

The Application of the Problem-Based Learning Approach to Teaching English Grammar through the Internet

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Abstract: The purpose of this study was to identify the effects of problem-based learning (PBL) instruction on Chinese-speaking university students' English grammar learning by means of the Internet. To achieve this purpose, this study examined whether or not the PBL approach can improve students' knowledge of verb complements by comparing the data collected from two types of instruction: (1) PBL instruction with 26 participants and (2) non-PBL instruction with 30 participants. All participants attended a course that used the same textbook and the same Internet resources. The grammar pre- and post-tests were administered at the beginning and end of the study. The findings showed that there were significant differences between the two groups in the total score on the post-test and the sub-test score on the blank-filling section in the post-test. By comparing the scores on the pre- and post-tests for each treatment group, the statistical results show that the PBL group achieved significantly higher post-test mean scores than its pre-test mean score. The study implies that PBL in university English courses has the potential to enhance acquisition of grammar knowledge.

Keywords: PBL approach, second language learning, the Internet, verb complements

1. Introduction

The advanced computer technology has developed the Internet into a massive knowledge database and a universal learning resource. While computers are widely used in most language classrooms, the Internet has also been progressively introduced into classrooms (Singhal, 1997). Lee (1997) stated, "the Internet has been increasingly considered as a pedagogical tool by which one can create innovative language experiences for [second language] teachers and learners" (p. 400). It has proved its great potential in all aspects of second language acquisition. The effects of the Internet on English learning have also been verified (Kaufman, 2006; Lai & Kritsonis, 2006; Mosquera, 2001; Wilson, 2004). With these positive results concluded from earlier studies, the author intended to integrate the Internet into English grammar instruction.

Grammar is indispensable in language teaching (Ellis, 2006). From the linguistics point of view, a language is composed of sounds, lexicon, and grammar. Among these three elements, some linguistics experts particularly emphasize the important role of grammar. For example, Chomsky (1965) claims that grammar can be regarded as a theory of a language. "[L]anguage without grammar would be chaotic; countless words without the indispensable guidelines for how they can be ordered and modified" (Bastone, 1994, p. 35). Dedicated to teaching Chinese students grammar, Wang (2010) considers grammar as the frame of a house and argues that sounds and lexicon may form a meaningful language system only through grammatical sentence structures. Grammar still plays an essential role in English learning; learners should be taught with grammar. However, there are numerous grammatical rules. This study only focused on the instruction of verb complements (VCs). Verbs are one type of content words. Moreover, verbs comprise the bulk of the text, contributing substantially to delivering the real meaning of a sentence.

An effective teaching method is essential to successful grammar learning. Without a proper teaching method, learners likely cannot improve their grammar learning even if they are offered well-designed Internet learning resource. During the past decade scholars of grammar teaching have been examining grammar teaching methods to promote mastery of a second/foreign language (Andrews,

2007; Mohamed, 2004). This study applied the Problem-based learning (PBL) approach to examine whether it can help learners who learn English a foreign language (EFL) to acquire grammatical rules effectively.

2. Literature Review

2.1 Problem-Based Learning Curriculum

Problem-based learning is a student-centered and problem-based learning pedagogic approach that provides resources, guidance, instruction, and opportunities for students to develop their professional knowledge and problem-solving skills. In a PBL classroom, the teacher gauges the difference between what activities students can do on their own and what they need to learn to do to solve the problem. Then the teacher designs activities which offer just enough of a scaffold for students to overcome this gap in their knowledge and skills (Greening, 1998). Overall, the teacher acts as a facilitator to support students to learn the skill of solving problems. The students take on active learning strategies to seek solutions to real-world problems and, more importantly, to develop skills to become self-directed learners. The present study applied the PBL approach to conducting English grammar instruction.

In a PBL curriculum, the problem is not only a starting point to activate a course but a centerpiece of this learning approach. The instructor should prepare problems and apply them in class to guide learning. However, a problem is not just the one related to the content of the material or the ones the students answer in a quiz or test. Expanding the scope, Bridges (1992) refers to a problem as a situation “for which an individual lacks a ready response” (p. 5). The students fulfill their knowledge gap in the situation constructed around the problem. In a PBL curriculum, teachers structure their courses around a variety of problems that are embedded in relevant, richly contextualized situations.

2.2 The Internet in English Learning

Constructivists contend that supportive environments are important to successful learning (Paris & Byrnes, 1989). Problem-based instruction that adequately uses instructional resources will be very effective for the enhancement of knowledge construction. Among the variety of instructional sources, the Internet is believed to be particularly useful and suitable for the PBL approach because it offers various information accesses. The Internet is constructed like a network formulating an interaction between information and people. The PBL approach integrated with the Internet may reflect a constructive approach. Such a combined Internet teaching approach is likely to foster learning and the transfer of learning due to meaning connection between the content in the textbook and the real world. In this study, the Internet is used as a support to assist the learners to acquire grammar knowledge.

Using the Internet to access authentic language material is another area from which EFL learners benefit. Mosquera (2001) asserted that the Internet offers “tons of authentic material that can be used in the EFL classroom” (p. 464). This advantage is particularly useful for learners studying in non-native English speaking countries. There is no doubt that the Internet is regarded as an immense source of authentic information (Lai & Kritsonis, 2006; Mosquera, 2001; Singhal, 1997; Wilson, 2004; Zhong, 2008). For example, Zhong (2008) stated that “[l]earning resources from the Internet not only are very colorful, but also multi-channeled, multi-perspective, multi-leveled and multi-formed” (p. 150). Lai and Kritsonis (2006) claimed that students could get various authentic materials either at school or from home 24 hours a day by connecting to the Internet. The Internet also contributes to the understanding of the target language culture by providing authentic language input and increasing various contacts with native speakers of the target language through a wide range of websites.

In sum, the growth of the Internet has had a great impact on English teaching and learning. The instruction outcomes that traditional textbooks (e.g., paper-based books) and traditional learning media (e.g., pen, blackboard, and chalk) cannot even compete with those produced by the Internet (Kaufman, 2006). Pointing out the indispensability of the Internet in English learning, Wilson (2004) concluded that “we must open the minds of educators and motivate the learners by unlocking the doors and allowing the spider to cast her electronic Web of English around our students in and out of the classroom” (p. 2).

2.3 Research Purpose and Research Question

The purpose of the study was to investigate the effect of the PBL approach on university students' learning of verb complements. For the purpose of this study, the following question was addressed:

Does the participants' learning of verb complements with the PBL instruction significantly differ from that with the non-PBL instruction?

3. Method

3.1 Participants

Participants were first-year university students at National Taiwan Ocean University in Taiwan, 26 in the experimental (PBL) group and 30 in the control (non-PBL) group. The 56 participants were all native speakers of Chinese and learned English as a foreign language (EFL). Their English ability is classified as intermediate level by the university based on the participants' scores for English in the General Scholastic Ability Test held by the College Entrance Examination Center in Taiwan. Their English ability ranged from grade levels 9 to 12 out of a total of 15, where grade 1 refers to the lowest level and grade 15, the highest. The author conducted an English proficiency test and independent sampling t-tests to further assure that there were no significant differences between the two groups' English reading and listening abilities.

3.2 Grammar Pre- and Post-Tests

The pre- and post-tests included the same question items but with varied item sequence. Both tests contained 30 question items measuring the participants' knowledge of verb complements, such as gerund as subject, gerund as object, infinitive without object, infinitive with object, and bare infinitive. The grammar test included two sub-tests: the multiple-choice sub-test with 20 items and the blank-filling sub-test with 10 items. The participants received a score of 1 each time they selected or wrote a correct answer, giving a total possible score of 30 for the grammar pre- and post-tests, 20 for the multiple-choice sub-test and 10 for the blank-filling sub-test. The pre-test was given before the first class session, and the post-test was administered immediately after the last class session.

3.3 The Textbook and the Internet

The study was administered in a language lab with 50 computers. Each participant used one computer to view the material and the Internet. The textbook was adopted from the Footprint Reading Library (Waring, 2009), which includes a non-fiction reading series for English language learners. The title of the selected textbook is *Cupid the Dolphin* and is graded as intermediate level with 1,600 headwords. From the textbook, two themes were designed to lead the participants to do extensive reading on the Internet. The extensive reading activity was to warm up the target grammar rules they learned in class.

The Internet was used as a supportive tool. The participants read the articles related to the two themes on the Internet. The two themes are Facts about Dolphins (http://www.dolphins-world.com/Dolphin_Facts.html), and Texas Marine Mammal Stranding Network (<http://www.tmmsn.org/about/about.htm>).

3.4 Treatment

The intervention study is a pre-test/post-test design. Before the treatment program, the two groups of participants were given a pre-test to measure their knowledge of verb complements. The two groups received the same learning content. However, the experimental group additionally received the PBL Instruction, while the control group had conventional instruction.

Two intact English classes joined this study and were randomly assigned to one of the two treatment conditions. All participants in each condition attended a required freshman

English class that covered the same content of the assigned materials. The class met once a week for two hours over a 14-week period. The duration of each meeting per week was a period of 100 minutes. The instructional activity was conducted with two themes and each theme was instructed for a duration of seven weeks.

The PBL group served as an experimental treatment, while the control group served as a comparison treatment. Table 1 summarized the teaching scheme of the two treatment conditions for Theme One. The second theme followed the same scheme.

In the first class session of the two groups, the instructor started the lesson by introducing the topic. This is because the result received from an earlier study conducted by Lin (2011) indicated that over half of the Chinese-speaking participants tended to read the topic and predicted the content of the upcoming section of the text. The topic introduction may activate the participants' prior knowledge related to the topic.

Table 1: The teaching scheme of the PBL and non-PBL treatment conditions.

	• PBL Instruction	• Non-PBL Instruction
1	The teacher introduces the textbook and the theme.	The teacher introduces the textbook and the theme..
• 2	The teacher demonstrates verb complements and explains the functions of VCs.	The teacher demonstrates verb complements and explains the functions of VCs..
• 3	• Students read the textbook, search for VCs in the textbook and write down the answers to the following two questions: (1) What are the functions of VCs in the sentences? (2) What are the meanings of the sentences imbedded with VCs?	• Students read the textbook and search for VCs in the textbook and the instructor explains the functions of VCs in the sentences and translates these sentences.
• 4	• Students read the Internet article of the first theme, search for VCs in the article and write down the answers to the two questions mentioned above.	• Students read the Internet article of the first theme, search for VCs in the article and the instructor explains the functions of VCs in the sentences and translates these sentences.

4. Results and Discussion

4.1 Comparison of the PBL and Non-PBL Groups

In total, 56 participants were given a pre-test at the beginning of the treatment and a post-test at the end of the treatment. The collected data were analyzed from a quantitative viewpoint to answer the aforementioned research question. Independent-sample *t*-tests and paired *t*-tests were used to analyze the quantitative data. Table 2 summarizes the mean scores and SDs of the grammar pre- and post-tests for the two groups.

There were no significant differences between the PBL and non-PBL groups on the pre-test: the total score ($t = 1.357$, $df = 54$, $p = .181$), the multiple-choice sub-test ($t = -.058$, $df = 54$, $p = .954$), and the blank-filling sub-test ($t = 1.811$, $df = 54$, $p = .076$). The PBL group made significantly better gains on the total score of the grammar post-test than the non-PBL comparison group ($t = 2.355$, $df = 54$, $p = .022$). Specifically, the PBL group made significantly better gains on the blank-filling score of the post-test than the non-PBL comparison group ($t = 5.641$, $df = 54$, $p = .000$); there was no significant difference between the two groups on the multiple-choice score of the post-test ($t = .037$, df

= 54, $p = .97$). At the end of the semester, the participants who received the PBL training generally performed better than those who did not receive any PBL training in learning knowledge of verb complements. The finding suggests that the instructor's direct interpretation of grammar rules is not efficient; the added problems activate the learner to review their knowledge of VCs and hence utilize it correctly. From the result of the blank-filling sub-test, an interpretation of the results is that the PBL approach can be an efficient way to improve the participants' ability to produce correct forms of verb complements.

4.2 Within Group Comparisons

Regarding the within group comparisons of the PBL group's pre- and post-tests, the PBL group's total mean score ($Mean = 20.23$) on the post-test was slightly better than its total mean score ($Mean = 19.31$) on the pre-test, but the difference fell short of statistical significance ($t = .1324$, $df = 25$, $p = .197$). However, it can be noted that the PBL group received a significantly higher mean score on the blank-filling post sub-test than its score on the pre-test ($t = .434$, $df = 25$, $p = .000$). The result suggests that the PBL approach obviously improved the participants' ability to write down correct verb complements in terms of sentence context.

Regarding the within group comparisons of the non-PBL group's pre- and post-tests, there were no significant differences in the total score, the multiple-choice sub-test score, or the blank-filling sub-test score. Judging from the three mean scores, the participants in the non-PBL group received lower scores on the post-test than on the pre-test. This result suggests that the participants receiving the teacher-led instruction did not make obvious progress in their knowledge of verb complements.

Table 2: Means and SDs for the grammar pre- and post-tests.

		PBL Group		Non-PBL Group	
		Mean	SD	Mean	SD
Pretest	Multiple-choice	12.69	2.478	12.73	2.803
	Blank-filling	6.62	1.235	5.83	1.877
	Total	19.31	2.839	18.07	3.841
Posttest	Multiple-choice	12.23	3.076	12.20	3.078
	Blank-filling	8.00	1.386	5.67	1.668
	Total	20.23	3.702	17.87	3.785

Note. $p < .05$

5. Conclusion

This study attempted to compare PBL and non-PBL grammar instruction, and aimed to determine whether PBL instruction is more efficient in a 14-week treatment than non-PBL instruction. In general, the results of the current study suggest that synthesized with the results of the totaled mean score and the blank-filling testing mean score on the post-test, the PBL approach successfully fostered the participants' knowledge of verb complements. The positive result is due to the significant outcome of the blank-filling sub-test. More specifically, the PBL approach significantly improved the students' ability to produce correct verb complements in the blank-filling evaluation format. This may be attributed to the active process of knowledge application. As Dewey (1963) stressed, students learn what they do, not what they are told. The students in the PBL group dedicated to finding out the answer by reading the material and writing down answers to the problems. In contrast, the participants in the non-PBL group were led by the teacher.

Armed with the results concluded from the present study, three instructional recommendations are presented for second language teaching professionals with the intention to use the PBL approach.

First, the instructor should include a writing task in the grammar curriculum when using the PBL approach. In the PBL group, the instructor proposed problems related to the textbook, and asked the participants to write down the answer. Through the process, the students wrote and read their

answers. Their conceptions of verb complements were repeatedly reinforced. Therefore, the task of writing down answers can help students to write down correct forms of verb complements.

Second, the Internet is a proper database to support the practice activity in the grammar instruction. In this study, the participants of the PBL group read the supplementary articles surveyed from the Internet to further familiarize themselves with how verb complements are used in the context of real world. The language professionals may integrate the Internet into their instruction.

Third, the learner is encouraged to take responsibility for his/her own learning. In this study, PBL instruction aimed at a learner-centered curriculum. The learner took on greater responsibility for the instruction process than their counterparts in the control group. The teacher acted as a facilitator, guiding them to achieve English grammar knowledge. In fact, a multimedia environment has access to an endless world. There are so many on-line resources for learners to find the solutions to problems. During the process of solving problems, it is not efficient for the learner to follow the teacher's explanations to learn linguistic knowledge of the target language. The learner needs to actively figure out the answers to the problems.

However, due to the limitation of the testing technique, the beneficial effects of the PBL approach do not hold up well at all. In this study, a delayed test was not administered, so whether the effects of instruction endure is questionable. As Truscott (2007) pointed out "[t]eaching is not a success if it produces only short-term benefits, disappearing soon after the instruction is over (p.10)." At present, the grammar pre- and post-tests are a type of immediate test. In future research, delayed post-tests should be added to examine whether the PBL approach has lasting benefits for EFL students' grammar learning. Although it cannot be currently generalized that the PBL approach produces lasting impacts on EFL university learners, this approach still have value for enhancing learners' ability to acquire the knowledge of verb complements.

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