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Content-Based CALL for Reading in Buddhism

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Abstract

This paper examines the effects that content-based CALL software may have on the understanding of reading texts regarding Kamma, a Buddhist principal concept of actions and reactions, by a group of Buddhist monks studying at Mahachulalongkornrajavidyalaya University. To accomplish this aim, a pre-post test design was used to investigate whether content-based CALL software could improve reading comprehension within an EFL context. Findings indicated that the participants' learning achievement was higher after the content-based CALL activity and that they had positive views on the content-based CALL in relation to their reading performance. These results raised interesting issues related to the use of technology in content-based classrooms.

Keywords: CBI; CALL; content-based CALL; content-based instruction with CALL

บทคัดย่อ

บทความนี้นำเสนอผลการใช้บทเรียนคอมพิวเตอร์ช่วยเรียนภาษาแบบอิงวิชาเนื้อหา (content-based CALL software) ที่อาจมีต่อความเข้าใจในบทอ่านเกี่ยวกับเรื่องกรรมในพระพุทธศาสนา ของพระนิสิตมหาวิทยาลัยมหาจุฬาลงกรณราชวิทยาลัย ในการศึกษาครั้งนี้ ใช้รูปแบบการวิจัยแบบทดสอบก่อน-หลัง (หนึ่งกลุ่มทดลอง) เพื่อทดลองหาว่า บทเรียนคอมพิวเตอร์ช่วยเรียนภาษาแบบอิงวิชาเนื้อหานี้จะมีส่วนช่วยพัฒนาความเข้าใจในการอ่านได้หรือไม่ ผลการศึกษาพบว่า หลังการทดลอง ผู้เข้าร่วมวิจัยมีผลสัมฤทธิ์ทางการเรียนสูงขึ้น และมีทัศนะที่ดีต่อการเรียนภาษาแบบอิงวิชาเนื้อหาโดยใช้คอมพิวเตอร์ช่วย ซึ่งสัมพันธ์กับความสามารถในการอ่านของพระนิสิต การศึกษาครั้งนี้ให้แนวทางหนึ่งในการประยุกต์ใช้เทคโนโลยีคอมพิวเตอร์สำหรับการเรียนการสอนภาษาแบบอิงวิชาเนื้อหา (content-based instruction)

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Introduction

It is well accepted that the learning of English language and content (or subject matter) is becoming increasingly common in Thai settings; especially in the bilingual schools and at the university level. In these settings, it seems that content-basedinstruction (CBI) plays a key role in the classrooms. The content that is interesting or relevant to learners can provide what Krashen calls comprehensible input, a factor for successful language acquisition and for the acquisition of a high level of proficiency in listening and reading (Brinton et al., 2003).

To accomplish this condition, computer-assisted language learning (CALL) may be applied to support the language learning process in the content-based classrooms. This paper reports on the results of a research project that examined the effects content-based CALL software may have on improving reading comprehension of Thai Buddhist-university students.

Theoretical Framework

Input hypothesis considers comprehensible input to be a crucial factor for language acquisition (Krashen, 1982). Ellis (1985) describes that this input refers to language which learners are exposed to by listening or reading. It can be comprehensible (i.e. acquirers understand input) or incomprehensible (i.e. acquirers do not understand input). It is possible that input comprehension may be a necessary condition for language acquisition. Krashen (cited in Beatty, 2003, p.82) also states that optimal input for acquisition has four characteristics: 1) input is comprehensible, 2) input is interesting and/or relevant to the acquirer, 3) input is not grammatically sequenced, and 4) input is provided in sufficient quantity.

Based on the input characteristics, the content-based approach takes into account the content that is relevant to the learner. When there is an emphasis on relevant, meaningful content rather than on the language itself, students learn language better (Grabe & Stoller, 1997). The relevant content may be drawn from the subject matters that students are studying or from students' occupational needs. In other settings, the content may be brought from subject matter that students have previously learned in order to take advantage of the students' existing knowledge.

With regard to students' prior knowledge, a principle of CBI builds on

the students' previous learning experiences, since it takes into consideration the students' existing knowledge of subject matter and of the academic environment as well as their second language knowledge (Brinton et al., 2003). This pedagogical principle is supported by schema theory. According to schema theory, Bartlett (1932) argues that the knowledge built up from past experiences is created in our heads in the form of a mental framework that helps us make sense of new experiences. Nunan (1999) points out that a text - whether spoken or written - does not carry meanings. Rather, it provides clues that listeners or readers will utilize to reconstruct the original meaning as intended by the speaker or writer. In reading texts, therefore, students need to fit the clues provided in the text to their own background knowledge in order to gain comprehension. As Carrell (1983) states that a reader's background knowledge can have an influence on reading comprehension.

Schema theory is related to bottom-up and top-down processing. To understand the reading text, the reader processes the input in two ways: Bottom-up and top-down. Reading comprehension thus is an interactive process between the reader and the text. Bottom-up processing is to make sense of what we read by focusing on the linguistic parts: the vocabulary, the grammar, the sounds, etc. The reader uses his or her own existing knowledge of such parts (knowledge of vocabulary, grammar, or sounds) to process the reading text (input) for comprehension. Top-down processing, on the other hand, begins with background knowledge - that is, content schema and textual schema. The content schema refers to general knowledge about the content of texts. This knowledge is based on life experience and previous learning. Textual schema is the knowledge of language used in a particular situation or setting (Rumelhart, 1997).

Content-Based CALL Design

For CALL design, Chappelle (1998) suggests that CALL software might be developed on the basis of hypotheses about ideal conditions for second language acquisition. The content-based CALL design in this research study follows this guide. Based on the above theoretical framework (explaining the relationship between input, CBI, schema theory, and reading comprehension), the principles for content-based CALL software design in this research are the followings (Brinton, 2003; Anderson, 2003; Chappelle, 1998):

1. The designer bases instructional decisions on content rather than language criteria

The selection and sequencing of language items are influenced by the choice of content. In the content-based CALL software, the content, Kamma, plays a key role in determining some grammar rules and vocabulary, which will help students comprehend the reading texts.

2. The student is provided with human-computer interaction for active learning

Content-based CALL software allows students to learn through doing to be actively engaged in the learning process. At all times students learn through the software and they can interact with it by clicking on buttons available in the software to play, stop, or repeat.

3. The content is relevant to students' lives, interests, and/or academic goals

In the context of the Buddhist university, the monk's education is primarily concerned with Buddhist teachings, which are integrated into other subjects. The content, Kamma,which is a Buddhist principal concept of actions and reactions, isused for Reading in Buddhism subject. So, it is incorporated for academic purposes.It is also relevant to students' lives and prior knowledge.

4. Authentic texts and tasks are used

Since the reading texts about Kamma, put in the software, are not originally constructed for language learning purposes, they are considered authentic. Those texts are retrieved from www.buddhanet.net.

5. The student's attention is drawn to language features

Content-based instruction (CBI) believes that comprehensible input alone will not lead to successful language acquisition (Brinton and Holten, 2001). The software, therefore, makes use of awareness-raising tasks to draw attention to specific learning features found in the authentic reading texts.

6. Reading tasks are divided into pre-task, task, and post-task

The activities in the content-based CALL software consist of Before Reading, While Reading, and After Reading. The three reading activities are facilitative for reading comprehension.

7. The students' background knowledge is activated before reading

A reader's background knowledge can influence reading comprehension (Carrell and Connor, 1991). Since most of the monks have learned

about Kammabefore, their prior knowledge of Kamma will be roused in pre-task by responding to questions related to Kamma.

8. Vocabulary available in the text is either taught before reading or students are provided with the opportunities to work on the vocabulary after reading

Vocabulary is important for successful reading. In the pre-task of thesoftware, the vocabulary which is drawn from the reading text, will be taught.Students' vocabulary will be developed more in a "Word Building Activity" after reading.

9. Reading strategies are taught

In each lesson of the software, reading strategies – such as guessing meaning from context, reading for main idea, etc. – are instructed in the pre-task. The strategies enhance active reading and help students better understand the texts.

10. Some linguistic features in the texts are made salient by highlighting – coloring or underlining words and sentences

In order for students to notice some linguistic features in the texts, the linguistic features need to be made salient in the software by coloring or underlining. It is hypothesized that this noticing of linguistic input is necessary for student's language development. When some words or sentences are noticed by students, the students may pay closer attention to form and meaning of the language (Tomlin & Villa, 1994).

Content-Based CALL Studies

There has been so far insufficient research on how content-based CALL materials contribute to improving students' reading comprehension. For CBI-based research, it has been reported that reading coherent extended materials leads toimproved language abilities and strategies, reading skills, greater content-area learning, and higher motivation (O'malley & Chamot, 1990; Elley, 1991). In the CALL environment, however, a few studies suggest that the use of computer-based technologies in the content-based classroom is correlated to positive academic outcomes, including higher test scores and better attitudes. A study (Alkahtani, 1999) on ESL reading examines students' reading comprehension after using a reading CALL program. The results show positive learning outcomes. In the English for Academic Purposes

(EAP) course, a form of CBI, Torut and Torut (2002) designed and developed a multimedia CALL material for graduate students at Silpakorn University, Thailand. The results indicate that the experimental group (learning through multimedia CALL program + textbook) outperformed the control group (learning through a textbook alone) in the final reading comprehension test. The experimental group also expressed positive opinions on the multimedia CALL software. In accordance with Lin (2004), a study assessed international students' attitudes toward technology-based learning in an ESL context. It is reported that 560 participants, made up of international students enrolled for courses at Mississippi State University of the Fall 2003, showed positive attitudes toward computer-based language learning.

In the present study, participants' mean scores obtained from both tests (initial reading comprehension and delayed recall) were compared to examine their performance. In addition, opinions about content-based CALL software and reading comprehension were explored through questionnaires and interviews. Specifically, this study addressed the following research questions.

1. Is the participants' learning achievement higher after the content-based CALL activity?
2. What are participants' views on content-based CALL software?

Method

Participants

Participants in this study were 17 English major students in the Faculty of Humanities. They were enrolled for the Reading in Buddhism II course at Mahachulalongkornrajavidyalaya University, Nakhon Ratchasima Campus, in the second semester of 2005. All the students were Buddhist monks ranging in age from 20-25.

Materials

The materials were integrated into the course syllabus and consisted of two tests (initial reading comprehension and delayed recall), a questionnaire, a structured retrospective interview, and the content-based CALL software (which was specifically designed for this research). All the materials were tested and improved during three pilot studies (individual test, small-group test, and field test).

The two tests (initial reading comprehension and delayed recall) consisted of reading texts on Kamma (a Buddhist concept) of a similar format and length to the one used in the content-based CALL software as well as thirty multiple choice questions. The questionnaire examined the participants' views about the content-based CALL software that might relate to their reading ability and examined the rationales behind the views. At the end of the study, a retrospective interview was conducted to gather more details concerning the participants' views about content-based CALL software in relation to their reading comprehension.

The main material in this study was a multimedia CALL program entitled "Content-Based Language Learning Software on Kamma," delivered in the form of CD-ROM. It was designed and developed according to the CALL design principles mentioned above. The content of this software was Kamma, a Buddhist concept regarding action and its results. The CALL activity was divided into four lessons (Figure 1). All the lessons were concerned with Kamma and retrieved from a Buddhist website, www.buddhanet.net, where there were a lot of Buddhist articles. The software consisted of reading selection (Figure 2) for each lesson as well as tests (Figure 3). Each lesson also contained four activities: pre-reading, while-reading, post-reading, and building vocabulary (Figure 4).

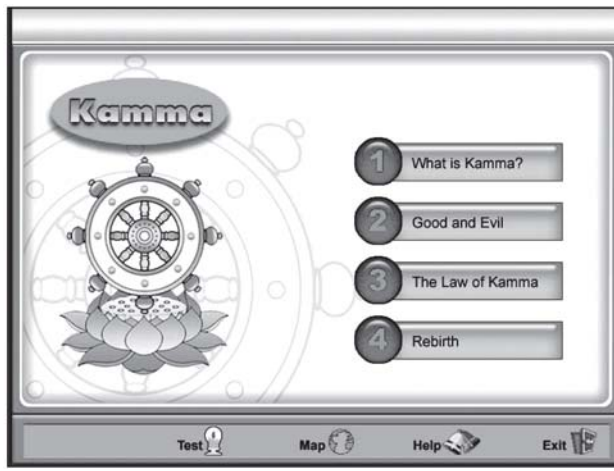

Figure 1: Screen shot of the four lessons

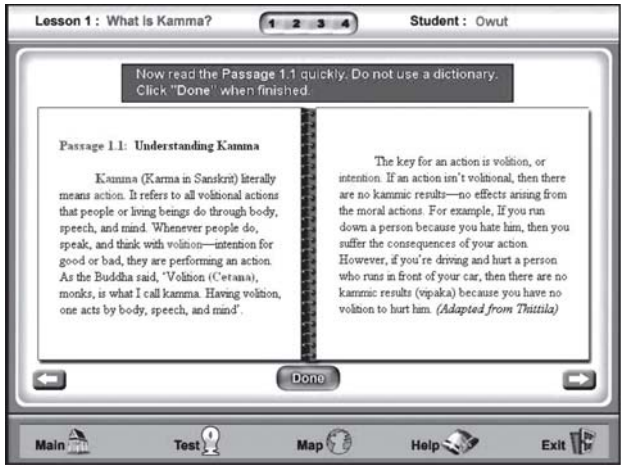

Figure 2 : Screen shot of a reading text page

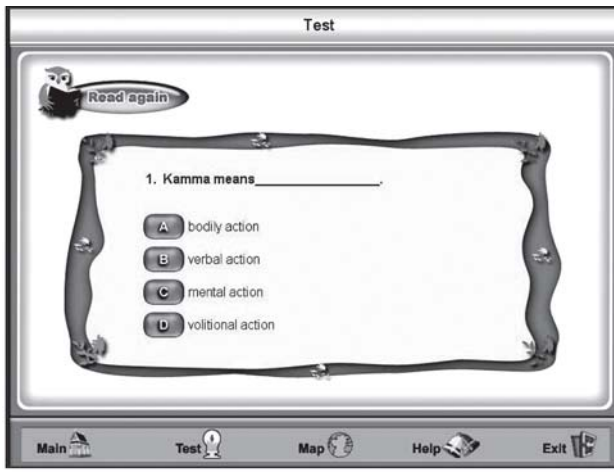

Figure 3: Screen shot of a test page

Figure 4: Screen shot of a 4-activity page

Procedures

This study was conducted as part of the Reading in Buddhism II course syllabus and continued for over 3 weeks. The class met twice a week for 2 hours in the computer lab, while interviews were scheduled outside of class time. After all participants had completed the initial reading comprehension test, they were given instructions on how to use the software. Then the participants started the first lesson in the software. Upon completing all of the lessons, they proceeded to the questionnaire and, in the third week of study, they completed the recall test. After reviewing the questionnaires and tests, all participants were invited to participate in the retrospective interviews.

Analysis

To answer the two research questions, the data were analyzed using quantitative and qualitative data analysis approaches.

To address research question 1 about the participants' performance after learning through content-based CALL software, the mean scores obtained from initial reading comprehension test and delayed recall test were compared using a dependent sample t-test.

To address research question 2, examining participants' views on content-based CALL software after learning, the questionnaire answers and interview responses were analyzed to see what participants thought about the software and their reading comprehension after the content-based CALL activity.

Results and Discussion

Research Question 1 : Learning Achievement

Overall, the participants did better on the delayed recall test, a finding already reported in the literature (Alkahtani, 1999; Torut & Torut, 2002; Elley, 1991). Their mean scores obtained from both tests were significantly different at the 0.01 level ($t = 8.77$, $p = .000$). When looking at the participants' mean scores, the mean of the delayed recall test ($\overline{X} = 19.71$) was higher than that of the initial reading comprehension test ($\overline{X} = 11.94$). That is, the participants produced higher learning achievement after learning through content-based CALL software. Table 1 shows descriptive statistics and comparison with t-test for both tests.

Table 1: Comparison of means obtained from initial reading comprehension test and delayed recall test

Tests	n	$\overline{X}$	SD	t	p
Initial Reading Comprehension	17	11.94	4.24	8.77	.000
Delayed Recall	17	19.71	4.23		

This might be due to the fact that the content related to Kamma in the content-based language learning software was taken from authentic materials via Buddhist websites. This content of authentic material was also presented through texts, sound, pictures, and moving pictures which enhanced student comprehension and motivation while they were learning the reading lessons in the software. In addition, the students had previously learned about Kamma as required by the Buddhist curriculum for Thai Buddhist monks. Thus, their background knowledge on Kamma might relate to their better comprehension in the reading selections (May, 1990). Besides, the learning software was developed from the language CBI approach and reading

strategies. In the learning software, reading techniques – such as guessing, reading for the main idea, reading for specific information and so on – were presented. This might have enabled students to fully understand reading strategies, thereby increasing their learning levels after the content-based CALL activity.

Research Question 2: Views on content-based CALL software

In general, all the participants (N = 17) had positive views on learning through content-based CALL software. The total score of the five-scale questionnaire with 10 items was 50. The participants' minimum score was 39 and the maximum score was 48. On average, participants scored 43.41 (86.82% of the total score). This indicated that the views of all participants were on the positive level as shown in **Table 2.**

Table 2: Levels of views on learning through content-based CALL software

Levels of Views	Score Interval	N	%
Positive	> 31.10	17	100
Neutral	28.90 – 31.10*	0	0
Negative	< 28.90	0	0

$\overline{X}$ = 43.41 S.D. = 2.32 Min = 39 Max = 48 Total = 50

* The criterion for neutral views was from estimating central value of score interval using the formula, Neutral View = $\mu \pm z\frac{SD}{\sqrt{n}}$

When looking at each item of the five-scale questionnaire, it was found that more than half of the participants 'agreed' and 'strongly agreed' that their own existing knowledge about Kamma helped them guess the meaning and better understand the reading texts. They also reported that they 'agreed' and 'strongly agreed' that content-based CALL software made learning of English and Buddhism more interesting and enjoyable. In addition, almost all of participants 'disagreed' and 'strongly disagreed' that they were worried and unconfident while learning through content-based CALL software. Table 3 shows participants' views about learning through content-based CALL software via a five-scale questionnaire.

Table 3: Participants' views on learning through content-based CALL software on Kamma

Participants' Views	Strongly Agree		Agree		Uncertain		Disagree		Strongly Disagree	
	N	%	N	%	N	%	N	%	N	%
1. Your existing knowledge about Kamma helps you guess the meaning in the reading texts.	6	35	8	47	3	18	0	0	0	0
2. Your existing knowledge about Kamma helps you better understand the reading texts.	9	52	4	24	4	24	0	0	0	0
3. Content-based CALL software makes your learning of English and Buddhism more interesting.	9	53	6	35	2	12	0	0	0	0
4. You enjoy learning though content-based CALL software.	10	59	7	41	0	0	0	0	0	0
5. Content-based CALL software makes your learning difficult.	0	0	0	0	2	12	6	35	9	53
6. You feel independent in learning while you are using content-based CALL software.	10	59	0	0	7	41	0	0	0	0
7. You get worried while you are learning through content-based CALL software.	0	0	0	0	1	6	10	59	6	35
8. You can choose to learn and review the lessons as you need while you are learning through content-based CALL software.	7	41	4	24	6	35	0	0	0	0
9. You get unconfident while you are learning through content-based CALL software.	0	0	0	0	1	6	4	24	12	70
10. Content-based CALL software stimulates your desire to study.	8	47	7	41	2	12	0	0	0	0

The participants' views on the CALL software were positive. This might be because the learning software was presented through multimedia consisting of texts, sound, pictures, and moving pictures. The multimedia helped enhance

students' learning and at the same time provided entertainment. Through multimedia, the students were motivated to learn actively. As active learners, they could interact with the computer by clicking or typing. In addition, the students could control theirlearning. They could choose to learn or review what they wanted in the software. In other words, the students learned in the context that was free from anxiety and they could learn at their own pace. Therefore, a good learning atmosphere was created and it created a good view on language learning (Heathington & Alexander, 1994).

Furthermore, these results were supported and confirmed by the interviews. Participants were asked more about preferences in the software and their existing knowledge about Kamma in relation to reading comprehension. Most of the participants reported that they liked the general features of the software because they became more motivated and found learning more convenient. They also reported that their prior knowledge of Kamma helped them guess the meaning of words, topics, and main ideas.

Conclusion

The results of the study on the effects content-based CALL software may have on participants' reading comprehension indicated that the participants demonstrated a higher level of learning achievement after the CALL activity. They had a positive view of learning through content-based CALL software. In particular, the participants reported that they took advantage of existing knowledge on Kamma to comprehend the reading texts.

This study may act as a guide on how to integrate English language and subject mater with the aid of computer technology. It may also act as a guide on how to design CALL software based on language learning and teaching approaches. Further research should be conducted to offer more insights of how participants learn by the use of CALL in content-based classrooms (process-oriented CALL research). Students' behaviors in the use of pre-task, task, and post-task in the content-based CALL software should be examined in relation to their learning achievement. In addition, students' use of modifications provided in the reading CALL software in the form of help options (such as glossary, simplified texts, etc.) should be investigated in order to understand more about how they take advantage of the help options to help them comprehend the reading texts.

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