yet, human resources and expertise are neglected in this aspect. Seminars, demonstrations, field visits can be taken as new forms of learning. The discussion may start here to define the various

types of OER, where usable resources which support education can be regarded as OER based on the above understanding.

As a pioneer of OER movement, the Massachusetts Institute of Technology (MIT) launched MIT OpenCourseWare (OCW) in October 2002, with an aim to unlocking knowledge and empowering minds (Massachusetts Institute of Technology, United States [MIT], n.d.). With 2,155 courses published and 125 million visitors, MIT OCW is a web-based publication of virtually all MIT course content which is open and available to the world. To date, over 200 institutions around the world have joined the OCW Consortium, which share a common commitment to increasing access to high-quality educational materials and empowering both well-served and underserved populations through the power of open learning (OpenCourseWare Consortium, n.d.).

MOOC is first mentioned in 2008 parallel with the OER movement. Facilitated by the emerging technologies, MOOCs can be regarded as Internet-based courses which make knowledge more available and accessible. The ultimate goal is to open up higher education to everyone around the world, especially to underserved populations, and allow learners to take control of their study. Like many other online phenomena, MOOCs are growing in popularity at a rapid rate. Examples of prominent MOOC platforms include Coursera, edX, and Udacity. Typically MOOCs do not offer academic credit or charge tuition fees. Meanwhile, this new form of self-directed learning poses two major challenges, including the lack of social presence and the high level of autonomy required to operate in such a learning environment (Kop & Fournier, 2010). While MOOCs are expected to impact the future of business education, this mode of delivery still has a long way to go before gaining wider acceptance.

Over the past decade, the use and dissemination of OER are growing continuously regardless of the types of resources. While ICT allows instant data transfer and information access through the Internet easily, the popularity of mobile devices these days gives room to the development and distribution of OER and MOOCs. In brief, open education has played a fundamental role in supporting educational development around the world, and its potential to transform the global education landscape is to be determined.

3 Challenges to Higher Education in Hong Kong

Hong Kong has 17 degree-awarding higher education institutions, including eight institutions funded by the public through the University Grants Committee (UGC), and eight self-financing institutions, and one publicly-funded institution. Among these institutions, some have developed online learning resources which are made available for internal sharing and for the public. For instance, The University of Hong Kong (HKU) has launched an institutional repository, namely HKU Scholars Hub, in order to make HKU authors and their research very visible, with the goal of increasing all forms of collaboration. HKU also hosts the Critical Thinking Web which provides over 100 online tutorials on different aspects of thinking skills. Meanwhile, The Open University of Hong Kong (OUHK) on iTunes U offers access to many free video and audio podcasts, whereas its Open Learning platform offers access to free courseware. The following figures show the interface of these websites.

Fig. 1. Screen Capture of HKU Scholars Hub

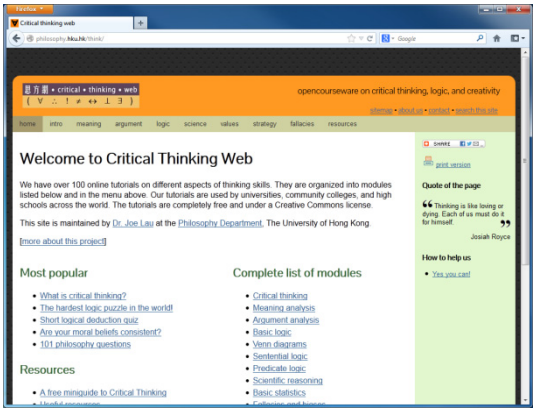

Fig. 2. Screen Capture of HKU Critical Thinking Web

Fig. 3. Screen Capture of OUHK on iTunes U

Fig. 4. Screen Capture of OUHK Open Learning platform

While increasing number of institutions are exploring and participating in open education worldwide, higher education institutions in Hong Kong face a number of challenges in taking part in this movement. The challenges are categorised and discussed in the following sections.

3.1 Cultural Barriers

From a British colony to a special administrative region of the People's Republic of China, Hong Kong is an international city which is deeply influenced by both the Western and Eastern cultures. With the unique historical background, people of the territory experienced a complex of cultures over the past century. Such complexity has a strong influence towards people's attitudes and perspectives on the development of open education in higher education. In this aspect, we will diagnose the cultural influences in three dimensions: from teachers' perspectives, students' perspectives as well as perspectives of higher education institutions (HEIs) management.

Teachers' Perspective. In the past decade, the use of ICT in teaching and learning became a crucial part among HEIs. Most of the HEIs had set up their own online learning environments to facilitate teaching and learning, as well as collaboration between teachers and students. However, even with the well-developed online learning environment, the use of online learning is limited to the extent of disseminating teaching materials. Teachers' attitudes are negative towards sharing and using online learning materials.

One of the key factors is that teachers are resistant to change their teaching habit. Most of the teachers deliver knowledge through traditional face-to-face classroom teaching. Such approach is highly valued among Chinese communities which knowledge is passed directly to limited number of students (Ardichvili, Maurer, Li, Wentling, & Stuedemann, 2006). While open education proposes free access to online educational contents by everyone, teachers are required to adapt to new teaching approach and habits. Due to the popularity of face-to-face teaching, teachers are too

familiar with traditional way of teaching and unaware of the benefits which knowledge sharing via ICT can bring to their teaching and students' learning. Hence, they do not realise the needs for changing their own practices (Bingimlas, 2009).

Meanwhile, "Knowledge is Power" is a well-known proverb in Chinese society. With the keen competition between academics in HEIs, people believe that they gain more power when they acquire more knowledge, and lead their road to success (Ardichvili et al., 2006). Upon sharing knowledge exclusively with others, some teachers are afraid they would lose their power or control over knowledge. Besides, academic independence is highly valued in higher education sector, unless sharing of knowledge can create a "win-win" situation, they are reluctant to share their "creations" with others (Dyson, 2004). Dyson (2004), and Yuen and Wong (2013, p.46) also mentioned that teachers and academics expected recognition for the knowledge they created or contributed, no matter in terms of money, promotion or awards. As mentioned by Bures (2003), teachers treat knowledge creation and sharing as "additional work", therefore, they would expect "something more". Such "desire to be recognised and rewarded" can also be treated as a way to maintain their "Power" which becomes barrier to the distribution of knowledge.

In Hong Kong, teachers are not merely responsible for class teaching, but also involve in performing researches, consultancy work and other administrative work. Time is always a constraint when it comes to create and share knowledge. Dyson (2004) stated that creating new knowledge is not easy which requires teachers to sit down and discuss all matters for improving teaching and learning effectiveness. Even with existing open educational resources, teachers still need time to select the most suitable ones for their teaching, not to mention asking them to manage a well-structured online course for open access.

Students' Perspective. Hong Kong students are always labeled as passive and teacher-centered learner. In the Chinese culture, teachers are considered to be the authority to deliver knowledge and positioned at a high status. Students are taught to be respectful to teachers and not to question nor challenge them (Wong, 2004). This "teacher-centered" manner generally shapes students to be passive learners. Students rely on one-way information transmission from teachers and do not challenge for the knowledge they acquired. Eventually, students are not eager to communicate and share their ideas openly. Moreover, teachers usually search most of the information for their students. While learning becomes so easy, students need not search and share knowledge with other learners. This "spoon-feeding" style of teaching and learning results in barrier towards open education.

A survey conducted by Wang, Kwan, Tsang and Wong (2011) shown that students are inactive in communicating via online learning system. Nearly half of the student samples even never access the online learning system during the whole semester. Students of the survey reflected that as using online learning system and sharing knowledge were too time-consuming and did not really contribute to their assessment, they preferred to spend more time for preparing their final examination. This "examination-oriented" attitude is typical among Hong Kong students. Wong (2004) indicated that "the assessment system for Asian higher education institutions is

generally examination based while the style of teaching and learning is aimed at helping students to pass the examination." Before the Education Reform took place in 2012, students had to take two public examinations during their secondary school study in order to get a place in one of the publicly-funded higher education institutions. Public examination results had an overwhelming influence on their chance to study in universities. Such influences were deeply embedded to students' minds and such learning style continues when they proceed to higher education level. Since accessing or sharing knowledge shows no direct benefits towards their assessment, students would not put much effort on it at all.

Management of HEIs' Perspective. Academic independence is highly valued in Hong Kong higher education sector. Such independence and academic contributions made by the scholars build up the reputation of the institution. Senior management of HEIs admires the reputation and would not take any risks accordingly. Yuen and Wong (2013) discussed that by using or publishing ideas or knowledge from others, possible negative impacts may arise which harm the institutions' reputation and status, especially when the knowledge used or shared is inaccurate or of low quality. Hence, senior management may take a conservative approach to maintain its reputation and resist using the works developed by other institutions.

In the past decade, the demand for higher education places had grown tremendously. Apart from the publicly-funded higher education programmes, the number of self-financed programmes also had a rapid growth. The number of full-time self-financed programmes offered by the industry increased from 84 in 2002/03 to 532 in 2012/13 (Education Bureau, 2012). It is obvious that the competition between HEIs is extremely keen. To keep their competitors away from copying their best ideas and knowledge, management of HEIs may have the tendency to retain knowledge for internal use. By accumulating knowledge within the institution, reputation and status would be enhanced which maintain the institution's competitiveness to attract more students to apply for their programmes.

3.2 Technological Support

With the widespread of ICT, technological support plays an indispensable role towards open education. Many HEIs sustainably invest and make a significant effort to prepare educational materials with the use of ICT. Needless to say, studies have reported that ICT is a driving focus to innovate and foster open education (Yuen, Law & Wong, 2003).

Research also reveals that technological support on teaching facilities and equipment is a very important factor to overcome the barrier of using ICT (Khalid, 2009). Pelgrum (2001) pointed out that inadequate technological support is the major criteria to discourage the use of ICT. In general, a comprehensive technological support can be interpreted in terms of knowledge, development and usage.

Knowledge. To facilitate open education, academics can make use of OER, which includes video clips, multimedia lesson units, notes, assignments and even existing

course materials. As such, teachers and students need to learn to search, select and use OER available on the Internet, with reference to the Creative Commons license. For instance, they can sign up an account in OER Commons. Through this website, they can customise their search by discipline, level of study, etc. However, they must review the copyright terms and quality of resources before adopting these resources in the course modules. In Hong Kong, e-learning is not mandatory in the course curriculum of most institutions (Yuen & Wong, 2013). It is merely complementary to traditional teaching and learning. That is, the habit of using OER is still at a nascent stage.

Development. Resources are the crux of open education. The process of redesigning and transforming teaching materials, as a part of pedagogical innovation, plays a vital role in this stage. By doing so, teachers can draw students' attention and bring the concept of open education to them. Therefore, instructional designer plays an important role to facilitate teachers and students to adopt this new educational approach. Though traditional education is led and oriented by teachers, open education pays more attention on students (Shim et al., 2011). The knowledge is built, consolidated, redesigned and shared by participants. In total, the design of open education is different from traditional learning. Teachers should design and customise the online learning curriculum for a wider group of target users. It may be time-consuming and requires teachers to learn some technical skills to integrate the module into learning management system.

In Hong Kong, most institutions have an educational development centre which is responsible for course design and pedagogy, as well as provides hands-on development support, training, technical support to users. In this way, teachers can focus on material content, whereas instructional designer is responsible for designing online course materials. The development of quality materials rely on the entire team.

Usage. The open, free and advanced technological support on platform is essential for open education. Studies have reported that sound open education architecture involves many technical components on cloud, with a physical hardware layer, virtualisation layer, middleware layer of education and application interface layer (Wang, 2011). Research by Becta (2004) states the implementation of ICT in teaching was discouraging because of fearing equipment breaking down. Obviously, technical assistance will affect the provision of open education. Research also reveals that website browsing and network connection issues will impede the natural flow of delivery of education (Scilia, 2005). Without technical support, open education is hard to be implemented.

In Hong Kong, Yuen and Wong (2013) finds out that many HEIs currently have no policy to encourage the use of OER for teaching and learning purposes, even for award-bearing courses. They seldom share and exchange materials with others, or upload their materials to the OCW Consortium and OER Commons, due to the lack of support. Therefore, adequate technological support can strengthen users' confidence to accept a new teaching pedagogy.

3.3 Government and Institutional Policies

Government Policy. As indicated by the Chief Executive in the 2013 Policy Address, HKSAR Government will continue to invest heavily in the post-secondary sector. The funding is provided to eight HEIs directly through UGC, as well as offered via various financial assistance schemes, such as the Land Grant Scheme and the Start-up Loan Scheme, to self-financed post-secondary education sector (Legislative Council Panel on Education, 2013). Nevertheless, the Policy Address did not provide a clear direction for the development of open education among higher education sector in Hong Kong.

From UGC's point of view, it did recognise the importance of "Knowledge Transfer" (KT) for enhancing the quality of teaching and learning and the notion was even incorporated to its mission statement (University Grants Committee, 2013a). The publicly-funded institutions were invited to submit an initial statement to describe their institutional-wide planning and strategies for developing KT. Among these institutions, most of them have set up hubs and repositories for administering KT, such as the Knowledge Exchange Office by HKU (The University of Hong Kong, 2012) and Knowledge Transfer Office by CUHK (The Chinese University of Hong Kong, 2012). However, the development is still at an initial stage which focuses on promoting the concepts of KT and exchanging knowledge through workshops and conferences. The provision of a well-managed and well-structured programme for open education purpose is far beyond achievement.

Institutional Policies. The research carried out by Yuen and Wong (2013) mentioned that many institutions have no policies to encourage knowledge sharing and develop open education. For the publicly-funded institutions, even they had set up hubs or repositories for promoting and using KT, no explicit policies can be found on their websites. Taking the Chinese University of Hong Kong as an example, a "Knowledge Transfer Office" was formed in 2009 and the corresponding website was established. However, the access to its policy of KT is limited to internal use only (Knowledge Transfer Office, Chinese University of Hong Kong, 2012). This limitation to access acts as a hurdle which blocks others to know more about the approach adopted by the institution. Policy is a collaborative decision made by the management of institutions. It provides guidelines and regulations for the development of institutions as well as set up boundaries to maintain the institutions' standard and performance. Without a clear policy on open education, administrative units, academic staff and students do not understand the benefits of open education and are not motivated to carry it out.

In addition, the competition among HEIs is keen. For self-financed institutions, they have to strike for a balance between academic standard and financial status. They have not come up with a balanced approach to open and commercial offerings. In order to avoid financial loss, self-financed institutions rarely have policies to promote open education. Besides, even these institutions did collaborate with overseas institutions, such collaborations are usually related to co-organisation of programme, but not a formal agreement nor guideline for knowledge sharing or open access of courses. Though some pilot group projects for knowledge sharing or knowledge

management were launched among those institutions, they do not have a concrete plan on long-term development towards open education. Lack of formal regulations or guidelines is a reason which slows down the development of open education.

3.4 Funding Resources

Financial Support from the HKSAR Government. UGC supports "Knowledge Transfer" (KT) of the publicly-funded institutions. When it comes to actual funding contributed to KT, an annual recurrent funding of HK$52.8 million was provided to those institutions for building up the capacity and broaden endeavor in KT since year 2009/10 (Financial Secretary Office, 2013). Each institution is required to submit an annual report regarding the use of such funding as well as their achievement and development towards KT. However, compared to the HK$15 billion budgeted to UGC for year 2013/14 (Legislative Council, 2012), the amount allocated for KT purposes only accounts for 0.4% of the whole budget.

In the meantime, self-financed institutions are not under the umbrella of UGC, such that no recurrent funding would be given and they would be requested to search for their own sources of funding. In fact, Education Bureau (EDB) of the HKSAR Government set up a 3-year grant scheme, namely Quality Enhancement Grant Scheme (QEGS), in year 2008/09 to support self-financed institutions for promoting quality enhancement in teaching and learning of higher education sector (University Grants Committee, 2013b). If those institutions would like to facilitate knowledge sharing or open education, they are required to submit proposals to EDB for requesting the grant. Nonetheless, such grant is one-off in nature and no recurrent funding will be provided to the institution upon project closure.

Financial Support from Other Sectors. Instead of obtaining funding from governmental bodies, the main source of funding for self-financed institutions is tuition fee. Unlike publicly-funded institutions, these institutions always face a dilemma between maintaining a balanced financial status but at the same time without sacrificing the academic standard. Though the management may have the ambitions to promote open education, the cost for developing open accessible course is high. For example, the Open University of Hong Kong (OUHK) launched a USD2.3 billion project on open textbook for different institutions' use (Yuen & Wong, 2013). Those expenditures can only be covered by either raising tuition fee or seeking for external funding.

Apart from governmental resources, institutions can also look for commercial support. However, even with a concrete proposal and budget plan, the sponsorship amount given by commercial sector is not guaranteed. Similar to some governmental subsidy schemes, the subsidies provided by commercial parties are one-off and not recurrent. In addition, commercial parties emphasise on "profits" and "benefits", i.e., they may request for return on investment, which may jeopardise the openness and standard of open education.

As the development of open education is a long and sustaining process, a reliable and sustainable source of funding is essential. Yet, in a "business-oriented" city like Hong Kong, it is difficult for institutions to obtain sufficient and recurrent funding to implement their plans.

3.5 Copyrights Issues

Copyright is another major factor affecting the willingness of adopting open education in Hong Kong. By definition, it is a bundle of exclusive right for authors to control the use of work for a limited period. The kinds of works include literary, dramatic, musical production as well as performers' performance. A copyright owner can copy, reproduce, publish, sell and distribute his/her own works. Copyright applies to the way an idea or information is expressed, not to the idea and information, regardless of its physical existence. Copyright works made available on the Internet environment, indeed, are also protected (Intellectual Property Department, HKSAR Government, 2013).

In the course of developing learning materials, teachers may simply:

- Copy an amount of other people's work
- Reproduce their own materials by referring to existing materials
- Develop learning materials by obtaining permission of copyright owner
- Use copyrighted materials with Creative Commons (CC) licenses

Users need to address copyrights issues wisely when copying and distributing copyrighted materials, otherwise they may fall into a trap of infringing copyright and trade-off the institution's goodwill. The barriers related to the copyrights issues are summarised as below:

Low Incentive of Work. Under the Creative Commons (CC) licenses, the spectrum of possibilities between full copyright (all rights reserved) and the public domain (no rights reserved) is redefined. In short, the licenses disclose partial rights to public (Creative Commons Hong Kong, 2013). Besides, publisher can adhere to CC licenses options – "Attribution", "ShareAlike", "NoDerivs", "NonCommercial" – which keep their copyright while inviting certain uses of their work. Meanwhile, this arrangement cannot motivate academics to develop OER or share their own work, as they are feared of losing their copyright eventually. In brief, HEIs are more willing to develop their educational materials on their own. The collaboration among institutions may be hindered.

Practical Hurdles for Obtaining Rights. If certain amount of third-party copyrighted materials is used for developing educational resources, it is necessary to obtain the original owners' permission before reproducing and distributing the resources. Usually, seeking for permission is a complex and time-consuming task (OECD, 2007). It requires the user to identify and locate appropriate owners. Then, the user needs to establish the right of usage, which sometimes involves sophisticated legal involvement of studying and clarifying the usage of copyrighted works. Usually, the response rate is low and disappointing. In some extreme cases, the user is required to pay enormous license fee to obtain the right. Hence, copyrights issues may be practical hurdles because of the operational complexity.

Lack of Awareness of Copyright Issues. Nowadays, learning materials are no longer restricted to physical objects, but can be digitalised. Academics are now dealing with the new copyright licensing concept. For instance, if they are asked to develop a learning object, they may use the web browser to search for related information first. It is convenient for them to copy other people's works or capture the ideas based on existing materials by a few clicks. To localise and promote the use of CC licenses in Hong Kong, Creative Commons Hong Kong (CCHK) was established in October 2008. Until now, according to the survey conducted by Yuen and Wong (2013), few people had paid attention to the introduction of CC licensing principle and practice to Hong Kong, and even fewer had paid attention to CC's utility for the legal consumption and contribution of OER. This demonstrated the situation which academics seldom develop their learning materials based on open licensing and few HEIs take the initiatives to address the copyright issues (OECD, 2007). This macro environment discourages the implementation of open education in Hong Kong.

4 Conclusion

This paper illustrates the challenges of taking part in open education faced by higher education institutions in Hong Kong. Some of these institutions have developed online learning resources which are made available for internal sharing and for the public. Meanwhile, a number of challenges are identified and categorised in terms of cultural barriers, technological support, government and institutional policies, funding resources and copyrights issues. This reflects the territory's participation in open education is still at a nascent stage.

To overcome these challenges, the primary action is to motivate all members of HEIs to take part in open education actively. At the initial stage, incentives are important to encourage their participation. Senior management of HEIs should set up a reward mechanism for developing and sharing open resources and experience (Geser, 2012). The rewards for teachers are not necessarily in monetary form but as recognition of their academic contribution. Apart from rewards and recognition, senior management can encourage the use of existing resources to reduce teachers' workload. For instance, some of the MOOCs available on edX are offered by well-known institutions. These courses require learners to complete a series of exercises and quizzes, where certificate will be issued by edX and the corresponding institution upon completion. Teachers can make use of these MOOCs as part of course assessment, say accounting for 50% of total coursework, and require students to obtain a certificate as a proof of completion. In this case, once the appropriate MOOC is selected, teachers need not go through the content covered by the MOOC and can focus on other parts of the course. For students, they can learn via the MOOC and collaborate with learners from all over the world taking the same MOOC. This allows them to experience and have a better understanding of open education, thus promoting a culture of lifelong learning.

To maintain a sustainable development of open education, funding is always one of the major barriers for HEIs to take a step forward. Most of the HEIs are willing to take part in open education if the cost is low or external funding is available.

Take MIT OCW as an example, MIT publishes all educational materials from its undergraduate and graduate level courses online and makes them widely available to everyone with no extra costs. Since neither academic credit nor certificate will be issued to learners, MIT is able to maintain its academic curriculum as usual. Moreover, MIT OCW sets up a donation channel and sells souvenirs for financing its development and operation. Interested parties can make monetary contribution and be awarded with different titles according to the donated amount. This is indeed a good example that HEIs can reduce costs and obtain external funding for offering OER and MOOCs.

Most HEIs have a team of IT professionals and instructional designers to facilitate the use of ICT in teaching and learning. Their services can be extended to support the provision of open education. Teachers and students can seek for assistance when they encounter problems. Latest development and updated information regarding all aspects of open education can also be introduced on a regular basis.

Open education is a global trend. Higher education institutions in Hong Kong can now take the initiatives to participate in OER movement and partner with international institutions in the provision of OER and MOOCs. It is believed that open education will transform the global education landscape and revolutionise the future of education, thus bringing a new scene to higher education in Hong Kong.

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Initiate a Knowledge Management Practice for Sustainable Continuing Education

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Abstract. With the wide adoption of online learning in higher education institutions, development and use of online learning resources for teaching and learning becomes inevitable. HKU SPACE introduced online learning for more than a decade, and large amount of online learning resources were developed. To maximize the usage of and increase the access to these resources, an institutional repository was developed by converting existing online learning resources into Learning Objects (LOs) and preserving them in a Knowledge Management (KM) platform. This paper covers issues to be addressed for a rich-multimedia knowledge management platform including systematic classification of resources for uploading and retrieving, infrastructure and functionality of Web 2.0 and a proposed framework of the platform. Some concerns about the knowledge management practice are discussed, such as copyright licenses, resources ownership, abuse control and performance tracking. The key factors to successful implementation of knowledge sharing and building are explored.

Keywords: Knowledge management, knowledge management practice, institutional repository, online learning resources, learning objects.

1 Introduction

Information and communication technology is being widely used in all kinds of educational institutions more than a decade. The School of Professional and Continuing Education of The University of Hong Kong (HKU SPACE) has actively developed and accumulated numerous of teaching and learning resources, including teaching and learning materials, learning activities, extra-curricular activities, teaching pedagogy, student guidance, experience sharing from students and graduates, and guest lectures. These resources are valuable knowledge-assets to the institute, which need to be preserved and reuse for organizational materials sharing. HKU SPACE Community College has initiated a project to develop an institutional repository in order to maximize the usage of these developed materials. The objective of this project is to reduce teacher's workload and effort to re-develop similar materials again by providing a ready to use resources or an editable source file. Teacher's and technical staff's development time can be saved by modifying these learning resources.

J. Lam et al. (Eds.): ICT 2013, CCIS 407, pp. 227–234, 2013.

Alavi & Leidner (2001) summarized that the objective of Knowledge Management System (KMS) was to support creation, transfer, and application of knowledge in organization. Andrew, Arvind, & Albert (2001) suggested that KM processes must be present in order to store, transform, and transport knowledge throughout the organization. These processes enabled the organization to capture, reconcile, and transfer knowledge in an efficient manner.

The aim of the project is to imitate an institutional repository with a KM model to retain existing valuable knowledge-assets. It also facilitates a platform for knowledge transfer, collaboration within organization and idea sharing among teachers. Teaching and learning materials are retained by converting existing materials into a reusable Learning Objects (LOs). Teacher can delivery the learning materials as supplementary exercise or extended learning resources to prospective students. Hence, cater the learning need from students with diverse academic background and vary skills level. A sustainable platform for lifelong learning is crucial factor for a successfully implementation as well.

There are four primal goals defined when the project started. First, develop an organizational knowledge-based assets library to retain good teaching and learning resources, diffuse good practice, and share resources to both staff and students. Second, develop a knowledge management system to enhance staff members' teaching quality and provide self-continuous professional development materials. Third, leverage on the learning materials from teachers inside the Community College and strengthen collaborations among teachers in order to create a more competitive organization. Fourth, develop an organizational knowledge management strategy and culture to facilitate a sustainable and transferable teaching and learning practice.

2 Conversion of Teaching and Learning Resources into LOs

Learning Objects (LOs) "first popularized by Wayne Hodgins in 1994 when he named the CedMA working group 'Learning Architectures, APIs and Learning Objects'". The widely accepted definition of Learning Object is "a digital or non-digital resource that can be reused to support learning" (WIley, 2000). A digital form LO usually could be broken down into small, reusable instructional components and each addressed a specific learning objectives. Daniel (2007) had defined a classification of six LO types named as presentation object, practice object, simulation object, conceptual model, information object and contextual representation

Duval (2001) & Boyle (2003) indicated that good eLearning resources are expensive to produce and the usage of these resources was limited by the developed format. Polsani (2003) raised there are three major definitions of Los that include accessibility, reusability and interoperability. Teacher's effort to develop similar teaching and learning materials could be minimize. Teachers can simply modify materials from one format to another. This was a flexible model to let teacher tailor-made their own teaching resources based on their subject context or students' abilities.

Presentation and Practice object are effective to achieve SOLO taxonomy pre-structural and uni-structural level of understanding (Biggs & Collis, 1982). Use of different types of LOs simultaneously can reinforce student understanding from

short-term memory to long-term memory. Simulation object and conceptual model are effective to achieve SOLO's multi-structural level of understanding which students attain the ability to "enumerate, classify, describe, list, combine, do algorithms" (Biggs & Collis, 1982).

Adopted the LOs definition and approach to converting existing self contained learning resources into reusable and interoperable LOs would align teachers pedagogy effectively. The developed materials were created with common standard and file formats. LOs shall be arranged in a systematic taxonomy with searching functions inside the KM platform, this allows learning resources to be accessible. Teachers can search and form their own collections of LOs to addresses their intended learning outcomes. Across time teacher might left the School, but the developed materials can be retained in the KM platform as a LO. New teachers can reuse those LOs and transform it with other LOs to form a new meaningful learning package based on a specific topic or subject area. As a result, LOs can be access by teacher's recommendation or students search based on their own needs.

2.1 Supported Material and Media Types

After investigation, the proposed KM platform supports a variety of material types that include documents, images, flash objects, LMS packages, web pages, hyperlinks, video and audio materials. Brief summaries are given in Table 1. All learning materials are uploaded to the platform as individual LOs, source file will be provided when available. It is recommended that each LO shall be able to finish within 15- 20 minutes the optimal study time for a small topic. Student's motivation can be maintained when the study time for each learning material is brief and short. When the students required finishing the task with a long time, they may not have interest to start working on it. Their interest and concentration will drop dramatically beyond 20 minutes.

Table 1. Potential supported material types file formats and content nature.

Material Type	Content Nature	Supported File Format
Documents	Lesson plans, Lecture slides, lecture notes, handouts, worksheet, exercises, questionnaires	txt, pdf, doc, xls, ppt, pps, docx, xlsx, pptx, ppsx
Images	Photo, images, diagram, illustrations etc	png, jpg, gif
Flash	Interactive flash activities	swf, fla
LMS package	Standard supported by LMS	SCORM, AICC
Web page	A collection of self contained web pages with its relevant content	zip
Video	Lecture video, guest lecture, student presentation, recap video	avi, wmv, mov, flv, mpeg, mpg, m4v, mp4, 3gp, 3gpp, vob
audio	Audio recording, sample audio, listening, music, sound fx ... etc.	mp3, ogg, oga, wma, m4a
URL	OER, third parties resources	http address

3 Proposed KM System Framework

Most of the KM platforms support informative file type that preserve or retrieve information in textual format such as word document, user manuals, steps and procedures, rarely presented in multimedia formats. The ideal KM platform shall support rich-multimedia formats to cater diverse teaching and learning materials types. Also, the user interface should be simple and easy to navigate. Not all of the users have high ICT skills. The retrieval mechanism should be simple and straight forward as well. The proposed KM platform address seven major areas including resources taxonomy, searching and filtering, grouping, sharing and collaboration, online support, copyrights and resources ownership, and access control.

3.1 Resources Taxonomy for LOs Storage

A classification with 24 categories was defined based on the subject areas offered by the School included Arts and humanities, Aviation, Business, Chinese, Chinese Medicine, Communication Studies, Culture and Media, Design, Engineering, English, Health & Recreation, Information Technology, Japanese, Law, Logistics & Transport, Mathematics, Music, Others, Philosophy, Real Estate, Science & Technology, Social Sciences, Staff Development, Tourism & Hospitality. LOs are uploaded to the KM platform based on its related categories. Additional keywords search function will also provide.

3.2 Searching and Filtering for LOs Retrieval

Information retrieval is addressed by three methods keyword search, filtering options and tags cloud. Teacher can input their preferred keywords, title name or topics to retrieve the available related LOs. To refine a search filtering function could be helpful to retrieve relevant learning resources. There are six filtering options provided that include ‘all’, ‘latest’, ‘featured’, ‘most viewed’, ‘rating’ and ‘comments’. On the other hand, users do not have an exact keyword for searching. They can also select the frequently access keywords displayed on the platform ‘tags cloud’ for inspiration.

3.3 Grouping

The ‘Grouping’ function allows teachers to create private tutor group for materials sharing or private discussion among staff and teachers only. In a sense, teacher can share their own resources within the tutor group. Moreover, teachers can use the ‘Album’ function to create their own collection of learning materials and share it to all platform users. Hence, other teachers can select and publish suitable materials to students. Students’ study group with common interest can also be facilitate and encourage communications and collaboration among peer students.

3.4 Sharing and Collaboration

One-click sharing to the School’s Learning Management System (LMS) is provided to facilitate instant connection between the two School platforms and hassle free sharing.

Selected learning materials can be directly embedded to the HKU SPACE self-developed LMS – SOUL 2.0. Simple and direct sharing mechanism will encourage collaboration and use of the KM platform. In this stage, sharing to public social media network function is not allowed due to the School's teaching and learning copyrights. Copyrights clearing for open materials will be required based of its license terms. Collaboration supported by resource's comment function, platform users can post their comments. Teachers and students can post their own comments immediately, reflection or additional resources information related to specify resource.

3.5 Online Support

Just-in-time online supports are provided by user guides, manuals, video tutorials and Frequently Asked Questions (FAQ). User guide and manuals provides detail information refer to the functionalities available on the platform. For users with lesser ICT skills, a step-by-step video demonstrate with and detail procedures for general functions such as upload or materials retrieval has been provided. Or, any other related technical questions for the platform. FAQ included commonly asked questions for teacher or student on the use of the platform.

3.6 Copyrights and Resources Ownership

Copyrights statement, materials ownership, redistribution rights and clearing statement should be clearly stated in the platform. According to the School policy's, materials developed by full-time teachers and commissioned content writer are solely own by the Schools. This means all teachers have the rights to use, modify or redistribute those materials within School for academic purposes. Details terms and conditions are based on The University of Hong Kong Libraries (2002) teaching and learning materials' copyrights.

At this stage, the KM platform is only available to teachers within the School. Hence, Open license might not be applicable to all materials. Open license would be applied with the resources owners' consent and redistribution terms based on the committed license. Atkins, Brown, & Hammond (2007) explained that Open Educational Resources (OER) are teaching, learning and research resources that reside in the public domain or have been released under an intellectual property license that permit their free use or re-purposing by others. For that reason, materials retrieved by OER or Creative Commons (2010) licenses can be shared to all users in the KM platform. It retains the license terms as its origin.

3.7 Access Control

The scope of the KM platform only supports the HKU SAPCE Community College teachers' and students' access in phrase one development. A HKU SPACE Central Authentication Service is applied for access control. Teachers and students do not need to login again for seamless multiple platforms integration. After evaluation the School's IT infrastructure capacity and the purpose of the platform, five user roles have been defined in the KM platform including platform administrator, programme administrator, teacher, student and guest roles. Platform administrator has the full

control to all materials available on the KM platform. Programme administrator has the control to all peer teachers. Student role has limited access to the platform, they are allowed to view resources, post in forum, post in Blog and rate learning materials. However, they are not allowed to upload or modify any materials on the platform. Guest account has restriction from all uploading or posting behavior to the platform. This user type only allows material browsing for OER.

4 Pilot Group Discussions and Common Concerns

During the development stage, teachers from English, Chinese and Science and Technology domains are invited to pilot group discussions. A KM platform demonstration has been conducted before the discussions started. The discussions covered topics area including user interface, supported media types, appropriateness of the classifications, functions available on the platform and teacher's point of view on copyright issues.

4.1 An Overview of the Platform

In general, all teachers thought the platform was simple, neat and easy to use with appropriate buttons and icons. The platform supported media types was adequate and some of the teachers suggested that we might limit down the format as the computer in the School's learning centre might not equip all of the latest software licenses. Teachers had no comment on the current classification, but asked about the capability to create sub-categories.

4.2 Abuse Control

Forum posting with coarse language or inappropriate content might be posted by students or malwares. In order to avoid this issue all users must login before they post a forum thread or comment on a resource. Students login the platform with their student accounts, hence they should responsible to their own postings and online behavior as an adult learner. Coarse language filter would be implemented to the platform to avoid malwares attack. Server monitoring program will be installed to have close tracking of abnormal behavioral. When abnormal behavioral was found, email and instant SMS by mobile will be sent to the server administrator immediately for investigation.

4.3 Students' Performance Tracking

Resource monitoring statistic will be helpful for teachers to identify materials or topic areas attains students' interest. Individual student performance tracking do not facilitated in KM platform. From a pedagogical perspective, a meaningful student performance tracking shall be associated with learning activities. The idea of a KM platform is for resources sharing and it would be open to everyone. The purpose for

this platform is resources sharing rather than focus on specific learning activities for evaluation. It is recommended that teacher shall make use of the School's LMS - SOUL 2.0 which has offered a comprehensive student performance record for evaluation purpose. As a result, they can have greatest benefits on collaboration between various learning platforms with different aims.

5 Conclusion

Alavi & Leidner (2001) mentioned knowledge management is complex and multi-faced. This project has proposed a new practice to teacher which is different to their practice in the past. Hence, it is expected that it will take some time to let teacher understand the idea and adopt the new practice. Pilot group has been initiated as pioneer to encourage teachers to adopt the platform with face-to-face pedagogical and technical support. Extensive promotions required to showcasing pilot projects plus hands-on trainings are helpful to broadcast the new practice and project idea.

The other way to encourage teacher to upload, modify or apply the platform's learning resources by substitute some of the lecturing hour to compensate active teachers could be considered. Referring to the focus group, classification with sub-categories would provide a precise taxonomy, to reflect or display the materials content. It would be useful when the platform has preserved large amount of resources. Searching functions would be enhanced with opt-out function by keywords to enhance the search performance.

Many of the world class famous Universities or institutes have released part of their formal courses to OER domain. For future development, the School could provide partial of the resources committed with OER licenses as trial courses for promotions and contribution to the community for lifelong learning through KM platform.

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