



Title	Strengthening students' reading comprehension ability (both Chinese and English) through developing children's literature equiz bank on the cloud
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STRENGTHENING STUDENTS' READING COMPREHENSION ABILITY (BOTH CHINESE AND ENGLISH) WITH CHILDREN'S LITERATURE E-QUIZ BANK ON THE CLOUD

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Abstract:

Reading proficiency is closely related to students' academic performance. The online e-quiz bank "Reading Battle" aims at enhancing students' reading interest and developing their reading habits. After reading children's literature borrowed from school libraries, students may take quizzes on the e-quiz bank to evaluate their reading comprehension ability. First launched in Hong Kong, the e-quiz bank assists students in enhancing their reading interest and abilities by motivating, scaffolding, and monitoring strategies. This article discusses the project's features and evaluates their effectiveness in achieving the project goals. Preliminary findings of the project shows that the e-quiz bank offer participants a fun, interactive, and personalized experience in improving their reading comprehension abilities and is effective in fostering a habit of reading.

Keywords: *Reading interest, reading habit, reading comprehension ability, primary education, e-quiz bank*

1. Introduction

The development of reading proficiency is of vital importance to primary school students, as suboptimal reading proficiency will hinder students' ability in reading to learn, and in the long run, impede their lifelong learning potential (Schoenbach, Greenleaf, & Murphy, 2012). It has been shown that proficient and frequent readers tend to perform well academically (Baker, L. and Wigfield, A. 1999; Loh & Tse, 2009; Applegate & Applegate, 2010). It is therefore crucial to strengthen reading comprehension skills.

Asking students to merely keep records of the books that they have read is not an adequate measure to ensure students have actually read them, or have successfully grasped the meaning of the books. Advances in ICT helps tackle the problem. Taking advantage of the high availability of computer facilities and mobile technology nowadays, teaching and learning, as well as assessment can be carried out on the cloud (López, 2010). Students can demonstrate their level of understanding of a book through attempting post-reading questions online (Sadaghiani, 2012). These computer-graded quizzes save teachers' much time on face-to-face evaluations of comprehension abilities, and grading of reading reports. Teachers can monitor students' development of reading comprehension abilities at ease (Richards-Babb, Drelick, Henry, & Robertson-Honecker, 2011). With the above benefits in mind, an interactive e-quiz cloud service with an award scheme as added incentive is developed to help engage students in reading, and quantitatively gauge their level of understanding.

2. Literature review

Reading schemes for Hong Kong primary school students

Hong Kong is the city where the project is first launched. Although Hong Kong primary school students performed well in international reading tests (PIRLS 2006 – ranking 2nd among 45 participating countries / regions [Baer et al., 2007]; PIRLS 2001 – ranking 14th among 35 participating countries / regions [Ogle et al., 2003]), it is not easy for students to remain "competitive" since other regions, for example Singapore and Taiwan, have put in a lot of effort in enhancing reading ability of their students. To safeguard Hong Kong students from lagging behind without overburdening them with a tremendous workload, it is important to come up with effective

and fun methods to develop their reading ability.

There are no doubt a number of reading programmes available to Hong Kong primary schools students. The then Education Department has started implementing Extensive Reading schemes in 1995 to enhance reading proficiency for upper primary school students (Education Department, 1999). The schemes were then extended to cover Primary 1 to Secondary 5 since 1997 (EDB, 2007). Students may read extracurricular books during class time, and complete the corresponding activity cards (Education Department, 1999). The activity cards were developed by the Education Department in the early years, however, such efforts were not sustained after 1999. The schemes are still running as of today, which mainly involve an annual school subsidy to replenish the library collection.

There are also a number of local as well as overseas reading schemes. Local reading programmes for example 中文百達通¹ and 每日一篇網上閱讀計劃², require students to read short passages online with post-reading questions. Students become accustomed to short readings and post-reading questions through these daily drills. The Oxford Reading Tree, developed overseas, is a mature English reading programmes product, yet it covers titles from only one publisher. Another scheme developed overseas is the Battle of the Books, which supports a limited number of books, only 12 books each year for local schools (Hong Kong Battle of the Books, 2012). The narrow book list may pose limitations to the interest of the vast student population in Hong Kong.

The need to develop a quiz database to supplement children's literature

The above-mentioned e-reading schemes that involve reading short passages online are convenient to practice daily, as compared to reading the whole book. However, reading of books for literary experience cannot be ignored. It is important to instill a love of books in children. Besides training students to look for information in a passage, students should also read for literary experience. A fruitful literary experience involves the sense of immersed in book's virtual environment and reaching a state of flow when drawn deeply into a story line (Schaeffer & Antonioli, 2013). During this process, students weave an intricate network of information into a meaningful story line, and utilize an assortment of cognitive skills unconsciously (Nikolajeva, 2010). These may include attending to the text type structure, activating prior knowledge, making inferences about character motivation, being sensitive to the situation the character encounters, and how the character responds to challenges (Hoyt, Davis, Olson, & Boswell, 2011). The reading of books can be a motivating and engaging journey, but teachers cannot tell the level of engagement unless students produce some output after reading. Quizzes are effective since scaffolded questioning has been found to significantly improve students' reading comprehension (Chen et al., 2011), and e-quizzes to supporting learning has been successfully implemented in the study of Souza and Bingham (2006). Hence, the project aims to develop a quiz database to scaffold students' reading experience, and to help evaluate and automate the monitoring of students' comprehension level.

Scaffolded questioning

Proposed by Graves and Graves (2003), the "Scaffolded Reading Experience" (SRE) is an instructional framework for reading. It is a flexible lesson plan designed for a specific learning situation, consisting of a set of activities before, during, and after reading specifically planned to help students to be proficient readers. Pre-reading activities may include pre-questioning, predicting, and building background knowledge. During-reading activities may take the form of silent reading, reading to students or oral reading by students. Post-reading activities include questioning, discussion, as well as writing. Different combinations of such practices can be adopted by teachers, depending on

¹ See <http://web2.chinese100.hk/index.php> for details of the reading scheme.

² See <http://www.prof-ho.com/reading/> for details of the reading scheme.

the needs of students, the reading selection, and their purpose (Clark & Graves, 2005). Scaffolded questioning significantly improves students' level of reading comprehension (Chen et al, 2011).

3. Project implementation

The project was launched with the belief that students who read well will excel academically (Loh & Tse, 2009), so it is crucial to enhance students' reading ability. Online quizzes were developed to scaffold students' reading experience. By gamifying the process of reading and subsequent reading comprehension exercise, Reading Battle aims to provide students with a fun, interactive, and personalized learning experience. The e-quiz platform also serves the purpose of monitoring students' level of reading comprehension ability. The ultimate goal is to enhance students' interest in reading and to foster a good reading habit.

Nine local primary schools participated in the research project in the academic year 2013-2014. Participants include students enrolled in primary 3, 4, and 5, with the support of teachers and teacher-librarians. The quiz database development began in May 2013. The system was launched for 1st round implementation from February to June 2014. Throughout this period, the project team conducted school visits for system support, promotion and coordination with schools. Data was regularly collected for project evaluation throughout the implementation periods. Evaluation parameters include the following:

- Benchmark and compare students' reading comprehension ability before and after intervention
- Collect questionnaires from teachers and students
- Compare students' reading interest through perceptual surveys
- Interview 5-10 students and 2 teachers after intervention
- Compare library books borrowing rate before and after intervention

For the purpose of this article, students, teachers and parents from 2 participating schools were interviewed in order to better understand their perception on the use of the e-quiz bank. The features of the e-quiz bank and preliminary findings of the project are presented in the section "Research findings" below.

The online e-quiz bank

Reading comprehension quizzes were developed and uploaded to an online platform named "Reading Battle". The e-quiz bank at the moment covered around 200 titles. The quizzes can be accessed through a search on title, author, book ID or ISBN, or they can be selected from archives that are categorized by genres. Once a book is selected, students enter the quiz interface. Each quiz consists of 10 multiple-choice questions randomly drawn from a pool of no less than 30 questions. Around 6,000 questions have been developed so far. The questions were developed based on a framework adapted from PIRLS (Mullis et al., 2009) on the processes of comprehension as listed below:

- Focus on and retrieve explicitly stated information
- Make straightforward inferences
- Interpret and integrate ideas and information
- Examine and evaluate content, language, and textual elements

The motivate-scaffold-monitor framework

Acquisition of reading comprehension skills demands great effort. Research has been conducted widely to investigate the use of instructional practices in enhancing development of reading comprehension skills (Swan, 2003; Guthrie et al., 2004; Guthrie et al., 2006; Tse, Lam, Lam, Loh,

and Westwood, 2007). Graves and Graves (1995) proposed three types of reading activities – pre-reading, during-reading, and post-reading – to build a scaffolded reading experience to enhance students’ reading comprehension. This project utilizes both during-reading and post-reading questions as scaffolding support. Motivation and engagement contribute to reading comprehension (Guthrie et. al, 2004). Following the principle, the fun and interactive Comprehension Engage accessible on mobile platforms add motivation and engagement to this project, while rewards in the form of e-badges add to motivation, providing incentives for students to read prolifically.

The rules of the quiz (or called “battle” in the system) are explained at the beginning of the battle: students are allowed two attempts for each question. The limit on the number of attempts prevents students from treating Reading Battle like a regular game, or take the battle without reading the book, a possible scenario if students are given unlimited tries in answering the questions. The second chance provides students with the opportunity to seek the true answer after an initial failure, aided by instant feedback and prompts. Guiding hints may be prompted if a student makes a wrong attempt. Students are invited to make one more attempt if they chose a wrong answer the first time. On the more difficult questions, an explanation will be displayed when no more attempts are allowed on the question. Students can verify their understanding immediately.

Students earn points every time they correctly answer a question, the score they receive in the battle determines the type of e-badges they receive. To encourage students to challenge themselves continuously, there is a leaderboard ranking the top one hundred students on the accumulated scores. In addition, there are various competitions on the class, grade, and school levels. The computer-graded quiz also helps teachers to monitor students’ progress in reading comprehension abilities. Figure 1 below illustrates the motivate-scaffold-monitor framework of the project.

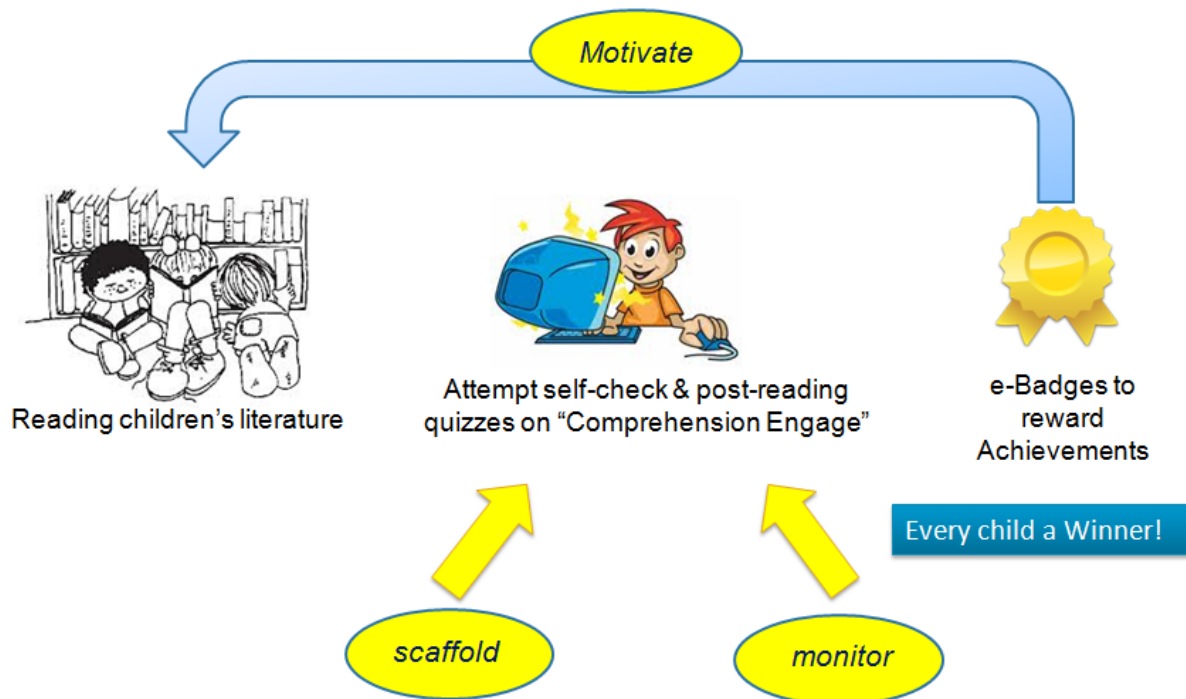


Figure 1. The motivate-scaffold-monitor framework adopted in the project

4.Results

Effectiveness of providing motivation

Competitions have been shown to induce achievement motivation (Lam, Yim, Law, & Cheung, 2004). The scoring system brings extrinsic motivation for students to engage in the scheme. Students

earn points every time they give correct answers in a quiz, with more points awarded for challenging questions. Digital badges of different levels were awarded to students as visual representations of achievements based on the number of points they have earned. In order to promote student participation and make every student a winner, these digital badges were easily attainable. To motivate students to challenge themselves against their classmates, periodic award schemes at class, grade, and school level were organized, with local school contests and international contests being planned. Other school-based awards include participation and reading performance on both individual and class levels.

The motivation strategies were effective, as reflected in interviews with all parties of stakeholders. The project was effective in fostering students' interest in reading. Students were eager to read more books. During the months of March and April 2014, an average of over a hundred books were borrowed from the library per week for school 1. Being able to read books chosen according to their interest raises their level of motivation, and in turn perform better in the follow-up activities (Bouchamma, Poulin, Basque, & Ruel, 2013). The autonomy to select books they liked to read also contributed to their interest. It is essential for students to be interested in the books they read, and that the books are their personal choice instead of readings imposed by teachers. Students also believed that taking quizzes helped them understand the books and widen their vocabulary. Parents shared the same view, adding that the questions draw children's attention to the aspects they have neglected, which helped them thoroughly understand the books. Also, the colourful system interface, cartoon figures, and the interactive design has made the Reading Battle "attractive", "exciting" and "fun", as described by students in school 1. For these reasons, they enjoyed participating in Reading Battle. Parents remarked that having an attractive name "Reading Battle" was important as it encouraged children to know more about the e-quiz platform and visit the website. The enjoyment students obtained in completing the quizzes, as well as the satisfaction of gaining new knowledge served as the main sources of intrinsic motivation.

As for extrinsic motivation, teachers observed that the award schemes provided strong incentives for students to read. They reasoned that children liked challenges and were competitive in nature. They loved to compare themselves to their peers. When students visited the leaderboard showing individual scores and scores of fellow students, they compared themselves to others and were motivated to score higher marks. Teachers were also surprised at how strongly the e-badges could enhance students' motivation and confidence in reading and challenging themselves with more reading and more quizzes. Teachers were optimistic that the success in developing students' interest in reading would benefit regular subjects, for example, students might be interested in searching for library books related to the topics discussed in English lessons, and deepen their understanding on the topics.

Effectiveness of scaffolding

The scaffolding support design was welcomed by students as well as teachers. In general, students considered the quizzes a helpful resource for widening their vocabulary, and for consolidating their understanding of the texts. Interviews with students reveal that there are varying levels of reading abilities among them – the time spent on reading a book ranges from an hour to over three hours. The satisfaction of completing the quizzes contributed to student enjoyment during their participation. Teachers also approved of the instant feedback. They contrasted the online quiz system with traditional worksheets distributed to students, and found the immediate response from the system effective, as students could view their results right after choosing an answer, and were given a chance to try again with a hint if they answered wrongly. The same teacher observed that students were more enthusiastic about doing online quizzes than filling in worksheets.

Launched for a few months, the project has kicked off with a good start. Interviews with students, teachers, and parents yield preliminary findings that the Reading Battle e-quiz platform, following principles of the motivate-scaffold-monitor framework, offered participants an engaging, interactive, and personalized learning experience. Students showed interest and were motivated to take quizzes on the platform, and perceived the quizzes helpful in improving their reading abilities. Keeping in touch

closely with participating schools, the project team will continue their effort in scaffolding and motivating students, and evaluate student's progress in reading interest, reading habit as well as reading comprehension ability.

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