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ABSTRACT

This paper denotes the findings from an action research project, which applied problem-based learning (PBL) in linguistics courses in an MA TESOL program in Vietnam. The project aimed to study the extent to which the use of problem-based tasks in semantic courses could promote students' employment of higher-order thinking skills in their learning. It was found that the PBL approach was specifically appropriate in promoting higher-order thinking skills for students with passive learning habits in such Confucian heritage cultures as Vietnam. With well-designed problem-based tasks and adequate tutoring, students learned how to use higher-order thinking skills to facilitate their learning; how to stay more focused on the completion process of problem-based tasks; and how to be motivated to engage in learning activities. In addition, some students were encouraged to follow the same PBL approach in their own teaching practice. Problem-based tasks which took place at a fixed time during class seemed to cause students to lose interest. In addition, a lack of adequate job experience might also have limited the effectiveness and overall success of the problem-based tasks.

Keywords: problem-based learning, higher-order thinking skills, critical thinking

Introduction

Vietnam is a country deeply rooted in Confucian values. In Vietnam, the education system is still enmeshed in the traditional lectured-based and teacher-centered approach (Hoang, 2008; Le, 2007; Le, 2011; Lewis & McCook, 2002; Nguyen, 2009; Pham & Fry, 2004). Within this approach to education, many teachers take the amount of information students are taught as priority while the development of learning skills are not adequately acknowledged. Reminiscent of Vietnamese feudal dynasties from the past, successful students in Vietnam are those who are able to memorize information; teachers generally emphasize memorization over understanding what they have taught in the lectures. Higher-level skills such as analytical reasoning, evaluating, or problem solving are not promoted in such a traditional approach.

For the past 10 years, Vietnamese educators have discussed the urgent need for an innovative approach which promotes students' self-directed learning and develops their thinking skills at higher levels (Nguyen & Nguyen, 2017). Characterized as a learner-centered approach, problem-based learning (PBL) has recently been applied on a small scale by a number of teachers in Vietnam (Vu, 2012; Nguyen, 2016; Nguyen, 2017; Tran, 2016; and Vu, 2016). In Vietnam, PBL has only been applied on a small scale in teaching students of medicine (Nguyen, 2017), in teaching science to primary and high school students (Nguyen, 2016; Vu, 2012; Vu, 2016), and in teaching mathematics to high school students and university students (Tran, 2016). This study is an effort to apply PBL in teaching linguistics. It focused on the following research question: To what extent could the use of PBL tasks promote students' use of higher-order thinking skills in learning? This article discusses PBL and analyzes a specific PBL project for teaching and learning linguistics in an MA TESOL program in Vietnam. The author shares the ways the program promotes students' higher-order thinking skills.

Problem-Based Learning (PBL)

PBL is a learner-centered pedagogical approach, which provides students with opportunities to engage in goal-directed inquiry. Students work in groups to analyze an open-ended problem, which involves different aspects of conceptual knowledge and which can be solved in many different ways (Barrows, 2000; Hmelo-Silver, 2004). According to Hung, Jonassen, and Liu (2008), PBL is the instructional method in which, by prompting an authentic problem to students and raising their need to solve that problem based on their knowledge and skills, teachers can initiate their students' independent and self-directed learning, as well as develop their problem-solving skills.

In PBL, "the focus is on organizing curricular content around problem scenarios rather than the subjects or disciplines" (Maggi, 2003, p. 2). Teachers play the role of facilitators rather than the disseminators of knowledge (Wilkerson & Gijselaers, 1996). Rather than disseminating knowledge and skills to students through transmissive, lecture-based techniques, teachers facilitate thinking, reflecting, and collaborative inquiry for their students. During this process, students discover what and how to learn in relation to the topic or the task requirement. Finally, once students make their final decision on the best way to solve the problem, they learn both the subject knowledge and skills and practice using higher-order thinking skills in learning.

Previous studies have discussed PBL as a promising approach to promote students' conceptual knowledge during the learning process (Hmelo-Silver, Derry, Bitterman, & Hatrak, 2009; Lambe, 2007; van Berkel & Schmidt, 2000; Walker & Leary, 2009; Zhang, Lundeberg, McConnell, Koehler, & Eberhardt, 2010). PBL is considered to be an innovative approach in teaching and learning. As pointed out by Hmelo-Silver and Simone (2013), the goals of PBL consist of conceptual and pedagogical content knowledge construction, collaboration, and self-directed life-long learning. PBL positively influences students' self-assessment ability (Scholman & Roters, 2009), and PBL helps learners develop independence and shared responsibility for their learning (Bell, 2012, p. 4). PBL also helps in enhancing their motivation to engage in the course (Jones, Epler, Mokri, Bryant, & Paretti, 2013; Lee & Tan, 2004). However, there are factors to consider when using this approach. PBL may be restrained by inadequate tutoring (Barrows, 1986, p.65), and the use of PBL may reduce teachers' control over content coverage and increase vulnerability and teaching-related workload (Bibeiro, 2011).

The origins of PBL are in the field of medicine (Barrows & Tamblyn, 1980); since 1980, it has been expanded to teacher education (de Chambeau & Ramlo, 2017; Hendry, Wiggins, & Anderson, 2016; Hmelo-Silver, 2004; Schetino, 2016; Sipes, 2016). PBL has also found applications in teacher professional development (Zhang et al, 2010). Recently, PBL has been applied in teacher professional development or TESOL courses (Caswell, 2016; Hung & Holen, 2011; Pourschafie & Murray-Harvey, 2013; Zhang et al., 2010). This action research project is an attempt to bring PBL into the Vietnamese MA TESOL classes.

PBL in Vietnam

In Vietnam, such student-centered approaches as PBL are not yet popular because of the continued influence of Asian Confucian values and views on education (Phuong-Mai, 2008), which identify the teacher as the end-all source of knowledge and truth, as well as teachers' high workloads, test-oriented teaching (Pham & Renshaw, 2013), and lack of infrastructure for teaching and learning in lower income areas (Pham, 2010). Of all the factors mentioned above, the most influential factor is the learned tradition of passive learning for Vietnamese students. This tendency is also a problem insistently discussed by many education experts, as well as commentators in Vietnamese media and educational forums. The teacher-centered approach to learning has been the dominant structure of the Vietnamese education system for centuries; thus, passive learning has long persisted in the learning habits of local students (Ho, 2015; Le, 2007; Le, 2011; Nguyen, 2009; Pham, 2010; Pham, 2014; Pham & Fry, 2004). Despite the efforts by the Vietnam Ministry of Education and Training to build up a learner-centered education system, Vietnamese teachers have resisted the paradigm shift toward engaging students in the learning process as active and independent learners (Le, 2011; Pham, 2010; Pham & Renshaw, 2013).

Thinking Skills and Problem Solving

Much has been discussed about promoting higher-order thinking skills for the sake of enhancing learning quality. Bloom (1956) proposed a model of thinking skills with three domains of education activities: cognitive, affective, and psychomotor. However, after half a century, education in the world has shifted from this framework, and later studies have also criticized Bloom's hierarchical taxonomy in categorizing educational activities from simple to complex for simplifying the nature of thinking and its relationship to learning processes (Marzano, 2001; Anderson & Krathwohl, 2001). In an attempt to curtail the limitations of this framework, Anderson and Krathwohl (2001) developed a revised version with new names for the three categories and the addition of subcategories. Also acknowledging the shortcomings of Bloom's (1956) one-dimensional taxonomy, Marzano (2001) incorporated a wider range of elements in the learning

process and developed a new two-dimensional thinking model of educational objectives, referred to as Marzano's new taxonomy. In this taxonomy, skills classified into the comprehension and retrieval levels are generally considered lower-order thinking skills, while those classified into the levels of analysis and utilization are considered higher-order thinking skills.

Different studies have identified the relationship between higher-order thinking skills development and the promotion of problem solving ability. As Chinedu, Kamin, and Olabiyi (2015) point out, "higher-order thinking skills involve analyzing information to determine the problem, evaluating the problem and creating a new workable solution" (p.36). Taking the PBL approach in teaching and learning, higher-order thinking skills enable learners to find a solution for a particular problem in their studies and in real life, which cannot be solved by simply using a memorized solution but rather by a combination of different skills like logical analytical reasoning, reflective thinking, and creative evaluating skills to develop a strategy. Hung et al. (2008) assert that to be an effective problem solver, students need to possess analytical, critical thinking, and metacognitive skills. Also, Bransford and Stein (1984) note that problem solving is the general mechanism behind all thinking and learning for understanding and is essential for critical thinking, creative thinking, and effective communication. In other words, PBL contexts could be a good environment for higher-order thinking skills development, and the employment of higher-order thinking skills conditioned the process of students finding solutions to the problems raised to them in learning. Once students could use higher-order thinking skills to solve the problems in their learning process, their academic achievement could consequently be enhanced (Rajendran, 2008), and their motivation and learning results (Brookhart, 2010) could also be improved.

Teaching Linguistics in Vietnamese Tertiary Institutions

In contemporary Vietnam's education system, the methods of teaching and learning are still very much teacher-centered (Hoang, 2008; Le, 2011; Le, 2007; Lewis & McCook, 2002; Nguyen, 2009; Nguyen, 2013; Nguyen, Nguyen, Nguyen, & Doan, 2015, 2016). This means that many teachers still place great emphasis on the quantity of information students are taught rather than the development of specific thinking skills needed for learning. Students are required to memorize an unreasonable amount of information in order to perform well on assignments, which are mostly in-class tests. The types of activities teachers employ tend to include exercises where students are required to fill in the blanks, answer true or false, or offer definitions for specific terms. In class, students are reticent to participate in class activities that test their knowledge. In addition, students appear to be terrified of taking tests (Nguyen et al., 2015, 2016). Many of these students have grown frustrated by their role as "passive acceptors" (Forester & Chau, 1999, p.10). However, students rarely question why they need to learn specific information and if there are any alternative ways to teach and learn more effectively (Le, 2007; Le, 2011).

In Vietnamese universities, linguistics subjects are offered as both core and elective subjects in undergraduate and/or graduate programs for literature, language, and foreign languages. In foreign language programs for both undergraduate and graduate students, linguistic subjects are designed to provide pre-service and in-service teachers, interpreters, and translators with the fundamentals of linguistics as a discipline so that they will be able to apply the linguistic knowledge and skills learned in their future jobs. Due to the upsurge in the demand for English in Vietnam over the last few decades, the employability of English graduates is high (Hoang, 2008; Le, 2007; Tran, 2012; Tran, 2014); many students of English could have already been able to find part time jobs as teaching assistants, tutors, or freelance translators before they took the linguistic courses. Therefore, they falsely believed that the linguistic courses were not necessary for them. Even though these courses would provide students with the necessary knowledge and skills to teach or translate at a more advanced level, linguistic subjects are considered something purely theoretical and far from essential and practical for the students, so their motivation for deep learning (Biggs, 2003) in linguistic subjects is often low (Nguyen et al., 2015, 2016).

With regard to the teaching of linguistic subjects in the foreign language college where I teach, the results of a recent survey conducted also showed that a teacher-centered approach in teaching linguistic subjects is still used here (Nguyen et al., 2015). The survey found that despite teachers' success in imparting linguistic knowledge to their students and in helping students to develop linguistic skills, the teachers still tended to neglect to develop students' thinking skills development in class (Nguyen et al., 2016). Teachers rarely created chances for students to be analytical or critical in their learning and to keenly learn how to apply the subject knowledge and skills in their current English learning, which could transfer to their future career. In line with the current teacher-centered approach in delivering the course, students' had not been taught to reflect on what they learned; to think analytically and critically; to evaluate with logical reasoning; to form conclusions on issues raised in the learning tasks; and to apply autonomously what they learned in solving real problems (Nguyen et al., 2015). In other words, there appeared to be a need for a teaching methodology to help students develop thinking skills, which include generalizing, deducing, clarifying, and justifying in solving

authentic linguistics and linguistics-related problems. This could also assist students in employing these skills outside of the classroom.

Research Design and Framework

To further delve into the issue of thinking skills promotion in PBL contexts, the focus of this research project is on students' use of higher-order thinking skills. The project followed Kemmis and McTaggart's (2000) action research spiral design with cycles: each consisted of planning of a change, enacting the change and observing the process and the consequences of the change, and reflecting on these processes and consequences. With the hypothesis that students' use of higher-order thinking skills can be promoted in PBL contexts, I designed the problem-based tasks in the semantic classes with TESOL MA students.

The research framework in this study, which is summarized in Table 1, was adapted from Nguyen et al.'s (2016) framework of thinking skills mostly required in linguistic tasks in the college under study. To build up this framework, Nguyen et al. (2016) selected all of the skills that students could possibly be required to use in the linguistic courses offered at the college and specified the skills they might employ for each course assignment. This framework was used in this study as the reference for designing the problem-based tasks in which higher-order thinking skills are required for tasking, and to seek evidence of how these skills were actually used.

In this action research project, PBL was applied in a partial approach, that is, the PBL approach was used in only one subject of English semantics (not the whole curriculum) and only at given points of the course in order to complete certain assignments (Ribeiro, 2011). In each cycle, the intervention was constructed from the problem-based tasks, which require students' use of higher-order thinking skills in task fulfilling. The definition of intervention in the context of action research will be explained in more detail later in this article.

The participants in Cycle 1 consisted of 14 MA students from TESOL cohort QH 2015 who took the Semantics course in Spring 2016. The participants from Cycle 2 were 12 MA students from TESOL cohort 2016, who took the Semantics course in late Fall 2016. All participants were aged from 23 to 39 years; spoke Vietnamese as their mother togue; and studied EFL as their major at the undergraduate level. Eighteen students were teachers at Vietnamese primary and high schools; five students were teaching at English teaching centers in Hanoi, Vietnam; and three students were working as tutors or freelance English translators.

Preliminary investigation

Before and after the survey by Nguyen et al. (2015), before this action research project commenced, I also had the opportunity to deliver the same semantic course to MA students of other cohorts, when I, for the purpose of continuous improvement of teaching quality, had observed and noticed that most MA students of TESOL made poor contributions to class discussion. In addition, their participation in learning activities was often inadequate, and their creative evaluation of the teacher's presentation and their friends' contributions to class discussions was often missing. These students did not know how to do critical analysis, generalize, or form conclusions from what they read in the materials. Therefore, they could not maximize what they had learned from lectures or written materials. Their presentations tended toward restatements or summaries of what had they read and lacked any creative or personal revelations. They also seemed to have trouble completing their final assignment, for which they were asked to apply the knowledge and skills gained from the course into their teaching.

Through informal discussion with some students, I discovered that students performed poorly not because of their low linguistic competence but because they did not know how to engage in learning activities or the higher-order thinking skills required for the discussion, presentation, and final essay. This led me to the conclusion that it would be necessary to promote the development of students' higher-order thinking skills in the course. It occurred to me that PBL could be appropriate for this goal because PBL is believed to be one essential factor for enhancing student learning (Brookhart, 2010; Rajendran, 2008).

The action research cycles

The intervention phases in the two action research cycles were conducted in 2016. The first cycle aimed to try out the PBL approach in teaching and test the problem-based tasks. After the first intervention—Cycle 1—the effectiveness of PBL could be observed and the limitations of the intervention were also noted. The intervention in Cycle 2 was comprised of the revision of what had been applied in Cycle 1 with efforts made to avoid the limitations and improve the effectiveness of PBL. In each cycle, the action started at week 1 and ended at week 10; week 6 was for the midterm test, so the intervention in each cycle actually lasted for 9 weeks. I started planning for the intervention about one month before the course was scheduled to begin. The problem-based tasks in the intervention were designed to increase in degree of problem structuredness, according to Jonassen's (2000) classification.

Code	Thinking skills used in the tasks	Marzano's taxonomy	Examples of linguistic tasks
IV.4	Adapt the existing rules/framework to investigate the linguistic data	UTILIZATION	Suggest the strategy to translate English modal devices into Vietnamese
IV.3	Experiment or test the rules/processes/strategy in students' own learning		Speak the sentence in Singaporean English accent / using the Falling Tune / the Dive.
IV.2	Figure out a way/ developing a strategy to solve the existing or predicted problem		How can the given Facebook statuses be devoid of sexism?
IV.1	Decide the best among the alternatives		Which is the most suitable pragmatic strategy to be used in the ELF situation?
III.4	Judge the given statement argument(s), Specify / justify the judgment on the statement(s)/the argument(s)	ANALYSIS	Do you agree or disagree with the statement "English is an agglutinating language"? Explain Comment on / Explain how metaphors work in the text.
III.3	Deduce / form conclusions from the findings about linguistic data Develop arguments for a certain conclusion		What type of genre is being used in the text chosen? It is said that Vietnamese women use more mitigating devices. How?
III.2	Generalize the data in terms of broader linguistic categories/ principles/ visuals		What are the communicative strategies that speaker A uses in the conversation?
III.1	Classify, compare, and contrast the issues /different views on the issues		Classify the cohesive devices used in the texts

Table 1: Thinking Skills Most Frequently Required For Linguistic Tasks (adapted from Nguyen et al., 2016)

II.4	Represent the language chunks using the given models	COMPREHEN-SION	Analyze the constituents of the clause: He asked me to open the door for him.
II.3	Illustrate the linguistic concepts(s) / phenomena		Make 2 clauses in SOV pattern.
II.2	Describe the relationship between the language chunks		Describe the structure of this noun phrase: the beautiful lady in pink over there.
II.1	Describe the key parts of the language chunks		Transcribe the word "watch" in IPA.
I.4	Identify the different types of certain linguistic notions or phenomenon	RETRIEVAL	State the morphological processes in the word: interpersonal
I.3	Determine if the statements are true or false		Decide whether the statement is T or F: /m/ and /b/ are bilabial sounds.
I.2	List the types or name the concept(s)/ issue(s) being described		What are the 3 characteristics of antonyms?
I.1	Recognize a concept from a list of descriptions		Write the term for the definition: The dictionary definition of the word .....

Table 1 (continued): Thinking Skills Most Frequently Required For Linguistic Tasks (adapted from Nguyen et al., 2016)

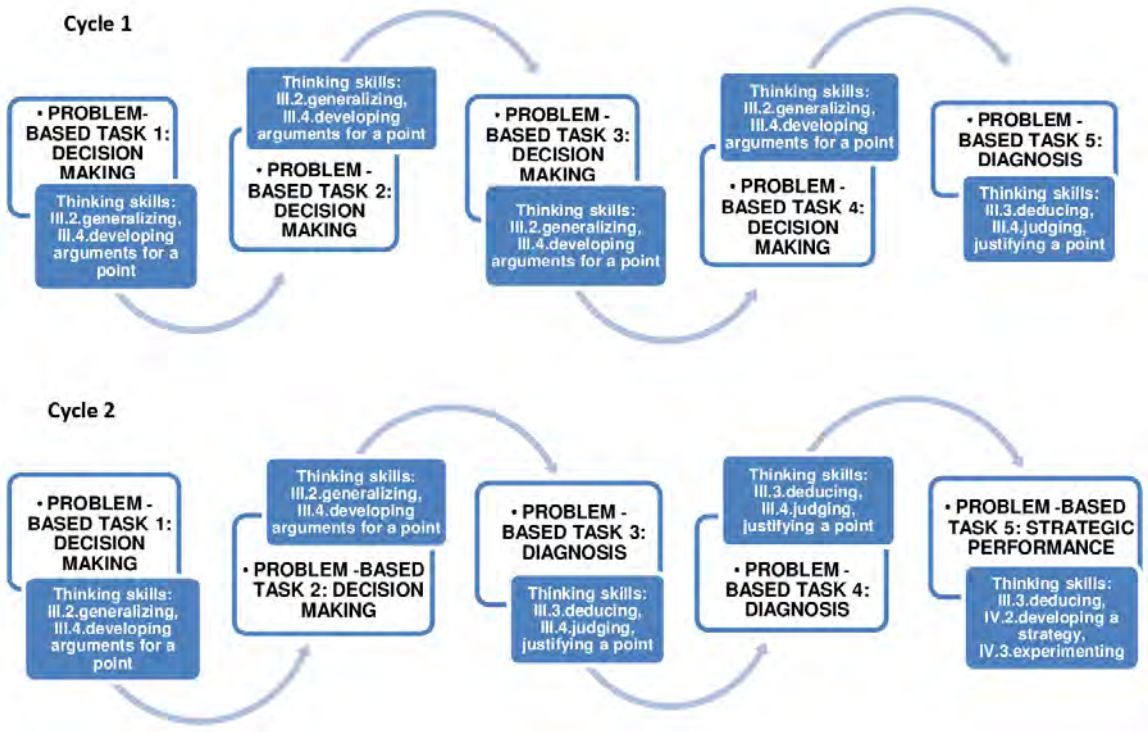

Figure 1: The problem-based tasks in two cycles.

As shown in Figure 1, students were asked to fulfill five problem-based tasks during the nine weeks of each intervention cycle. The first four problem-based tasks were conducted individually in the form of post-lecture reflective writings from weeks 1 to 4, which were coded as A in the higher-order thinking skills employment checklist (see Appendix 1, Part A and Appendix 2, Part A). Problem-based task 5 was conducted in a group, prepared at home, and presented in class; there was one group presentation per week from weeks 7 to 10, which were coded as B in the checklist (see Appendix 1, Part B and Appendix 2, Part B). Week 5 was for the tutorial, when I arranged different time slots for different groups. The whole group came to my office at the assigned slot and discussed all of the problems they encountered for task 5.

In Cycle 1, the first four problem-based tasks consisted of "decision making" and the fifth task consisted of "making a diagnosis." In Cycle 2, the first two tasks consisted of "decision making." The third and the fourth cycles involved "making a diagnosis," and the fifth task involved "strategic performance." As seen in Figure 1, the intervention in Cycle 2 was the revision of the intervention in Cycle 1 in that problem-based task 3 and task 4 were changed into a more ill-structured problem format according to Jonassen's (2000) classification, from decision making to a diagnosis case, and problem-based task 5 in Cycle 2 was no longer a diagnosis case but a strategic performance case, requiring students to employ thinking skills at a higher level.

The problem-based tasks were designed to promote thinking skills. I considered students' experience in problem solving, reasoning skills, and epistemological development when designing the tasks, as these factors all affected the problem difficulty (Jonassen & Hung 2008, p. 8). Accordingly, the first task was designed so that students were required to use level 3 thinking skills from Marzano's (2001) model of thinking skills, including generalizing and developing arguments for a certain given statement. In the last task, students were required to use higher level thinking skills such as developing a strategy to reach a goal and experimentation.

More specifically, in the first four weeks of Cycle 1 students were asked to complete four reflective writing tasks for which they had to reflect on what they had learned in the lectures to solve a decision making problem. The skills they had to use in weeks 1 to 4 mostly involved generalizing from what they had learned and developing arguments for their points, deciding and constructing supporting ideas for their decision. In weeks 7 to 10, the students worked in groups to deal with a diagnosis problem in which they had to make

generalizations based on the knowledge from the readings. They were then required to deduce the applicability of the linguistic knowledge in their teaching practice and justify the arguments they made about the applicability. For these tasks, the skills they had to use were from Marzano's (2001) level 3.

In Cycle 2, the higher-order thinking skills requirement in the first two reflective writings were kept the same as in Cycle 1 so that students had to generalize and develop arguments for their decision. However, the reflective writing tasks in weeks 3 and 4 were changed from decision-making format to diagnosis format, requiring students to use higher skills in Marzano's (2001) level 3: deducing, judging, and justifying their points. In the last problem-based task in Cycle 2, students had to reach Marzano's (2001) level 4. In other words, they had to develop a strategy to solve a specific teaching problem, which was real in their teaching practice. As required in the task requirement, each group had to develop a strategic solution to the problem, then experiment the solution in the microteaching (as part of their group presentation). Figure 2 shows an example of how a group of students accomplished this task. The detailed description of the tasks and the evidence of higher-order thinking skills employment can be found in the task fulfillment checklists in Appendix 1 (Cycle 1) and Appendix 2 (Cycle 2). The description of the 3-point scale used in these two checklists is provided in Appendix 3.

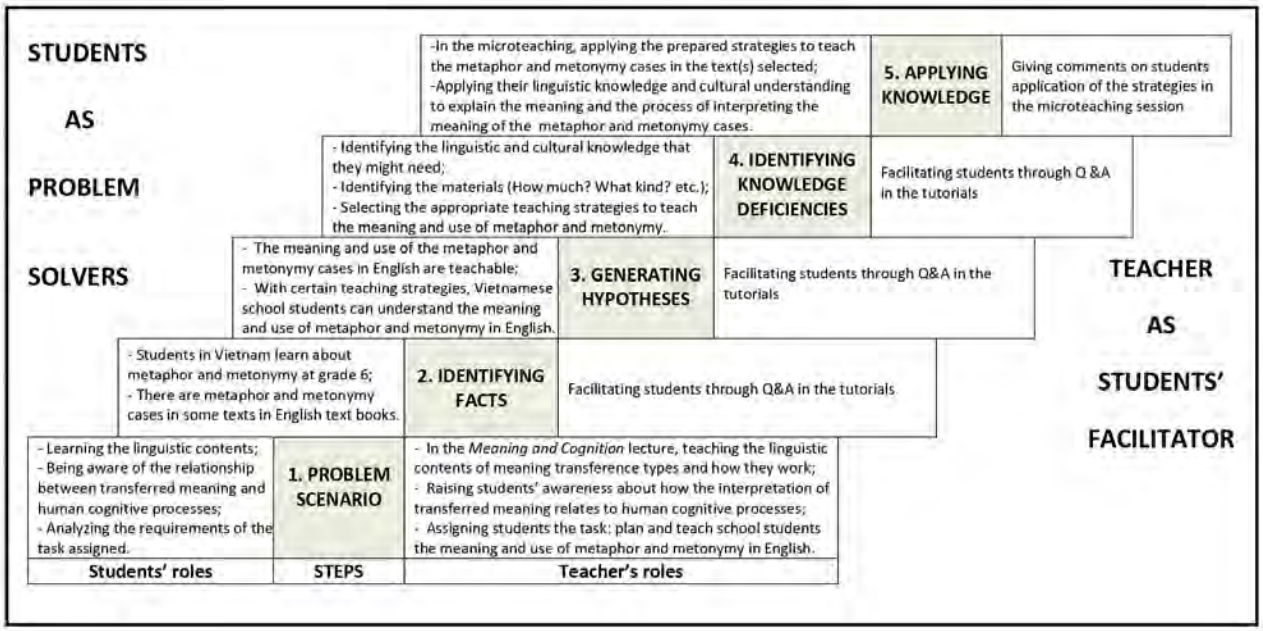

Figure 2: The steps in conducting problem-based task 5.3 of Cycle 2.

Data Sources and Data Analysis

In each cycle of the study, the data were collected from four sources: namely, class observation, assignment analysis, semi-structured interviews, and informal talks. During the problem-based tasks, I observed students' contributions to pair or group discussions. I observed what they did and how they used higher-order thinking skills during the problem-based reflective writing tasks; their presentations and the Q&A session after each presentation; how much they were motivated by the tasks; and the problems that they might be facing when doing the tasks. I noted my observations in my teaching diary and then analyzed them to get a sense of how the students used higher-order thinking skills to learn in problem-based tasks and how the problem-based task contents and designs could promote or hinder students' use of higher-order thinking skills in learning. In this way, I could determine if revision were necessary for the interventions in the following cycles.

Students' reflective writing assignments, presentation slides, and reports were scrutinized for evidence of students' higher-order thinking skills employment. The framework presented in Table 1 was used as the analytical framework during this process. The analysis of the final assignment—a two- to three-thousand-word essay on a certain subject learned during the course—was also a source of reference to triangulate data about students' use of higher-order thinking skills.

Students' use of higher-order thinking skills in writing tasks, presentations, and submitted assignments were coded using the analyzing checklists presented in Appendix 1 and Appendix 2. I was the only coder, so in order to ensure consistent analysis of the data, I based the codes on the evidence identified in students' assignments to categorize their thinking skills employment into three levels, which were quantitatively coded according to a 3-point scale. The descriptors of the levels in this 3-point scale can be found in Appendix 3.

After the intervention in each cycle, four group leaders were asked to join an audio-recorded, semi-structured focus group interview to provide information about their employment of higher-order thinking skills in the problem-based tasks and how the design and instruction of these tasks assisted them in task fulfillment. As the interviews were semi-structured, the six prepared questions were used as the prompts, and guiding questions were added so that the interviewees had the chance to clarify their points and/or offer further reflection on the tasks (see in Appendix 4). The interviews were then transcribed. The purpose of the interview component was to triangulate data about students' use of higher-order thinking skills in problem-based tasks and to elicit students' comments and suggestions about how these tasks and/or the teaching procedure should be revised.

Another channel for data collection was very brief informal talks—a kind of informal conversational interview (Patton, 1980, p. 206)—during break time with some students about what they did to fulfill the tasks, along with how and what they learned from the tasks. The information I exchanged with the students during these talks always emerged from my class observations right before the break, so these questions matched well with individual students. For students to feel more comfortable sharing their ideas, I neither audio recorded the talks nor asked them to go to a quieter place; I conducted our informal talks right in the noisy break time classroom, so that my students did not feel any pressure from being recorded. The most important reason for this choice was to create the most sociable and natural possible atmosphere of ordinary conversations, where I could easily approach my students and the students could demonstrate the highest openness in answering, explaining, and sharing their informal comments on the problem-based tasks I gave them. If the talks were recorded, such spontaneity and openness might not occur (Al-Yateem, 2012). I noted the key points of the talks and some short quotes from students in my teaching diary right after the talks. As the break lasted for only 15 minutes, I had one 10-to-20-turn informal talk with students each week; therefore, I did not have any trouble remembering what students shared with me. All key points could be noted down, and I was also able to recall some short quotes.

Both interviews and informal talks were conducted in Vietnamese for convenience and accuracy, as my students and I both spoke Vietnamese as our mother tongue and English as a foreign language. The quotes from interviews and informal talks used in this paper were all translated by me and another colleague of mine, then resent to the students for checking to ensure the translated version reflected exactly what they had said or meant. With interview data and informal talk data, thematic analysis was conducted inductively to identify the emerging themes about how students used thinking skills in the problem-based tasks and how the content and designs of the problem-based tasks could promote or hinder students' use of higher-order thinking skills in learning (so that revision could be made to the intervention in the following cycles).

Cycle 1: Intervention

The intervention in Cycle 1 was observed and the reflection could be summarized in terms of themes. As mentioned in the description of action research cycles, the intervention in Cycle 1 lasted for nine weeks. Each student was required to complete five problem-based tasks, increasing in both the degree of problem structuredness and higher-order thinking skills. As shown in Figure 1, the first four problem-based tasks were designed as decision-making problems, which were assigned to the students at the end of the lecture as a kind of 30-minute reflective writing activity. In each of these tasks, students were given a thought-provoking, open-ended question so that they would have to make full use of what they had learned from the lecture in integration with their background knowledge to generalize and form conclusions regarding the appropriate answers. They would also have to use their knowledge to develop arguments to support the points they made.

The problems students had to solve and what students were expected to learn from the problem-based tasks are summarized in Table 2. As the questions were open-ended and the main purpose of the tasks was to encourage students to think critically and creatively, there could be different answers to the questions, provided that the answers were well argued and well supported. Students' written answers were analyzed to find evidence of students' use of higher-order thinking

skills (see Appendix 1, Part A). In the tutorial (week 5), students received comments on their use of thinking skills in four problem-based tasks (i.e., whether the conclusions were formed successfully, whether judgments were clear and all-sided, whether the points were well argued and supported, etc.). All student groups then discussed with me how they should address problem-based task 5.

The last problem-based task took place with four student groups between weeks 7 to 10. The students were assigned to work in one of the four groups to complete a two-part assignment. In part 1 of the assignment—the linguistic component—each group did the analysis with detailed specification and evaluation on one of the four semantic aspects assigned. They then presented their work in class. In part 2 of the assignment, which was also problem-based task 5, the students were required to draw out linguistic generalizations from the subject knowledge and skills about the semantic issues they had analyzed, specified, and evaluated in part 1 of the assignment. Based on these generalizations, they then deduced possible ways to apply their understanding of those semantic aspects to their teaching practice to justify their points. The evidence of students using higher-order thinking skills in this task was analyzed using the checklist, which can be found in Appendix 1, Part B. The description of the four tasks that I assigned to the four groups of students and the problems they had to solve in these tasks are elaborated in Table 2.

Students' employment of higher-order thinking skills in the final assignments was also analyzed using the same checklist in Appendix 1. In addition, the 52-minute group interview with four group leaders was another tool for observing students' employment of higher-order thinking skills. The four group leaders Ba, Binh, Chau, and Chi (all pseudonyms) were interviewed on June 5th, 2016.

Cycle 1: Findings and discussion

The findings from Cycle 1 can be summarized in five major themes, which will be discussed in turn below.

Theme 1: Students made progress in their ability to use higher-order thinking skills.

The data about how students used higher-order thinking skills in the problem-based tasks in Cycle 1 are summarized in Table 3.

As seen in Table 3, the thinking skill that was most improved was that of generalizing (i.e., students' ability to draw out conclusions from what they read and learned). The possible trend was that as students became more experienced in using higher-order thinking skills in the problem-based tasks, their ability to use higher-order thinking skills increased. Significant progress was made by Binh and Chi in the way they generalized conclusions from the readings for task 5.

The comparison between the values of numbers coded for students' performance on task 5 and those of other tasks, especially the difference between 1B1 and 1A1 (generalizing skills [III.2]) revealed that when students had a chance to work in a group and do the tasks at home where they were not under time constraints and could spend time thinking and discussing in their groups, they could draw much more detailed original conclusions than when working alone under time pressure in class. Though students could discuss in class, the reflective writings were still conducted individually.

In the interview, all students said that in the first four tasks, as the questions were quite closely related to what they had learned from the lecture, they did not have much difficulty in constructing the supporting ideas and examples for the conclusions they made. In task 5, however, though four groups of students did their preparation at home, which meant they had more investment of time and efforts on the task, I observed that their presentation of the applicability of semantic aspects of their teaching practice still showed a big gap between their linguistic understanding and their teaching practice. Such a gap hindered their full justification for the deductive reasoning ideas. Three out of the four groups could only offer general supporting ideas and examples to support their points about the applicability of linguistic aspects to teaching.

Theme 2: Students found the problem-based tasks with higher-order thinking skills requirement meaningful to their learning.

During the problem-based tasks in the class, I noticed that students were more motivated and lively than in other reading or discussing activities during the lectures. This discovery was comparable to Lee and Tan (2004) and Jones et al. (2013) regarding the influence of PBL implementation on students' motivation and engagement in learning. Most students actively discussed the answers to the problem-based questions on meaning acquisition, referential ambiguity, lexicon development, and the mechanism behind figurative language with their peers, and others read the handouts over and over again to find any possible clues for discovering the answers. Some students raised questions to clarify the terms or asked for further instruction about what they were expected to do to complete the task. In the interview, the feedback about how students learned from the problem-based tasks was quite positive. For example, Chi noted:

The tasks	What students are expected to engage in doing and learn from
1. How can deaf and blind people acquire meaning?	Make use of what students have learned about how meaning could be created, conveyed, and acquired to decide which might be the possible problems that deaf and blind people face in acquiring meaning, then give your own explanation to those problems (there is no such explanation for this in the lecture).
2. Which types of texts have the most/least referential ambiguity? Why?	Make use of what students have learned about referential ambiguity and how referential ambiguity might influence meaning interpretation to decide the types of texts as required; then give their own explanation to a real issue where referential ambiguity is still used to communicate at different levels for specific communication purposes (there is no such explanation for this in the lecture).
3. How can our lexicon be built up and structured?	Make use of what students have learned about meaning and cognition relation to decide which might be involved in lexicon construction, then explain the possible mechanism for the development of the language user/learner lexicon (there is no such explanation for this in the lecture).
4. How can figurative language work? How can we say something in one way but the listeners understand it another way?	Make use of what students have learned about cognitive processes and conceptual mappings to decide which mechanism might work in figurative language interpretation, and describe those mechanisms (there is no such explanation for this in the lecture).
5.1. What are the basic features of predicate / semantic roles of arguments in English? How would an understanding of these features help you in your English teaching? 5.2. What are the basic relations between the language used and the perception of colors, space, motion, and time in English? How would an understanding of these features help you in your English teaching? 5.3. What are the basic features of meaning transference in English? How would an understanding of these features help you in your English teaching? 5.4. What are the basic features of modality in English? How would an understanding of these features help you in your English teaching?	Make a diagnosis of the possible connection between the knowledge in semantics (predicate or semantic roles of the argument/ perception of colors, space, motion, time/meaning transference/ modality), which had been learned from the lectures and from the provided readings and one's own teaching English teaching practice; deduce and justify the applicability of linguistics to language teaching.

Table 2: Problem-based Tasks in Cycle 1

"It's good in the sense that we had to look back to the lectures handouts and materials and tried to think... and think seriously to draw conclusions about what we've learned" (personal communication, June 3, 2016).

I also noticed that after problem-based task 1 in week 2, the students became more attentive and critical in the discussion activities during the lectures. They showed greater effort in learning, for what they learned might be useful in the upcoming tasks. The problem-based tasks with higher-order thinking skills requirements seemed to make learning meaningful for them.

Theme 3: Students appeared unconfident, seeking further facilitation while doing the problem-based tasks.

During the interview and from the informal discussion with students after the lectures, I realized that the reason why most of the students failed to use higher-order thinking skills was because they had never been taught how to perform those skills. Two group leaders, Ba and Chau, shared in the interview that it was not until week 3 that they finally figured out that they needed to articulate the unstated conclusions instead of just repeating the points with identical words that they had memorized from the lectures.

In the very first problem-based task, I noticed a student turning over the pages of the coursebooks over and over again, then using her smartphone to type in the whole task content on Google in an attempt to find any ready-made answer to the questions. The students seemed to need further assistance to understand how to use higher-order thinking skills to complete the tasks. The supplement of the teacher's model for how to conduct the task and/or additional guidance in the next cycle might be an appropriate improvement to the intervention, which also might help to avoid or minimize what Barrows (1986) calls the negative effects of inadequate tutoring on PBL implementation.

Theme 4: Students had problems dealing with the tasks, which were heavily loaded in linguistics and not quite teaching-related.

About three-fourths of the students commented through informal discussion that the linguistic content of the tasks—task 5 in particular—was too difficult for them. As the group leaders explained in the interview, since the students' major was TESOL and many of them were teaching at primary schools, language centers, and even as tutors or freelance translators, the linguistic input needed for teaching and translating was believed to be comprised predominantly of word meaning, sentence meaning, and idioms. Therefore, they found it hard to justify the applicability of such aspects as semantic roles or meaning transference in their own teaching practice.

"Semantic roles are for the linguists, I just can't think of how to use the concept in teaching" (personal communication, April 24, 2016).

In the interview, Chau shared:

My students were at primary schools, so I find it hard to teach idioms to my students, they're just too small. […] Yeah, some simple idioms of colors are OK

Mean (N = 14)	**Task 1**	**Task 2**	**Task 3**	**Task 4**	**Task 5**
1A1(**III.2**): Generalizing	1.89	1.89	2.14	2.21	
1A2 (**III.3**): Developing arguments for	2.07	2.07	2.21	2.21	
1B1 (**III.2**): Generalizing					2.75
1B2 (**III.3**): Deducing					2.25
1B3 (**III.4**): Justifying the points					2.0

Note.III.2, III.3, III.4 are the codes for levels in Marzano's (2001) taxonomy (for further details, see Table 1)

Table 3: Progress in Cohort 2015 Students' Ability to Use Higher-order Thinking Skills in Cycle 1

> and fun but… I've never done it before, so I just can't think of the examples for the applicability. (personal communication, June 3, 2016).

In addition, students also suggested during the informal talks, which was also Binh's position in the interview, that the task be more related to teaching.

> "Do you think it's better if we could discuss something more related to teaching, or more real-life?" (personal communication, June 3, 2016).

There seemed to be a need to reduce the linguistic load and extend the applicability of the problem-based tasks to students' teaching practice.

Theme 5: Students might feel bored with the repeated design of the problem-based tasks.

I also detected from my class observation that by week 4 some students were no longer interested in the reflective writing with the same form of decision making. I also inferred from the analysis of the reflective writing that two to three weeks might be sufficient for students to be able to perform the skills of generalizing, forming conclusions, and developing arguments. There was little evidence that students' use of these thinking skills was significantly improved in problem task 4. There seemed to be a need to vary the form of the problem-based tasks in the intervention.

I also realized from the assignment analysis that students might need higher-order thinking skills practice. Six out of 14 students did not show as clear evidence of using higher-order thinking skills as they did in the writing and the presentation. It could be inferred that using higher-order thinking skills had not become their habitual activities in learning.

Cycle 2: Intervention

The intervention in Cycle 2 was improved from what I had observed in Cycle 1. Having made several discoveries from my obversations in Cycle 1 about the need to model higher-order thinking skills employment, in Cycle 2 I tried to add more thought-provoking questions for students to discuss. During the lectures, I raised open-ended, thought-provoking questions in discussion activities so that students had to use higher-order thinking skills for their own reflection, as well as in their pair or group discussions. I then facilitated instructions, clarification, and guiding questions in order to guide the students in using higher-order thinking skills. Before students started their first reflective writing for problem-based task 1, I also asked questions to make sure they understood the process for completing the assignment. Guiding questions were also provided for students who were still unsure of how to fulfill the task.

I revised the first problem-based task in Cycle 2 to be more thought provoking. Also, problem-based tasks 3 and 4 were changed into a more ill-structured format—the diagnosis problem—for which students were asked to offer a judgment on a given belief or statement. The students therefore had to make use of all they had learned from the lectures, their reasoning skills, and their group discussion to deduce the reasons why there was such a belief or a statement, to offer positions on the belief or statement, and to justify their positions. The problems students had to solve and what students were expected to learn from the problem-based tasks are summarized in Table 4. The checklist in Appendix 2, Part A was used in the analysis of higher-order thinking skills employment for these tasks.

From my observations in the reflection in Cycle 1, I revised the last problem-based task to reduce the linguistic load and increase the applicability of the task to teaching. Part 1 of the assignment was cut from the group assignment of MA students of TESOL. Part 2—the problem-based task—was revised to be more relevant to their teaching jobs. In this task, students were expected to collect their own data; to analyze the data in the aspect required; to deduce the teachable points; to plan the complete strategy to teach that aspect to their students; and to test that strategy in a microteaching session. The evidence of students using higher-order thinking skills in this task was analyzed using the checklist in Appendix 2, Part B. As I discovered from Cycle 1, there was an increase in the degree of job-relatedness throughout the problem-based tasks in the intervention of this cycle.

The final assignments were analyzed using the higher-order thinking skills employment checklist in Appendix 2. The tutorial and the 46-minute group interview were conducted on January 13th, 2017 in the same way and with the same contents as in Cycle 1. The four group leaders that I interviewed were Tien, Vy, Xuan, and Xuyen (all pseudonyms).

Cycle 2: Findings and discussion

The findings in Cycle 2 could be summarized in six themes.

Theme 1: Students made progress in ability to use higher-order thinking skills.

The data about how students use higher-order thinking skills in the problem-based tasks in Cycle 2 are presented in Table 5.

The tasks	What students are expected to engage in doing and to learn from
1. "There are only two things in the world: nothing and semantics," Werner Erhart. In your opinion, why does Erhart say this?	Make use of what students have learned about how meaning could be created, conveyed, and acquired to decide the possible implicature of the saying, then give their own opinions (there is no such explanation for this in the lecture).
2. Which types of texts that have the most/least referential ambiguity? Why?	Make use of what students have learned about referential ambiguity and how referential ambiguity might influence the interpretation of meaning to decide the types of texts as required, then give their own explanation for a real issue where referential ambiguity is still used to communicate at different levels for certain communication purposes (there is no such explanation for this in the lecture).
3. It is believed that conversations with meaningless sentences could be used as the input to teach your students. Do you agree or disagree? Why?	Make use of what students have learned about sentence meaning, utterance meaning, and cognition relation to make a diagnosis of a real situation in teaching, then give their own opinions (there is no such diagnosis in the lecture).
4. Turner (1991) said, "The words themselves say nothing independent of the richly detailed knowledge and the powerful cognitive processes we bring to bear." How then can we teach abstract words to young children?	Make use of what students have learned about the meaning and cognition relation to make a diagnosis of a real situation in teaching and give their own opinions (there is no such diagnosis in the lecture).
5. 1. Analyze students' writings and evaluate the development of their lexicon. How to further develop their lexicon? 5.2. Plan and teach a lesson in which semantic mapping or sense relations are used in teaching reading skills or vocabulary. 5.3. Collect texts with the use of metaphor and metonymy or idioms about colors/space/motion/time, then plan and teach students about the meaning and use. 5.4. Collect data of teachers' comments or instruction in the class. Analyze the use of modality in these comments or instructions, then suggest ways to improve the effectiveness of the teachers' comments and instructions.	Make use of what students have learned about semantics to analyze real texts in real teaching contexts, deduce the teachable point, plan the strategy to implement the knowledge and skills gained from the course on their teaching, and try the strategy in microteaching.

Table 4: Problem-based Tasks in Cycle 2

Mean (N=12)	Task 1	Task 2	Task 3	Task 4	Task 5
2A1 (**III.2**): Generalizing	1.91	2.17			
2A2 (**III.3**): Developing arguments for	1.91	1.91			
2A3 (**III.3**): Deducing from the contents of the lectures			1.91	2.17	
2A4 (**III.4**): Judging			2.08	2.17	
2A5 (**III.4**): Justifying the points			2.08	2.17	
2B1 (**III.3**): Deducing from the data and materials					2.5
2B2 (**IV.2**): Developing a strategy (teaching plan)					2.75
2B3 (**IV.3**): Experimenting (conducting the microteaching)					2.25

Note. III.2, III.3, III.4, IV.2, IV.3 are the codes for levels in Marzarno's (2001) taxonomy (for further details, see Table 1).

Table 5: Progress in Students' Ability to Use Higher-order Thinking Skills in Cycle 2

Progress in students' ability to use higher-order thinking skills in problem-based tasks has been illustrated in Table 5. The students who made the most significant improvement in higher-order thinking skills employment were Vy and Xuyen; based on their understanding of linguistic relativity theory, these students were able to provide creative and vivid illustrations of how to teach English idioms of motion in their microteaching task. In general, students made the most progress in the skill of deduction (III.3). Just like in Cycle 1, as students became more experienced in using higher-order thinking skills, their ability to use these skills increased. This situation, together with the findings about students' progress in Cycle 1, resonates with the conclusions of Hmelo-Silver et al. (2009), Lambe (2007), van Berkel and Schmidt (2000), Walker and Leary (2009), and Zhang et al. (2010) about the positive influences of PBL on promoting students' conceptual knowledge during the learning process.

The findings illustrated in Table 5 in comparison with the findings demonstrated in Table 3 also show that there might be a positive relation between the degree of job-relatedness of the tasks and how well the students fulfilled the tasks, which required such higher-order thinking skills as deducing and justifying the given points. In the interview, all of the students said that they were teachers or tutors of English already, so they were more confident and skilled in dealing with the diagnosis problem-based tasks (tasks 3 and

4) and strategic performance task (task 5). In the interview, problem-based task 5 was said to be the most meaningful and applicable to students' teaching practice, as it was an integration of lesson planning skills, teaching experience, and understanding, which were all related to students' teaching jobs. From analyzing the final assigments, evidence of the application of higher-order thinking skills in 11 out of 12 papers was also identified, which demonstrated students' ability to use higher-order thinking skills in learning.

Theme 2: Once students were familiar with using higher-order thinking skills for the problem-based tasks, they became more attentive in learning.

As mentioned, in this cycle, I integrated thought-provoking questions for discussion in the first lecture to elicit students' critical thinking. Students' answers in the very first discussion activities were quite simple; however, as I gave them detailed instructions in the form of guiding questions—"Why do you say so?"; "Can you give an example?"; "What could be inferred?"; "What would happen if…?"—they were able to offer more detailed answers. Such discussion activities were the model for how to use higher-order thinking skills in learning.

From week 3 on, I was able to reduce the amount of instruction I gave as students learned from the model activities. However, students were still attentive in the discussions, as they knew they still needed to pay close attention in the discussion for a specific reason. Also, as observed in Cycle 1, the use of problems in the reflective writing at the end of the lectures was a good reason for students to stay focused during the lectures. Tien explained she paid close attention in class and had to concentrate in order to employ the higher-order thinking skills that were required for the class discussions and in the problem-based tasks:

> "I was very lazy, but then I tried to participate in all the learning activities because I might get good input for the reflective writing. I tried to listen and take notes" (personal communication, January 13, 2017).

I found that higher-order thinking skills required for the problem-based tasks helped students stay focused, which was quite similar to Bell's (2012) finding that PBL could positively influence students' responsibility for their learning.

Theme 3: Students were motivated if the problem-based tasks were well designed.

From the informal talks, I was told that some students liked the meaningful quotes from the famous scholars. I could also observe that discussions on how to understand the meaning of the quotes were noisy and fun as each student contributed an interpretation from his or her own view. The description of the tasks, if well designed (e.g., with the quotation of evocative sayings or beliefs by famous people), might also inspire students to read more and learn more.

> "I think what Werner Erhart says is special because there could be different way to interpret it. I will search Google to see how people explain it" (personal communication, October 28, 2016).

In the last problem-based task, the microteaching presentations conducted by the groups were successful in the sense that all audience students were involved in the teaching and learning process, and they participated enthusiastically as real students who were learning a lesson. The students actively participated in the activities of semantic-mapping, reading, guessing the meaning of color idioms, and constructively discussing the appropriate degree of modality to be used in classroom instruction. The presentations were enjoyable and informative; students learned from their peers.

All of the group leaders said they invested a great deal of time and effort for the planning and the rehearsal of the presentations, even predicting the possible problems that might occur and coming up with solutions. The last task was considered to be the most rewarding because all of the students worked hard and learned something. This situation echoed Jones et al.'s (2013) findings about the positive impact of PBL on students' learning motivation.

Theme 4: Students felt encouraged to apply PBL in their own teaching practice.

As the problem-based tasks in Cycle 2 were revised to be more related to students' teaching practice, the last problem-based task of Cycle 2 required students to plan a complete strategy of applying semantic issues in teaching, and then experiment with the strategy in the form of microteaching. In class, all students could observe how this task worked out in the real practice of teaching. They learned by modeling the way I gave instructions in the form of guiding questions. Xuyen shared in the interview:

> "I guess many students understood the problem quite well but don't know how to express their ideas. Your questions pushed me to think and elaborate my points. […] I might try this in my teaching" (personal communication, January 13, 2017).

Theme 5: When the problem-based tasks were repeatedly given at a fixed time, students might lose their interest in doing them.

All of the problem-based tasks in the intervention were used to encourage students to think critically about what they had learned, which meant that students were required to use higher-order thinking skills to understand and apply what they had learned to the new situations. However, I noticed that once the post-lecture problem-based tasks became a routine, students appeared to lose interest with these tasks. These problem-based tasks might also work well during or even before the lecture (in the form of lead-ins or discussion activities) so that students become aware of what they need to learn to solve the problem raised; thus, they can understand the real-life context for learning specific skills. In the next cycle, I might arrange flexible time slots for problem-based tasks.

Theme 6: The students who had little job experience might fail to fulfill the problem-based tasks at their best.

As mentioned, there were 12 final assignments submitted seven weeks after the course ended. Eleven out of the 12 assignments showed evidence of students employing higher-order thinking skills. The requirement for the final assignment was: "Write a 7-10 page (main text), double-spaced paper, presenting how you have applied/are applying/would apply your understanding of one of the linguistic aspects you learned in the course—sense relations, reference, meaning transference, etc. —in your own teaching."

While 11 out of 12 assignments demonstrated to different degrees the students' creative plans in applying the linguistic contents in teaching activities and critical analysis, the student's assignment with unclear higher-order thinking skills employment was only a simple reproduction of ideas presented in the group presentation; almost no authentic discussion related to real teaching context was identified. I then determined that the assignment was by a student who was working as a freelance translator four months after graduation. With her BA degree in TEFL, her teaching experience was no more than six weeks of teaching practicum embedded in her BA course. This might be the reason why she could not make progress in generating creative ideas to apply the linguistic knowledge in teaching and in critically analyzing the possible effects that the application might create. Her insufficient teaching experience might have hindered her task fulfillment because such a task required a much deeper understanding of teaching contexts and teaching skills.

Limitations and implications for the next cycles

After two cycles with the revision in the intervention, I found that there were still limitations in this research project. First, the problem-based tasks were all used in the post-lecture activity, which might not have been interesting for the students. The use of these tasks before and during the lectures might also have had a positive impact on students' motivation to learn. In addition, the number of problem-based tasks could be increased in the next cycles, and the task contents and formats should be more flexibly used. Also, the relation between the flexibility in the time frame for using the tasks and students' motivation in learning was not fully explored in the two completed cycles, so the statement that teachers may need to be flexible in the time slots for problem-based tasks might be subjective. The finding that the insufficiency of job experience might hinder the effect of problem-based tasks was not entirely reflected in the two completed cycles, so the statement might be subjective, too. In the subsequent cycles, the relation between the degree of job-relatedness in the contents of the tasks and students' motivation in learning and the relation between job experience and the effectiveness of the problem-based tasks will be investigated.

Conclusions and Implications

In general, the findings of this study resonate with the statement that PBL is a promising approach to promote students' conceptual knowledge during the learning process, which has been found by many scholars such as Hmelo-Silver et al. (2009), Lambe (2007), van Berkel and Schmidt (2000), Walker and Leary (2009), and Zhang et al. (2010). The problem-based learning tasks, as designed and used in the two cycles of this action research project, did help promote students' use of higher-order thinking skills in learning. Similar to Bell's (2012) points on PBL support and positive impact on learners' independent learning and responsibility for their learning, in this study PBL helped the students to stay more focused on the task completion process and the problem-based tasks. The observation of students taking the problem-based tasks as meaningful to their learning and feeling encouraged to apply PBL in their own teaching strengthens Jones et al.'s (2013) and Lee and Tan's (2004) accounts of PBL enhancing students' motivation to engage in their courses. Moreover, the conclusion that students needed further assistance in the form of a teacher's model or guiding questions throughout the tasking process is comparable to Barrows' (1986) discussion about inadequate tutoring problems, which might inhibit PBL implementation.

In addition to the conclusions that echo those found in the previous studies, the following considerations might be helpful to other teachers in their PBL implementation. First, the

problem-based tasks could be more meaningful to students and motivate them to learn if they are familiar to students and practical for their professional practice. As I observed in this study, the more practical and job-related the problem-based tasks were, the more the students were motivated by the PBL implementation and the more eager they seemed to follow the same approach in their own teaching. Second, the use of problem-based tasks again and again at a fixed time needs careful considerations. Some students were observed losing interest in the problem-based tasks when the tasks were repeated at exactly the same time for the third and the fourth time of use. Third, the effectiveness of the problem-based tasks was limited with the student who lacked adequate job experience. Fourth, this approach was specifically appropriate for promoting higher-order thinking skills for students with passive learning habits. With teachers who are in the Asian context where students have the same learning habits as Vietnamese students, the action research design as described in this study could be applied. As learning might happen any time people solve problems in both invented and real-life situations, it is recommended that the PBL approach be used in teaching linguistic subjects other than semantics, and other content subjects.

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Appendix 1

Cycle 1 Higher-order Thinking Skills Employment Checklist

CYCLE 1 HIGHER-ORDER THINKING SKILLS EMPLOYMENT CHECKLIST

(USED IN WRITING AND ASSIGNMENT ANALYSIS)

FIRST CYCLE				
Week	The problem-based tasks	Evidence of HOTS required		
1	1. How can deaf and blind people acquire meaning?	**III.2**	1A1. Generalizing: forming conclusions (not stated in the lecture) about the issues	1 2 3
		III.3	1A2. Developing arguments for the points: constructing supporting ideas and examples	1 2 3
2	2. Which types of texts that have the most / least referential ambiguity? Why?	**III.2**	1A1. Generalizing: forming conclusions (not stated in the lecture) about the issues	1 2 3
		III.3	1A2. Developing arguments for the points: constructing supporting ideas and examples	1 2 3
3	3. How can our lexicon be built up and structured?	**III.2**	1A1. Generalizing: forming conclusions (not stated in the lecture) about the issues	1 2 3
		III.3	1A2. Developing arguments for the points: constructing supporting ideas and examples	1 2 3
4	4. How can figurative language work? How can we say in one way but the hearers still understand it another way?	**III.2**	1A1. Generalizing: forming conclusions (not stated in the lecture) about the issues	1 2 3
		III.3	1A2. Developing arguments for the points: constructing supporting ideas and examples	1 2 3

B. CYCLE 1 HIGHER-ORDER THINKING SKILLS EMPLOYMENT CHECKLIST

(USED IN PRESENTATION AND ASSIGNMENT ANALYSIS)

FIRST CYCLE

Week	The problem-based tasks	Evidence of HOTS required		
7	5.1. What are the basic features of predicate / semantic roles of arguments in English? How would the understanding about these features help you in your practice of teaching English?	III.2	1B1. Generalizing: forming conclusions (not stated in the lecture) about the issues	1 2 3
		III.3	1B2. Deducing: pointing out the relations between the knowledge about this linguistic aspect and the English teaching practice	1 2 3
		III.4	1B3. Justifying the point: elaborating the points with arguments with supporting ideas and examples	1 2 3
8	5.2. What are the basic relations between the language used and the perception of colors, space, motion, and time in English? How would the understanding about these features help you in your practice of teaching English?	III.2	1B1. Generalizing: forming conclusions (not stated in the lecture) about the issues	1 2 3
		III.3	1B2. Deducing: pointing out the relations between the knowledge about this linguistic aspect and the English teaching practice	1 2 3
		III.4	1B3. Justifying the point: elaborating the points with arguments with supporting ideas and examples	1 2 3
9	5.3. What are the basic features of meaning transference in English? How would the understanding about these features help you in your practice of teaching English?	III.2	1B1. Generalizing: forming conclusions (not stated in the lecture) about the issues	1 2 3
		III.3	1B2. Deducing: pointing out the relations between the knowledge about this linguistic aspect and the English teaching practice	1 2 3
		III.4	1B3 Justifying the point: elaborating the points with arguments with supporting ideas and examples	1 2 3
10	5.4. [What are the basic features of modality in English?] How would the understanding about these features help you in your practice of teaching English?	III.2	1B1. Generalizing: forming conclusions (not stated in the lecture) about the issues	1 2 3
		III.3	1B2. Deducing: pointing out the relations between the knowledge about this linguistic aspect and the English teaching practice	1 2 3
		III.4	1B3. Justifying the point: elaborating the points with arguments with supporting ideas and examples	1 2 3

Note. 1: no evidence 2: unclear evidence 3: clear evidence (see Appendix 3)

Appendix 2

Cycle 2 Higher-order Thinking Skills Employment Checklist

CYCLE 2 HIGHER-ORDER THINKING SKILLS EMPLOYMENT CHECKLIST

(USED IN WRITING AND ASSIGNMENT ANALYSIS)

SECOND CYCLE				
Week	The problem-based tasks	Evidence of HOTS required		
1	1. "There are only two things in the world: nothing and semantics," Werner Erhart. In your opinion, why does he say so?	**III.2**	2A1. Generalizing: forming conclusions (not stated in the lecture) about the issues	1 2 3
		III.3	2A2. Developing arguments for the points: constructing supporting ideas and examples	1 2 3
2	2. Which types of texts that have the most / least referential ambiguity? Why do you think they are so?	**III.2**	2A1. Generalizing: forming conclusions (not stated in the lecture) about the issues	1 2 3
		III.3	2A2. Developing arguments for the points: constructing supporting ideas and examples	1 2 3
3	3. It is believed that: conversations with meaningless sentences could be used as the input to teach your students. Do you agree or disagree? Why?	**III.3**	2A3. Deducing: pointing and explaining the reasons why there is such a belief (not stated in the lecture)	1 2 3
		III.4	2A4. Judging: showing one's well-informed position on the statement or the belief	1 2 3
		III.4	2A5. Justifying the point: elaborating the points with arguments with supporting ideas and examples	1 2 3
4	4. Turner (1991) said: "The words themselves say nothing independent of the richly detailed knowledge and the powerful cognitive processes we bring to bear." So how can we teach small children the abstract words?	**III.3**	2A3. Deducing: explaining the meaning of the saying (not stated in the lecture)	1 2 3
		III.4	2A4. Judging: showing one's well-informed position on the statement or the belief	1 2 3
		III.4	2A5. Justifying the point: elaborating the points with arguments with supporting ideas and examples	1 2 3

A. CYCLE 2 HIGHER-ORDER THINKING SKILLS EMPLOYMENT CHECKLIST

(USED IN PRESENTATION AND ASSIGNMENT ANALYSIS)

SECOND CYCLE

Week	The problem-based tasks		Evidence of HOTS required	
7	5. 1. Analyze students' writings and conclude about their lexicon. How to develop their lexicon.	**III.3**	2B1. Deducing: pointing out the general patterns from the data with explanation	1 2 3
		IV.2	2B2. Developing a strategy: planning and clarifying the steps and the conditions needed	1 2 3
		IV.3	2B3. Experiment: generating the process to bring the planned strategy into reality, under real conditions	1 2 3
8	5.2. Plan and teach a lesson in which semantic mapping or sense relations are used in teaching reading skills or vocabulary	**III.3**	2B1.Deducing: identifying and explaining the applicability of the linguistic issues to teaching	1 2 3
		IV.2	2B2. Developing a strategy: planning and clarifying the steps and the conditions needed	1 2 3
		IV.3	2B3. Experiment: generating the process to bring the planned strategy into reality, under real conditions	1 2 3
9	5.3. Collect texts with the use of metaphor and metonymy or idioms about colors / space / motion / time, then plan and teach students about the meaning and use	**III.3**	2B1. Deducing: identifying and explaining the applicability of the linguistic issues to teaching	1 2 3
		IV.2	2B2. Developing a strategy: planning and clarifying the steps and the conditions needed	1 2 3
		IV.3	2B3. Experiment: generating the process to bring the planned strategy into reality, under real conditions	1 2 3
10	5.4. Collect data of teachers' comments or instruction in the class. Analyze the use of modality in these comments or instructions, then suggest ways to improve the effectiveness of the comments and instructions	**III.3**	2B1. Deducing: identifying and explaining the applicability of the linguistic issues to teaching	1 2 3
		IV.2	2B2. Developing a strategy: planning and clarifying the steps and the conditions needed	1 2 3
		IV.3	2B3. Experiment: generating the process to bring the planned strategy into reality, under real conditions	1 2 3

Note. 1: no evidence 2: unclear evidence 3: clear evidence (see Appendix 3)

Appendix 3

The Description of the 3-point Scale Used in the Checklists

SCALE	Generalizing, forming conclusions	Developing arguments for the given position	Deducing from the given information	Judging a certain statement / belief	Justifying the stated points / judgment/ evaluation	Developing a strategy	Experimenting the plan / strategy
3	Generalization with authentic* conclusions; it is clear that students can generalize or form conclusions, and would be able do so in different problem cases / situations	Authentic arguments with elaboration; it is clear that student can develop arguments for a point, and able do so in different problem cases / situations	Authentic reasoning from information provided; it is clear that student can deduce from given information, and able do so in different problem cases / situations	Clear judgment with authentic evaluating ideas; it is clear that students can judge a certain statement / belief, and able do so in different problem cases / situations	Justification with creative and well-supported explanation; it is clear the students can judge the stated points / judgment / evaluation, and be able to do so in different cases / situations	Well-developed, creative plan with steps being clarified; it is clear that students can develop their own strategies	Full demonstration of the plan, vivid illustration; it is clear that students can experiment / implement the developed plans / strategies

2	Generalization with non-authentic** conclusions; it is unclear whether students would succeed in using generalizing and making conclusions in different problem cases / situations	Non-authentic arguments with elaboration; it is unclear whether students would succeed in developing argument for a point in different problem cases / situations	Non-authentic reasoning from information provided; it is unclear whether students would succeed in deducing from given information in different problem cases / situations	Clear judgment with non-authentic evaluating ideas; it is unclear whether students would succeed in judging statements / beliefs in different problem cases / situations	Justification with comprehensive but non-authentic explanation and support; it is unclear whether students would succeed in justifying the given point / judgment / evaluations in different problem cases / situations	Plan with clear steps, comprehensive but not very well developed; it is unclear whether students would succeed in developing their own strategies in different problem cases / situations	Full demonstration of the plan, not quite comprehensive illustration; it is unclear whether students would succeed in implementing the developed plan / strategies in different problem cases / situations
1	Simple, non-authentic generalization; (almost) no conclusions, students fail to use the HOTS of generalizing and making conclusions	Poor arguments with (almost) no elaboration; students fail to develop arguments for the given point	(Almost) no reasoning, just repeat / restate information provided; students fail to deduce from the given information	Unclear judgment; students fail to judge the given statement / belief	Justification with (almost) no explanation and support; students fail to justify the stated point / judgment / evaluation	Poor plan, strategies under-developed	Effortless demonstration of the plan; students fail to implement the developed plans/ strategies

Note. *The term "authentic" is used to refer to the arguments, conclusions, evaluations, or solutions created by the students themselves, not the ones they read or heard from the materials, the lectures, or different sources.

**The term "non-authentic" is used to refer to the arguments, conclusions, evaluations, or solutions which appeared in the materials or in the lectures, or different sources.

Appendix 4

Interview Questions

1. What did you do in each of the problem-based tasks?
2. Did you face any problems when doing the tasks?
3. Have your learning skills and thinking skills changed? How?
4. Which problem-based task(s) do you like best? Why?
5. What could be applicable to your teaching?
6. What do you suggest for improvement?