Article

My-Bookstore: Using Information Technology to Support Children's Classroom Reading and Book Recommendation

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Abstract

This paper describes a learning system, named My-Bookstore, where students *buy* (make records of) books (paper books) which they have read, and then *sell* (recommend) the books they like to others. This system is designed to encourage elementary students' classroom reading and book recommendation. The long-term influence of the My-Bookstore system on students' reading in terms of word usage and perception among 204 first-grade students who had used the system for three semesters was investigated. The results indicated that (a) the students borrowed a large number of books and were willing to recommend their favorite books in My-Bookstore; (b) most of the students felt that the overall use experience of the My-Bookstore was attractive, and the goal of the game was relevant to their reading. They also had confidence in recommending books and felt satisfaction when other students accepted their recommendations.

Keywords

extensive reading, modeled sustained silent reading, book recommendation, My-Bookstore

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Introduction

As a consequence of the fact that reading plays a critical role in literacy, the Taiwan government has promoted a number of large-scale plans encouraging reading activities for more than 10 years. These activities include the purchasing of numerous books for extracurricular reading and establishing reward rules for reading certification as a promotion incentive. However, according to the Progress in International Reading Literacy Study (PIRLS) issued in 2006 (Mullis, Martin, Kennedy, & Foy, 2007), Taiwanese students have a lower interest in reading than students in neighboring countries. This lowered ranking for Taiwanese students seems to indicate that merely purchasing a large number of books does not help students develop an interest in or the habit of reading. There are two possible reasons that might explain this result. The first one is related to the students' *reading autonomy*. Students have few opportunities to choose the books they want to read, most often having to read the books assigned by teachers. In addition, they are often asked to write a summary or book report afterwards. Because the students have to do a number of assigned tasks that are not decided by themselves, their interest and enthusiasm for reading are damaged. The other reason is related to *classroom pedagogy*. Compared with neighboring countries, such as Hong Kong, the pedagogy adopted by Taiwan's teachers emphasizes intensive mastery of fewer materials. To enhance their reading comprehension, students are taught to memorize a large number of words and phrases, instead of being asked to read a wide variety of books. Thus, although most students have good comprehension of the contents of the textbooks and even obtain high scores on exams, but they still lack interest in reading.

Recently, modeled sustained silent reading (MSSR), which combines the teacher acting as a model (Chien, Chen, Ko, Ku, & Chan, 2011; McCracken & McCracken, 1978) with silent reading by the students (Gardiner, 2005; McCracken, 1971; Pilgreen, 2000), has become one significant classroom reading activity aimed at overcoming the abovementioned difficulties. The first part focuses on the teachers' modeling because adult modeling can have great impact on student learning (McCracken & McCracken, 1978). In other words, everyone in the classroom must read, including the teacher, who reads in front of the class. The latter emphasizes quiet and continuous reading in the classroom for a long period of time (McCracken, 1971). In MSSR, interruption must be avoided lest students lose comprehension or interest (Atwell, 2007; Gardiner, 2005). Students freely choose the books they want to read and then exchange them when they lose interest. MSSR provides students with opportunities to explore what they are really interested in and to have an engaging and enjoyable reading experience. They make their own decisions and take responsibility for their own reading, which might be helpful to stimulate their interest, and even encourage them to become lifelong readers in the future.

The promotion of MSSR in classroom faces two challenges (Ye et al., 2012), although it offers many positive benefits. The first challenge is related to the *complexity of book management*. Specifically, the adoption of MSSR necessitates the acquisition, organization, borrowing, and return of the books. Although the classroom library is smaller in scale than school library, the additional workload might reduce the adoption of MSSR. The second challenge is related to the *complexity of integration of multiple follow-up activities*. Such activities usually involve voluntary sharing and discussion of the books, such as book talks (Pilgreen, 2000), storytelling, and dramas. Because these follow-up activities are essentially different from traditional book reports, they can play a significant role in sustaining the students' interest and enthusiasm in reading (Gardiner, 2005; Pilgreen, 2000), as well as the development of a positive attitude toward reading (Atwell, 2007). Nevertheless, the integration of multiple follow-up activities might be complex in the classroom.

To overcome the two challenges, this study developed a My-Bookstore system. On the one hand, the My-Bookstore supports the management of the classroom library. With computers, the My-Bookstore can help teachers reduce the burden of the routine of borrowing and returning books. In addition, it is easy to collect and analyze the students' reading portfolios, giving the students the opportunity to be aware of what they have or have not read, as a reference for choosing their next books. On the other hand, the My-Bookstore supports the connection between MSSR and follow-up activities to facilitate the building of an online reading community, where students can share, discuss, and recommend books. In short, this study aims to overcome the two practical challenges to MSSR in Taiwan through developing and evaluating the My-Bookstore system. In this way, we can gain a deeper understanding of the influences of the system and further reflect on how the two challenges can be alleviated. More specifically, the research question dealt with in this study is related to the influence of the My-Bookstore system on student reading, which can be further divided into two subquestions in terms of usage and affective aspects:

1. What are students' usages of the My-Bookstore system in terms of book borrowing and recommendation?
2. What are students' literacy performances with the My-Bookstore system?
3. What are students' perceptions of using the My-Bookstore system?

Design Principles

Information Visualization: Bookstore as Open Student Model

This first design principle is related to visualization of information in the student portfolios, a purposeful collection of student work that serves as a window into the student's mind, helping them to understand their efforts, progress, and

achievements (Chang & Chen, 1998; Paulson, Paulson, & Meyer, 1991). More specifically, the aim is to concretize the learning portfolios so that students can become more aware of their learning status and further improve their learning. From a broader perspective, the visualization of students' portfolios is related to the concept of open student model, opening what students have learned to the students themselves and allowing them to observe, edit, or negotiate with the educational system as well as interact with learning peers (Bull, 2004; Bull, Gardner, Ahmad, Ting, & Clarke, 2009; Bull & Kay, 2007; Chen, Deng, Chou, & Chan, 2007; Vélez, Fabregat, Bull, & Baldiris, 2009). Such *visible* and *open* model benefits students in more ways. For example, the open student model serves as a *mirror* so that students have more opportunities to reflect on what they have learned or have not yet mastered (Bull, 2004; Chen et al., 2007; Vélez et al., 2009), which further enhances their awareness of performance. Thus, in this system, a bookstore is chosen as both the actual and metaphoric representation format of open student models. A bookstore is both a structured place for book storage and access as well as an unstructured open environment for reader choice, reflection on preferences and needs.

Learning Community: Every Student Runs a Bookstore

The second design principle is related to classroom reading. The goal is to promote a reading atmosphere for the whole class. The classroom is a social arena, where a student's concepts, beliefs, and behaviors are strongly influenced by their classmates (Alsop & Hicks, 2013). For instance, if a student finds that reading is interesting and meaningful, his/her reading behavior and attitude may be copied by other classmates, subsequently spreading out to the whole class to create a good reading atmosphere. Thus, in this study, every student runs a bookstore, and all of the bookstores together become a bookstore street or area. In a sense, this concept is similar to the group open student model (Bull, 2004; Chen et al., 2007). Students can not only understand their learning status but also observe their peers' status. The group open student model offers students different perspectives (e.g., self and group) on their learning status, and this context is helpful to their social interaction, based on the comparison of different students, especially for book recommendation.

Social Interaction: Recommendation as Selling

The third design principle is how to facilitate students' book recommendation to each other. The objective is to create a joyful and positive book recommendation cycle. The system allows students to play the role of manager in running their My-Bookstores. They are encouraged to learn how to be a successful and responsible manager. To do this, they must first be a good reader. In other words, being a good reader is equivalent to taking good care of their bookstore

(i.e., the representation of what they read). The third principle further makes book recommendation equivalent to *selling* a book in the My-Bookstore. A good manger not only needs to read a lot of books but also choose appropriate books to recommend to other students. In this way, a positive book recommendation cycle can be formed.

My-Bookstore System

To realize the three aforementioned features, the My-Bookstore system implements four functions: *decorating*, *stocking*, *selling*, and *profiting*. First of all, decorating allows students to create a unique place bookstore for collecting concretized portfolios. Stocking, selling, and profiting are the major functions of the bookstore. The profiting function offers an incentive model connected to other functions, forming a positive cycle: decorating-stocking-selling (see Figure 1). The student's My-Bookstore thus serves as the stage for showing off their books as well as performing the selling functions.

Decorating

Decorating refers to the process of making the My-Bookstore look more attractive by putting up decorations. Decorating allows students to create their own unique place for collecting concretized portfolios so that their *ownership of the space* can be enhanced. The ownership of the space involves the social presence of the students, which further influences the quality of how students project themselves into the environment, both socially and emotionally (Cameron & Anderson, 2006). Thus, creating unique My-Bookstores, students can become more deeply engaged in the role-play of the bookstore owner. This also enhances the sense of ownership to their own version of My-Bookstores, which can further motivate students to participate in the activities within the bookstore.

Decorating includes altering the *outdoor appearance* and *indoor placement*. My-Bookstore offers students the functions to adorn their bookstores by buying a series of different objects, such as trees, flowers, grass, and ponds. Figure 2 illustrates a My-Bookstore which is adorned with a pond and several trees. Regarding the indoor placement, two bookcases are highlighted on which students can put their favorite books to sell. One bookcase, the *historical bookcase*, shows all of the books the students have read. Visitors to the My-Bookstore can see the list of books the bookstore owner has read. My-Bookstore also shows the number of books in the bookstore, which can be regarded as a reputational system to encourage student reading. In the other bookcase, the *best selling bookcase*, shows the five books that the student likes the most and wants to recommend. Thus, each bookstore owner needs to choose five books from the historical bookcase to put into the best selling bookcase, implying that these are books worth reading.

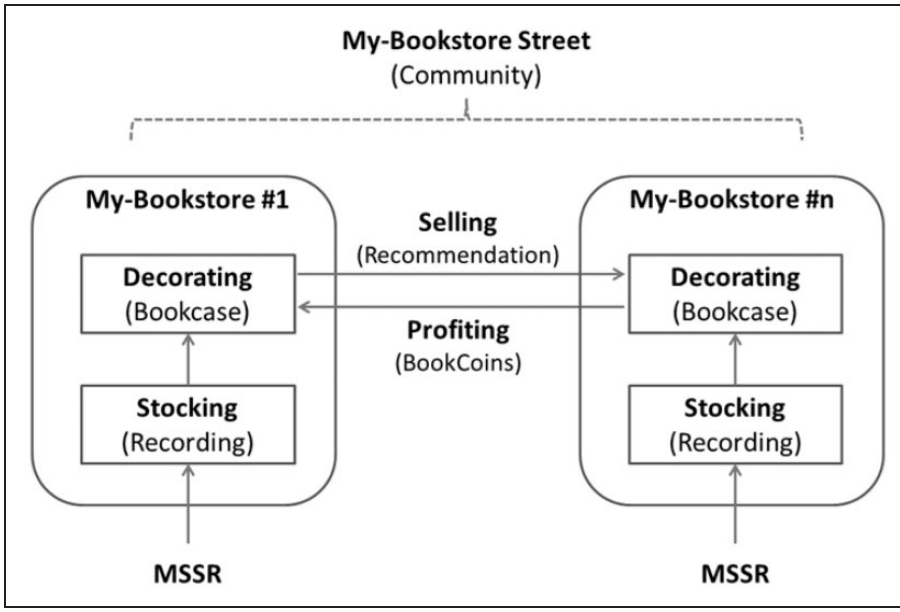

Figure 1. Conceptual diagram of My-Bookstore. MSSR = modeled sustained silent reading.

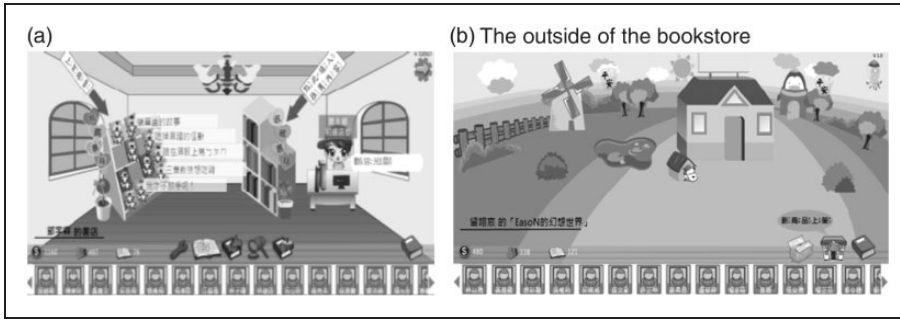

Figure 2. Screenshots of the management functions.

Stocking

Stocking means recording which actual books the students have read so that these can be shown in the form of virtual books. Specifically, after a student borrows and reads a book from the classroom library, which contains several real bookcases filled with books, they are asked to record the book and the system automatically adds it to the historical bookcase. In other words, stocking

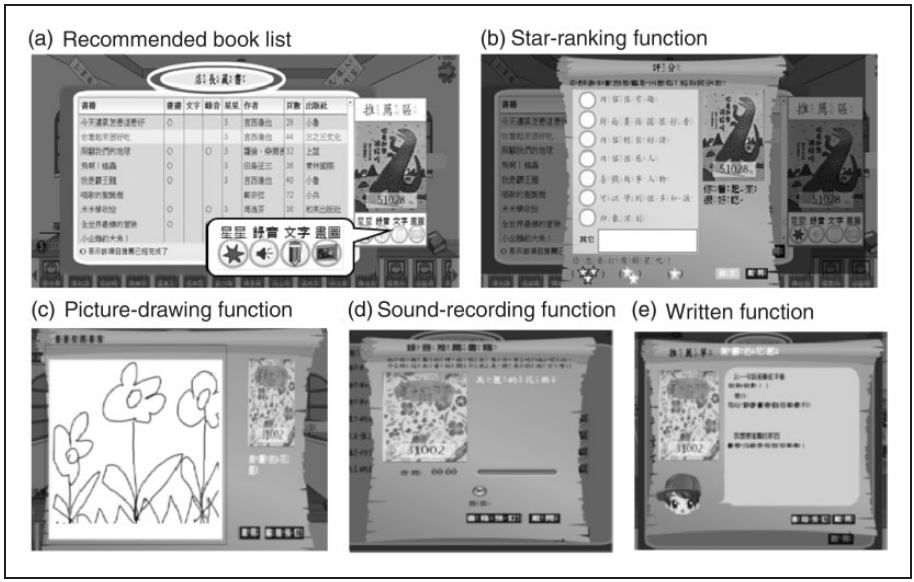

Figure 3. The four recommendation functions in My-Bookstore.

works acts a bridge that connects the reading activity with the self-learning management system. Through stocking, students can further produce, accumulate, and manipulate their learning wealth.

The stocking function is supported by a book recording system, by which not only information about the book is recorded but also the student's feedback and reading preferences can be collected. This function is implemented through asking the student several questions, such as '*Is this book easy to read?*' '*How do you like this book?*' and '*Would you like to read this book again in the future?*' The questions emphasize whether the students liked the book and why they chose it, as opposed to asking them to give a summary of the book.

Selling

Selling refers to recommending books to other students. The My-Bookstore serves as a stage for showing personal performance to the class. Four recommendation functions are offered, as illustrated in Figure 3. The first recommendation method is the *star-ranking recommendation*. A student gives the book a ranking (from one to three) to show how much they liked it. This ranking recommendation is offered because it is an easy and convenient way for elementary school students to express their comments or opinions. In addition, a student can also offer a reason why they give such a ranking by choosing one of several predefined reasons.

In addition to the star-ranking recommendation, two other functions are provided: the *sound-recording* function and the *picture-drawing* function. With the first, a voice recording service allows students to record their thoughts regarding the book, and the voice file is made available later for other students to listen to. This recommendation function is offered because it allows students to express their opinions regardless of any limitation in terms of written language and vocabulary of these young students. The sound-recording function can release them from such limitations, allowing them to use a more natural and familiar means of expression—oral language. Students are also able to record and modify their comments repeatedly so that their skill of expression can be enhanced through practice. Likewise, a student can also use the picture-drawing function to recommend their books. This function allows students to draw a picture related to some part of the book that has impressed them or to illustrate an interesting story. Because drawing is a more natural way for young students to express their thoughts and feelings, this function is regarded as a way to generalize some basic ideas in order to incorporate them with other recommendation styles. For example, a picture could be illustrated with the elaboration of sound-recordings.

The final function is the *written recommendation*, which encourages students to put their feelings or comments in writing. Three levels of written recommendations (from easy to complicated) are offered. The first level is one-sentence writing, in which students only have to write down a simple sentence to express an overall impression of a book. The second level is one-paragraph summary writing, which allows students to describe the content of a book in detail. The final level is related to critical writing, where students apply their inherent knowledge and write down meaningful commentaries about what they have read.

In short, although four recommendation functions are offered, students can freely choose one of the four ways to add their comments, and then open this information to other students in the My-Bookstore. In other words, the bookstore is a place to show the bookstore owner's reading portfolios, serving as an open model with the student's book choice, reading comments, and reflection. In addition, the bookstore is also an open environment for sharing, discussion, and recommendation. Other students can go to the owner's bookstore and access this information to know what the owner read, think, feel, and recommend.

Profiting

Profiting means that bookstore owners can earn Book-Coins when they successfully recommended their books to other classmates, excluding the bookstore owners themselves. More specifically, students visit the bookstore to see what books the bookstore owner wants to recommend. If they find a book interesting, they can reserve it. Then, they can pick up the reserved book from the

classroom library. Meanwhile, the bookstore owner who has made the recommendation can earn Book-Coins from a successful sale (i.e., recommendation). In this way, the recommendation can be linked to bookstore management, which, in turn, encourages students to run their bookstore efficiently.

In addition to the Book-Coins, a reputation system according to the number of books the bookstore owner has recommended is also incorporated into the incentive model. For example, a bookstore owner is assigned the status of beginner when just starting to run their bookstore. Gradually, as the student reads and stocks more books, and then sells them, they will be promoted to a higher achievement level (there are a total of five levels: beginner, novice, assistant, experienced, professional). These grades can enhance the students' sense of achievement while sharing their enjoyable reading experiences with others.

Method

Participants

To answer the research questions, a within-subject experiment lasting 18 months (i.e., three semesters) was conducted. The participants were students at a suburban elementary school, where approximately one third of the students come from families with a low/middle level socioeconomic status. This school was selected to show that the lessons learned from this case study can be applicable to other schools with similar diverse student populations. The participants were 204 first-grade (aged 7 to 8) elementary students. Those 204 students participated in this study for three semesters (i.e., 1.5 years). In the first and second semester, the students were divided into seven classes (with seven different teachers). In the third semester, except for a few students who had transferred to other schools, the students were divided into eight classes (with eight teachers), based on the school policy. The ratio of male to female during the three semesters was close to 1:1. The details of the number of students in the different classes are shown in Table 1.

Setting

In the first semester, the teachers started to conduct 40-minute MSSR sessions without the support of the My-Bookstore system. Every morning the teachers acted as a role model to demonstrate silent reading in front of the classroom. At the beginning of the session, students were allowed to choose one to five books they liked, and then took these books to their seats to read. After reading the books, they made records of the books they had borrowed with paper and pencil.

In the second and third semesters, the My-Bookstore system was introduced to the classroom. Like the first semester, teachers demonstrated silent reading every morning. The students also chose books to read at their seats. However,

Table 1. Number of Students in Different Classes for the Three Semesters.

	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Total
First	31 (17:14)	29 (15:14)	29 (16:13)	29 (16:13)	28 (15:13)	29 (16:13)	29 (15:14)	N/A	204 (110:94)
Second	31 (17:14)	29 (15:14)	29 (16:13)	29 (16:13)	28 (15:13)	29 (16:13)	29 (15:14)	N/A	204 (110:94)
Third	26 (15:11)	27 (14:13)	27 (13:14)	25 (15:10)	27 (14:13)	26 (13:13)	25 (13:12)	20 (10:10)	203 (107:96)

Table 2. Context of the Study.

Semester	Intervention
First semester	MSSR
Second semester	MSSR + My-Bookstore
Third semester	MSSR + My-Bookstore

Note. MSSR = modeled sustained silent reading.

unlike the first semester, each student had a tablet pc to run their My-Bookstore, including making records of the books they read, and recommending ones they liked to others. In other words, the major difference between the former and latter semesters was the support of the My-Bookstore system, as shown in Table 2.

Data collection

Paper record and system log. In the first semester, each student's reading history was recorded with pencil and paper. Students were asked to write down specific items of information about each book they read at the end of each morning. In the second and third semesters, they made records on touch-screen tablet computers. In addition, the My-Bookstore usage logs were collected for further analysis. The collected data included the timestamps of specific behaviors in My-Bookstore, such as making recommendation, accepting other's recommendation, and adorning their bookstores.

Literacy performance. The literacy performance test consisted of two parts. The first part is *The Test of Reading Comprehension* (TRC; Chang & Yang, 2004), which measures first-grade student reading proficiency. The test contains 17 multiple-choice questions that require students to demonstrate different levels of reading comprehension: literal comprehension, proposition assembly,

sentence comprehension, and short passage comprehension. The second test is *The Chinese Peabody Picture Vocabulary Test-Revised* (CPPVT-R; Lu & Liu, 1994), which is used to measure the student's receptive vocabulary knowledge at both pre- and posttest stages. For each testing item, the child was asked to select one of four pictures that would best correspond to the vocabulary word orally presented by the experimenter.

Perception questionnaire. The fact that students' motivational status might vary based on different levels of perception, willingness, or confidence is taken into consideration. We regard motivational status as a critical indicator of students' perception. A motivational questionnaire similar to that developed by Dempsey, Rasmussen, Haynes, and Casey (1997) was used to collect information pertaining to four dimensions: attention, relevance, confidence, and satisfaction. However, as the original questionnaire was developed for college students, not all of the items were suitable for the sample in this study—elementary school students. In addition, the questionnaire had too many items ($N = 36$) for elementary school students. Thus, we systematically eliminated items so that the simplified version contained 12 items (each dimension retained three items). Each of these items was measured using a 5-point Likert scale, from *strongly disagree, disagree, neutral, agree*, to *strongly agree*. The simplified questionnaire had an intermediate reliability (Cronbach $\alpha = .723$).

Procedure

The data collection procedure is described as below. (a) During the first semester, students were asked to record the books they borrowed on pencil and paper. In addition, the literacy performance test was conducted as pretest. (b) At the beginning of the second semester, the My-Bookstore system was introduced. Then, the students participated in the MSSR sessions with the My-Bookstore system for one semester. (c) At the end of the second semester, the literacy performance test was conducted as posttest. In addition, the perception questionnaire was used to collect students' perceptions related to system usage. (d) The students continued to participate in the MSSR sessions and used the My-Bookstore system in the third semester.

Data Analysis

Three data analysis approaches are used in this study. First, a paired samples t test, which is suitable for identifying significant differences in one independent group, was applied to conduct data analysis. A significance level of $p < .05$ was adopted in this study. To further realize the quality of writing recommendation status, which is closely related to students' literacy performance, the contents of the written recommendations in My-Bookstore were analyzed by *Chinese*

Knowledge Information Processing Group (CKIP) and *Chinese Latent Semantic Analysis* (CLSA). We compared the vocabulary used in the students' written responses with the formal textbooks in order to understand the development in performance of the participating students. Descriptive statistics were used to analyze the data collected from the system logs and perception questionnaire responses. In particular, to make the results of data analysis for the perception questionnaire clearer, student choices were further categorized with agree and strongly agree classified as positive feedback, and the others as negative feedback.

Results

The Number of Books Students Borrowed

Table 3 illustrates the average numbers of books borrowed by each student in the three semesters. On average, each student borrowed 43 books, 169 books, and 102 books in each of the three semesters, respectively. In addition, the average number of words per book in the three semesters was 92 k, 428 k, and 648 k, indicating that students gradually borrowed more books with greater numbers of words over the course of the study. This result was very surprising, because Taiwan's Ministry of Education has suggested that elementary students should read at least 30 books a year (Ministry of Education of Taiwan, 2007). In other words, the results demonstrated that the students read more books than students in general. A possible explanation is the effect of students' natural growth and development stimulated by the school education. Another explanation is the influence of the My-Bookstore system. The main difference between the first and later two semesters lies in the usage of the My-Bookstore system.

However, this also leads to a further interesting question: *Do students really read and understand the books they borrow?* The system logs show the percentage of books that students reborrowed: 20%, 17%, and 14% in the three semesters, respectively. This might imply that the students needed more time to understand them; however, it also suggests that they were interested in these books, so were willing to read them again. In short, the results showed that although students

Table 3. Average Number of Books Read by Each Student.

	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Avg.	No. of words
First	39	48	25	22	42	89	24	–	43	92 k
Second	156	165	139	173	176	191	169	–	169	428 k
Third	102	102	89	105	111	111	97	84	102	648 k

might not completely understand a book, they were interested and some even reborrowed the books to read again.

The Number of Books Students Recommended

The status of students' recommendations can be described by the quantity and favorite functions. Regarding the quantity, students on average recommended 63 books in the second semester and 43 books in the third semester (see Table 4). Although there was decrease in the number of recommend books of approximately 37%, the recommendation rate (recommended books/books read) in the third semester was 42% (=43/102), higher than the 37% (=63/169) in the second semester. On the other hand, comparison of the functions students used to recommend books in the second and third semesters showed that they used more functions in the third semester than the second semester to recommend a single book. For example, the drawing function increased from 33% in the second semester and to 43% in the third semester. In short, the quantitative data from the system logs show that the students gradually adopted the *My-Bookstore* functions to recommend books.

Of the four recommendation functions, the most popular in the two semesters was the star-ranking function (93% and 96%). One possible reason is that this is a simple and basic function making it easy for the student to complete their tasks. The second most popular approach was picture-drawing (33% and 43%), possibly due to the fact that drawing is a natural way for young children to express their ideas. The least two popular functions were writing (19% and 25%) and sound-recording (17% and 19%). One possible explanation is that these students were young and inexperienced, lacking the fundamental computer skills needed and possessing insufficient experience in presentation. In addition, although the writing function was not as popular as the other ones, the analysis of quality of the content showed that the number of vocabulary items used by the written recommendation (847 and 911 items on average for the second and third semesters) was higher than the number of vocabulary items provided in traditional textbooks (177 and 411 items on average for the second and third semesters).

Table 4. The Number of Books Recommended by Each Function.

	Recommendation functions				
	Star-ranking	Picture-drawing	Writing	Sound-recording	Recommendation rate
2nd	93%	33%	19%	17%	37%
3rd	96%	43%	25%	19%	42%

Table 5. Results of *t* Tests for Literacy Performance.

	Pretest		Posttest			
	M	*SD*	*M*	*SD*	*df*	*t*
TRC	11.86	3.45	13.28	8.15	200	2.617*
CPPVT-R	60.8	23.517	68.47	20.741	197	5.807**

Note. TRC = test of reading comprehension; CPPVT-R = Chinese Peabody picture vocabulary test-revised.
* <.05; ** <.01.

Literacy Performance

The literacy performance results are illustrated in Table 5. It can be found that the posttest scores were higher than the pretest scores in terms of TRC and CPPVT-R. Two paired-simple *t* tests showed significant differences regarding student literacy performance ($t = 2.617$, $p < .05$ and $t = 5.807$, $p < .01$). This analysis indicates that student reading comprehension and vocabulary were significantly enhanced during the two semesters. One possible explanation for this result is that the voluminous classroom reading program was a major contributor to such a significant improvement. Another explanation was that student growth and development resulted in this improvement.

Students' Perceptions

Table 6 shows the results of analysis of questionnaire responses. Regarding the attention dimension, the results showed that most of the students felt that the overall experience was interesting and enjoyable. A possible interpretation is that the designs of My-Bookstore system are attractive to students because they are different from what they usually do in the classroom. An alternative interpretation is that role playing as a bookstore owner is an unusual experience, so the students felt it to be interesting and enjoyable.

Regarding the relevance dimension, the data indicated that most students agreed that they understood that utilizing the My-Bookstore was closely related to book recommendation, and the process of being a bookstore manager was interesting to them. A possible interpretation of this phenomenon is that the process of managing the My-Bookstore (stocking to selling) is similar in form to the process of reading and recommendation. Asking students to be a bookstore manager not only provides students a fantasy impression to encourage them to better engage in with the experience but also highlights the primary tasks of the My-Bookstore system, encouraging reading and recommendation.

Regarding the confidence dimension, most of the students were able to grasp the main ideas of playing *My-Bookstore* at the beginning, while a few students, after a little hesitation, could play well after a brief period of instruction.

Table 6. Results of the Perception Questionnaire.

	Category	Items	Neutral/ Negative	Positive
Attention	Perceptual arousal	There was something at the beginning of the My-Bookstore that got my attention.	18%	82%
	Inquiry arousal	The My-Bookstore had elements that stimulated my curiosity.	23%	77%
	Variability	A lot of things changed during the My-Bookstore	25%	75%
Relevance	Goal orientation	From the beginning of the My-Bookstore, the goals were clear.	38%	62%
	Motive matching	Recommending a book to my classmates in the My-Bookstore is interesting	19%	81%
	Familiarity	I am glad that I have the choice to select favorite functions to recommend books in the My-Bookstore.	17%	83%
Confidence	Learning requirements	After reading or being given verbal directions, I felt confident that I knew how the My-Bookstore was played.	17%	83%
	Opportunities for success	When I first looked at the My-Bookstore, I had the impression that it would be easy for me.	45%	55%
	Personal control	When I did well at the My-Bookstore, I felt it was through my efforts.	18%	82%
Satisfaction	Natural consequences	It felt good to successfully stock books in the My-Bookstore	15%	85%
	Positive consequences	Stocking and decorating in the My-Bookstore gave me a satisfying feeling of accomplishment	17%	83%
	Equity	The competition was fair.	20%	80%

In addition, the data further indicated that most students agreed that they felt confident in their ability to play well when they first tried to use *My-Bookstore*. A possible explanation could be that the designed means of recommendation provides students an approachable path, from easy to difficult, shallow to deep, depending on their inherent ability so they can gradually build up a sense of accomplishment.

Regarding the satisfaction dimension, most students felt a feeling of satisfaction when they completed a recommendation or their recommendations were accepted by their classmates. A possible explanation could be that the sharing was voluntary and did not have any assessment component. The feeling of satisfaction mainly comes from the emotional voice after reading and the sense of ownership.

Discussion

Using My-Bookstore to Realize Information Visualization

In this study, a bookstore is used as a metaphor for information visualization because this visual representation of abstract data could be regarded as open student model to promote students' awareness of their current status, which in turn could strengthen participatory motivation and reinforce reading behaviors. The results from the perception questionnaire administered as part of this study showed that such a design (e.g., there was something at the beginning of the My-Bookstore that got my attention; the My-Bookstore had elements that stimulated my curiosity) could enhance most students' motivation (82% and 77%) in terms of attention dimension. In addition, the results of system log analysis revealed that the students gradually borrowed more books (169 and 102) with increasing numbers of words (428 k and 648 k). In particular, the result of literacy performance further showed that student reading comprehension and vocabulary were significantly enhanced during the two semesters. It seems that the My-Bookstore system can benefit student learning in both affective and cognitive gains.

Overall, the results demonstrate that using a bookstore as an open student model to realize information visualization could enhance students' participatory motivation, especially in terms of the attention dimension. Although the students' book borrowing does not mean that the students completely comprehend the content of the books, this is still an affective indicator of the students' interest in reading. This is actually the goal this study wants to achieve. Thus, it might be a useful strategy to first focus on the affective aspect, and then gradually seek to deepen comprehension and expand the categories of books. This study is a good starting point for the promotion of student reading and offers a foundation to further investigate how to deepen their compression and expand the categories of books.

Using My-Bookstore to Build a Learning Community

In addition to the individual, the social aspect is also taken into account in the design of the My-Bookstore system. When many My-Bookstores together form a bookstore street or area, it implies that reading is not only an individual activity but also a group activity. Students also play the role of managers running a bookstore, to better prepare themselves for further sharing and exchanging. The results of the questionnaire showed that such a design could enhance the feeling of satisfaction (e.g., It felt good to successfully stock the books in the My-Bookstore; stocking and decorating the My-Bookstore gave me a feeling of accomplishment). However, the result of system log analysis showed that the simplest star-ranking function was the major recommendation strategy among the four. Finding ways to encourage students to share what they read or what they feel would be a significant challenge in future work.

In short, the results revealed that students are willing to organize what they read, but they tend to choose the simplest way to share this with others. From the perspective of follow-up activities, although students should have choices about whether and what kind of follow-up activities they want to participate in, information technology could empower them and further guide them to carry out an activity. Thus, there is space to improve the My-Bookstore system for fostering and guiding students to prepare themselves better and share with their peers in the learning community.

Using My-Bookstore to Recommend Books

Underpinned by the first (i.e., information visualization) and the second principle (i.e., learning community), the third principle uses the business cycle to promote social interaction between students, especially book recommendation. In the questionnaire, the book recommendation (e.g., recommending a book to my classmates in the My-Bookstore is interesting; I am glad that I have the choice to select favor functions to recommend books in the My-Bookstore) feature received the most positive feedback (81% and 83%) in terms of the relevance dimension. In addition, the system log revealed that the recommendation rates were 37% and 42% in the second and third semesters, respectively. Analysis of the content showed that the number of vocabulary items they used in the written recommendation was higher than that in the standard textbooks.

In short, the results showed that most of students felt the design of recommendation as selling was interesting. Specifically, they thought selling to be quite relevant to recommendation, which further enhanced their motivation. However, although most of students held a positive perception of book recommendation, the recommendation rate was only about one third (37% and 42%). This result implied that how to improve the recommendation rate is a significant issue for continued research. Moreover, in addition to the four recommendation

approaches, how to integrate more useful approaches from other follow-up activities is also a direction for future research.

Conclusion

This paper addresses two research questions. The results for the first research question (*What are students' usages of the My-Bookstore system in terms of book borrowing and recommendation?*) showed that My-Bookstore encouraged students to borrow more books with more words to read, and even reread. In addition, more than one third of the students recommended the books they liked to other students, especially using the ranking and drawing functions. Regarding the second research question (*What are students' perceptions of using the My-Bookstore system?*), the findings revealed that My-Bookstore was attractive to most of students. Some expressed the idea that the goal of the My-Bookstore is highly relevant to reading and is clear and easy for them to understand. In addition, students also showed a feeling of satisfaction or accomplishment when their recommendations were accepted by other students.

Nevertheless, this study has some limitations that should be further investigated in the future. First, this study emphasizes a preliminary evaluation of the usage of a system and lacks a systematic design of control groups. Second, this study merely focuses on the collection of quantitative data. Qualitative analysis is required to further evaluate the system usage, such as the content of student recommendations and student perceptions. Third, this study is a starting point of the My-Bookstore system development, and more and deeper evaluations are required to offer revision and feedback for improving the My-Bookstore system.

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