Undergraduates' Learning on Elementary School English Education through Problem Based Learning in Scenario Analysis

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Abstract: This study explored 45 Taiwanese undergraduates' learning about elementary school English education through problem based learning (PBL) in scenario analysis in a teacher education program in the northwestern Taiwan. The data analysis on the documentation, questionnaires, and participants' projects revealed the following findings. First, this study supported current empirical studies on the importance of PBL in scenario analysis for pre-service teachers' knowledge construction. Secondly, what participants gained the most from the PBL in scenario analysis was "teamwork" and "developing interests in elementary school English education." In order to effectively integrate scenario analysis into the language teacher education program, three essential elements should be taken into consideration in terms of peer learning, authentic scenarios, and bridging the theories and practice.

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Teacher education is often blamed for insufficiently preparing teachers for the complexities of teaching practice (Korthagen, Loughran, & Russell, 2006). Pre-service and student teachers often feel a large gap between theory and practice in their teacher education program. Moreover, pre-service teachers and student teachers often experience a reality shock when they enter into the profession (Korthagen, 2001; Korthagen et al., 2006; Ruys, Defruyt, Rots, & Aelterman, 2013). These prospective teachers have to face diverse and complex problems that occur in the classroom or pedagogy. In order to solve these problems, they must be equipped with different knowledge

bases such as content knowledge, pedagogical knowledge, knowledge of learning, pedagogical content knowledge, or reflective knowledge (reflection-in-action and reflection-on-action; De Simon, 2014).

In Taiwan, after completing the elementary teacher education program and one-semester practicum, elementary school teacher candidates are required to take the Elementary School Teacher Certificate Examination in order to become qualified teachers. Since 2015, the numbers of simulation questions have increased as mandated by the Ministry of Education of Taiwan (2015). One of the simulation questions is presented below as "Ms. Wu is responsible for the remedial education among ten fifth graders. These ten fifth graders are at different proficiency levels and they have low motivation. There are no teaching materials suitable for these learners. What should Ms. Wu do?" (Ministry of Education of Taiwan, 2015). Teacher candidates must brainstorm possible solutions for the above simulation or scenario.

In order to prepare undergraduates to be equipped with the competence necessary for the Elementary School Teacher Certificate Examination, scenario analysis and simulations are integrated into Children's English, an elective course in a language teacher education program in a university in northern Taiwan. The integration of scenario analysis and simulations fits well with the current trend in teacher education for pre-service teachers to master their own learning through problem-based learning including starting point of learning as a problem (scenarios), the problem as the one that pre-service teachers will encounter in the future work, and pedagogical content knowledge as organized around the problems.

This study explores undergraduates' learning on elementary school English education through problem based learning in scenario analysis. This study discusses the following two issues. First, how did the problem based learning in scenario analysis influence the participants in terms of their learning elementary school English instruction, their interest in elementary school English instruction, and its realistic application and relevance to their future profession? Secondly, what facilitation supported their learning the problem based learning in scenario analysis? Suggestions are provided on the effective integration of problem based learning in scenario analysis into language teacher education programs.

Literature Review

Issues discussed in the literature review included the definitions, process, and benefits of problem based learning (PBL), empirical studies on PBL in language teacher education, and literature gap. Albion (2007) defined PBL as "an approach to education for the professions that is characterized by a focus on authentic problems likely to be faced by future professionals" (p. 1). Finkle and Torp (1995) regarded problem based learning (PBL) as "a curriculum development and instructional system that simultaneously develops both problem solving strategies and disciplinary knowledge bases and skills by placing students in the active role of problem solvers confronted with an ill-structured problem that mirrors real-world problems" (p. 1).

Boud (1985) proposed the following process of PBL. First, an authentic problem that is related to the students' intended profession is presented (Boud, 1985; So, Yeung, Lo, & Volk, 2001). Memory, Yoder, and Williams (2003) designed 60 vignettes on common situations related to collaboration with school colleagues (i.e. counselor, psychologist), parents, other community members (i.e. service learning), and area organization (i.e. business organization). Fong, O'Toole, and Keppell (2007) suggest that teacher educators and trainers should provide more real life cases for teacher candidates to explore, such as scenarios of classroom management in local schools. Students work in small groups to analyze the problem and determine what information might be

required for a solution (Boud, 1985; De Simone, 2014). Next, students undertake some study and research for the solution (Boud, 1985). They apply the solution to the problem. Finally, they are involved in reflective practice and summarize what they have learned (Boud, 1985).

PBL has been implemented in teacher education since the 1980s, and it aims to better prepare teacher graduates with more relevant skills for teaching professions (Borhan, 2014). PBL is effective and beneficial for educational professionals. First, it focuses on collaborative learning through problem solving in an authentic context rather than memorizing and recalling information (Albion, 2007; So et al., 2001). Compared to the traditional teaching group, the post-test case completed by 38 participants in the PBL group in De Simone (2008) revealed that they significantly surpassed the traditional approach in four areas of problem solving. The four areas included identification of the central issue/problem, quality of problem definition, relationship of the solution to the problem, and use of resources. Second, under PBL, pre-service teachers are provided with opportunities to construct knowledge (i.e. pedagogical content knowledge) and develop skills simultaneously (Borhan, 2014; Kwan, 2008). The preliminary analysis of students' reflections, tasks, instructors' journals, and staff reflections indicated that undergraduates of a bachelor program in primary education in Melbourne in Chambers (2001) had positive attitudes toward PBL, because PBL allowed undergraduates to develop both their content knowledge and the transferable skills required as a teacher. Patrick and McPhee's (2014) survey research revealed that participants in master degree programs in primary education in Scotland regarded the scenarios as useful contexts in which academic theory and professional practice might be linked.

Empirical studies focus on the integration of PBL into teacher education programs among general education teachers (i.e. De Simone, 2008; Dean, 1999; Kwan, 2008; Pourshafie & Murray-Harvey, 2013), early childhood teachers (i.e. Edwards & Hammer, 2006, 2007), technology (i.e. Albion, 2007; Chambers, 2001; Choi & Johnson, 2005, 2007; Choi & Yang, 2011; Fong et al., 2007; Ma & O'Toole, 2013; Ma, O'Toole, & Keppell, 2007, 2008; Walker et al., 2011), or science teachers (Karakas, 2008), but only a few on language teachers (i.e. Christian, Dillard, & McAtee, 2014; Mishan, 2011).

A total of 26 white female pre-service teachers in Christian et al. (2014) participated in a three-session PBL case in a literacy method course in the southern United States. These pre-service teachers were presented with information about a Hispanic English learner, Isabel, who was struggling with reading in Science and Social Studies. The analysis of group session notes and participants' reflections revealed that the implementation of PBL as an instructional strategy in a literacy methods course assisted the pre-service teachers' development of collaborative problem solving skills (i.e., process) and culturally relevant literacy pedagogy (i.e., content). Most importantly, the systematic and purposeful collaborative work during the PBL promoted pre-service teachers' collective efficacy and growth in critical thinking skills.

Mishan (2011) explored the integration of PBL in a materials development module in a Masters in English Language Teaching program (MA in ELT) in Ireland. The analysis of five participants' self and peer-reflection and assessment of the PBL process revealed that participants could work collaboratively or independently in solving the problems. These five participants consciously evaluated and applied learning theories and teaching approaches that they had learned before. Moreover, during the PBL process, they practiced their professional skills in terms of teamwork and giving and receiving feedback. However, they needed more guidance and structure for self-reflection in order to be reflective practitioners.

Only a few empirical studies (i.e. Christian et al, 2014; Mishan, 2011) focus on the integration of PBL into language teacher education programs. Following the current research on

the designs and process of PBL in scenario analysis (e.g. Boud, 1985; Fong et al., 2007; Memory et al., 2003), in this study PBL consisted of four important elements including (1) the researcher's generated authentic problems in elementary school English classrooms, (2) a learner-centered approach, (3) the instructor as the facilitator, and (4) undergraduates working in small groups to gather information, solve problems, design activities, report findings, and reflect. The data that collected in limited empirical studies on PBL among language teachers mainly were mainly teachers' reflections (e.g. Christian et al., 2014; Mishan, 2011). This study aims to use questionnaire, the participants' projects, and documentation to explore 45 Taiwanese undergraduates' learning about elementary school English education through problem based learning in scenario analysis.

Method

This study followed a mixed method approach including both qualitative research and survey research. A survey was employed in this study with the aim to explore participants' learning skills and knowledge learned from the PBL in scenario analysis. The qualitative research, through data collection and detailed data analysis of undergraduates' learning under PBL, helped the researcher obtain an in-depth understanding of the learning process that these undergraduates experienced and their interpretation of their own experiences and learning in natural and social contexts.

Setting and Participants

Participants in this study were 45 freshmen majoring in Education and Learning Technology in a university in northern Taiwan. The participants registered for a course titled Children's English, an elective course for the language teacher education program, in fall 2015. This course aimed to help pre-service teachers acquire practical knowledge and skills for teaching children. Participants would gain background knowledge about how children learn the language, develop skills in designing activities that motivate children's English learning, and collect resources and materials related to English teaching. All these freshmen indicated their willingness to participate in the study. Of the 45 participants, 35 were female (77.8%) and 10 were male (22.2%). With regard to their English proficiency levels, 48.9% (n=22) of the participants reached the B1 (threshold) of the Common European Framework of Reference for Languages (CEFR). However, 46.7% (n=21) were at A2 (way stage), below the requirement for graduation as a major in English instruction. Of the participants, only two were at B2 (vantage).
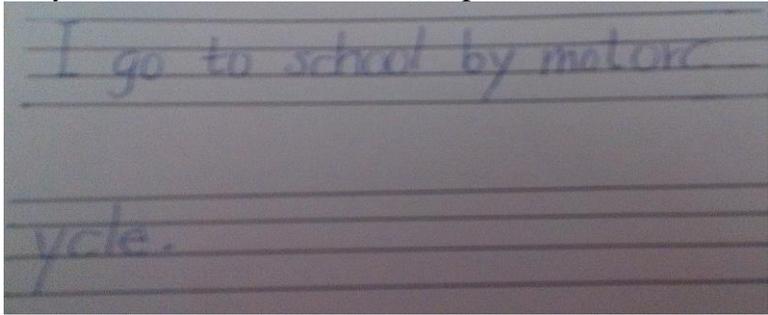
Data Collection

Data in this study included one questionnaire, the participants' projects, and documentation. Documentation included the teaching materials that the class reading, class PowerPoint slides, and the participants used for presenting the projects. While the questionnaire, participants' projects, and documents for presenting the projects were used to answer the first research question, the questionnaire, class reading, and class PowerPoint slides were used to answer the second research questions.

The questionnaire was used to measure the participants' learning about and facilitation employed for the PBL in scenario analysis. The questionnaire included 20 items on a 6-point Likert scale (1=strongly disagree, 6=strongly agree). The questionnaire design was based on different studies including Choi and Yang (2011), Choi and Johnson (2005, 2007), Marcangelo, Gibbon, and Cage (2009), and Munshi, Zayat, and Dolmans (2008). The items of the questionnaire were examined by two research experts with knowledge in English language teaching and experience

in developing questionnaires. In addition, a pilot test was conducted among five freshmen in order to measure the reliability of the instrument and remove threats to validity. As a result, the instrument had a Cronbach's alpha of 0.95.

With regard to the projects, participants chose one of the scenarios the instructor provided or they could write their own scenario. They were asked to use the class reading and discussion to analyze the problem occurring in each scenario as in Table 1. Next, they were asked to design a 5-to-10-minute activity to solve this problem. Finally, they were asked to use the class reading and discussion to analyze their activity design in terms of its effectiveness. These 45 participants formed into groups of three students and completed fifteen projects.

Table 1
Scenarios

#	Scenarios	Categories
1	John writes "dook" for "book" or "qig" for "pig" for his homework.	alphabet
2	The teacher asked Pam "What's your name?" Pam answered, "My [nen] is [pæn]."	pronunciation
3	It was Kevin's birthday. The whole class sang Happy Birthday song to Kevin. Kevin said, "[sɪk] you."	pronunciation
4	Mrs. Peterson gave students a crossword worksheet and asked them to complete it in 5 minutes. Joseph finished it in one minute and began to talk to other kids around him.	classroom management
5	Sandy can recite "a, a, [æ], [æ], b, b, [b] [b], c, c, [k], [k]." Mrs. Lindsay gave her a word card "cab." Sandy did not know how to say this word and began to cry.	phonics
6	Amy wrote her homework as in the picture:	writing
7	Vivian shared what she did on the weekend in class. She said, "On weekend, my mom make a apple pie. He buy 10 apple."	grammar
8	Mr. Bryant said to his Taiwanese second graders in an elementary school as "Fold this blue color paper in half. Fold in half to make a crease. Fold in the dotted line." All the second graders looked puzzled.	classroom management

Data Analysis

Data were analyzed by the following steps. First, the Likert responses were coded on a scale of 1 to 6 for the questionnaire. The numerical description was employed for the mean and standard deviation. The second procedure involved a factorial ANOVA which was used to look for statistically significant relationships between participants' scores on the project and their learning

toward PBL in scenario analysis in terms of problem solving skills, analytic skills, teamwork, communication skills, and elementary school English education. Next, the researcher used open coding to look for emerging themes in the documentation and final projects. Data were labeled using tentative codes (i.e. teamwork, class reading, instructor). Later, these codes were grouped into different categories (i.e. facilitation, learning) based on the research questions. Peer review performed by the researcher's colleagues was employed during the data coding and analysis procedure. To ensure the trustworthiness of this study, triangulation was employed through comparing participants' projects, responses from the questionnaire, and the documentation on class PowerPoint slides.

<div align="center">Results</div>

Based on the data analysis on the survey, documentation, and participants' projects, the results were discussed in terms of participants' learning through scenario analysis, their projects, and facilitation for the scenario analysis.

Participants' Learning through Scenario Analysis

Participants learning through scenario analysis could be classified into five major areas in terms of problem solving (i.e. tackling unfamiliar problems), analytic skills, communication skills, teamwork, and competence in elementary school English education (interest development, preparation for getting involved, changing viewpoints, motivation to learn). As revealed in Figure 1, teamwork was rated the highest by learning participants at 91.1% (*n*=41), followed by "develop my interest in elementary school English education" (80%, *n*=36). Other learning included "sharpened my analytic skills" (77.8%, *n*=35), "develop problem solving skills" (75.6%, *n*=34), and "learn about elementary school English education" (75.6%, *n*=34). The participants felt that they learned the least about "tackling unfamiliar problems occurring in elementary school English classrooms" (60%, *n*=27).
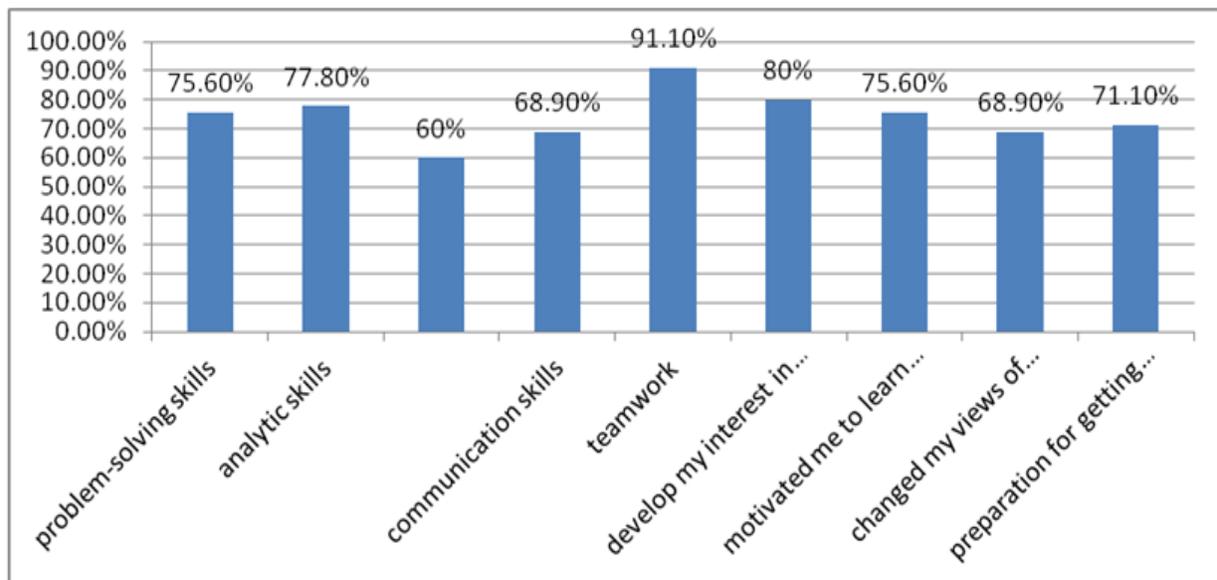

Figure 1. Participants' learing through scenario analysis

In this study, the scenario analysis helped participants develop interactive skills through their teamwork, and critical thinking skills through analyzing the scenarios, designing activities around problems in the scenarios, and evaluating their activity designs. Eventually, they became sophisticated in their learning about elementary school English education.

There was a positive correlation between participants' learning and their scores on the projects on the scenario analysis, particuarly in their learning about elementary school English education as revealed in Table 2. Such positive correlations existed in terms of "interest development," "motivation to learn," and "preparation for getting involved."

Table 2

Correlation between Learners' Learning and Scores on Scenario Analysis

skills	correlations
problem solving skills	-0.18
analytic skills	-0.09
tackled unfamiliar problems	-0.03
communication skills	-0.28
teamwork	-0.11
interest development	0.14
motivation to learn	0.34
changed my views	-0.10
preparation for getting involved	0.09

The PBL in scenario analysis helped the participants in this study begin to develop their interest, motivation to learn, and preparation for getting involved in the elementary school English education.

Participants' Scenario Analysis

Figure 2 revealed the rubric on the class project on the scenario analysis. Five criteria included consisting of required elements, analysis of the activity design based on the class reading and discussion, class presentation, well-organized writing, and submission on time.

Class Project (worth 6 points each) Total: _____

Criteria is: 6 = well fulfilled   4=good 2= satisfactory   0=insufficient

1. Class project includes the required elements.
2. Use the class readings and discussion to analyze the project.
3. Give a presentation on the class project.
4. Writing is complete, concise, and well-organized, with few stylistic errors.
5. The assignment is submitted within required time.

Figure 2. Rubric on scenario analysis

As revealed in Table 3, three groups received the full 30 points. One group received the lowest score, 23. The mean was 27.2 and the standard deviation was 2.37. Except for the three groups that received full points, the remaining groups lost points because they did not use the class reading

and discussions to analyze the scenarios or activity designs. Participants' English proficiency had a negative relationship with their scores for the scenario analysis, -0.08.

Table 3
Participants' Projects on Scenario Analysis

Groups	Scenario	Score	Activity designs
1	5	29/30	sound out the words
2	2	27/30	Phonics song, sound out the words
3	3	28/30	Phonics dice, classifications, listen and check, listen and write, phonics wheel, sound out the words
4	5	28/30	matching, sound out the words
5	6	24/30	color fun, listen and do
6	7	30/30	true/false, family tree, matching, hangman, classification
7	6	23/30	vocabulary train exercise, matching
8	8	28/30	whispering
9	1	28/30	alphabet TPR
10	7	30/30	listen and check, listen and choose
11	6	28/30	Unscrambled word, unscrambled sentences, finding the faults
12	2	30/30	role play, alphabet stories
13	4	27/30	Kind words
14	4	24/30	My little helper
15	1	24/30	blending fun, matching

A total of 33 activities were designed by 15 groups as in Table 3. Group six was assigned to do their scenario analysis on Scenario #7 "Vivian shared what she did at the weekend in class. She said, 'At the weekend, my mom make a apple pie. He buy 10 apple'" as in Table 1. First, they wrote their scenario analysis as in Figure 3. Vivian made three grammatical errors in terms of past tense, pronouns, and articles.
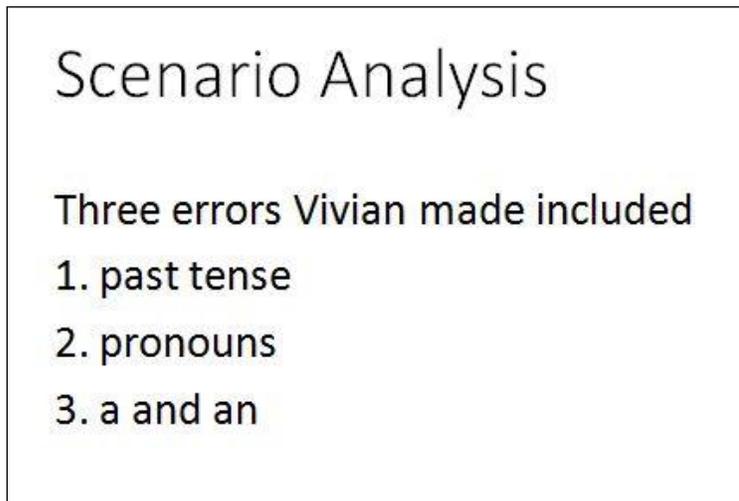

Figure 3. Group six's scenario analysis

The participants in group six first identified the grammatical errors Vivian made from the assigned Scenario #7 in terms of past tense, pronouns, and articles. English articles can be one of the most difficult grammatical concepts for Taiwanese EFL learners, because there is no equivalence between English and Chinese article systems.

They designed five activities including True/False, Family Tree, Matching, Hangman, and Classification for the scenario analysis. Taking Family Tree as an example in Figure 4, group six used a Chinese family tree to explain the pronouns "he," "she," and "they."
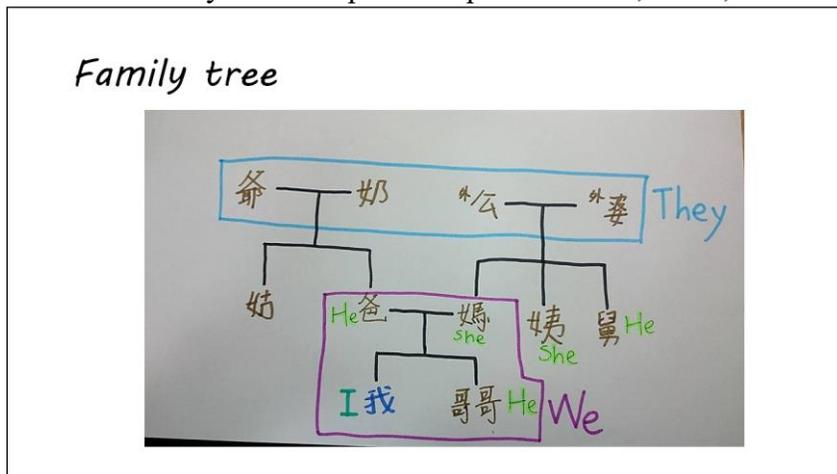

Figure 4. True or false activity

Some of the language teachers introduce grammatical concepts by providing learners with an isolated phrase and analyzing it. In this way, learners have little or no idea how the grammatical concept can be used in context. Participants in group six explained the pronouns through a family tree. Follow-up activities can be designed, such as a controlled drill on matching subject pronouns to object pronouns or a guided or a meaningful practice using the family tree to write a short paragraph.

Facilitation for Scenario Analysis

Different types of facilitation were provided for participants to complete their scenario analysis. Facilitation included peers, the Children's English class, and online resources. As revealed in Figure 5, of all these different types of facilitation, "Discussions with my team members" was regarded as the most helpful (*n*=43, 95.6%), followed by "presentation preparation" (*n*=42, 93.3%), "my classmates' feedback" (*n*= 41, 91%) and "class activities" (*n*=41, 91.1%).
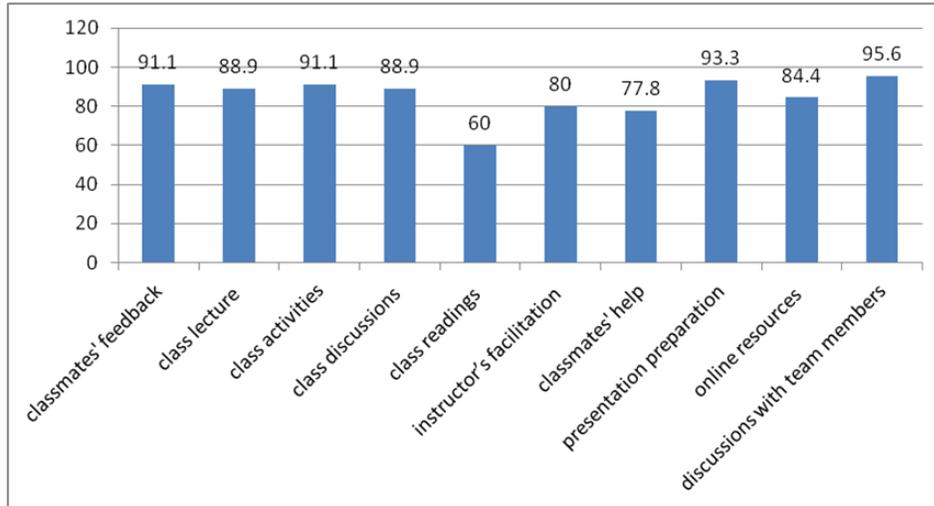
Figure 5. Facilitation for scenario analysis

Other useful facilitation included "The class lecture" (*n*=40, 88.9%), "The class discussions" (*n*=40, 88.9%) and "The online resources" (*n*=38, 84.4%). "The class reading" was regarded as least helpful by the participants (*n*=27, 60%).

The instructor in this study modeled the instructional strategies and after-reading activities for Sweeny's (2000) *Me and My Family Tree* picture book. So group six adopted the instructor's family tree activity into their activity design for their assigned scenario. Group six, as in Figure 3, used the Family Tree to explain the three pronouns "he," "she," and "they." Group six thought that the class activity helped them design this activity. Figure 6 shows the class activity on making your family tree. Learners in the Children's English class had to make their own family tree and introduce their family trees to their group members.

Figure 6. Class PowerPoint slide on family tree activity

Figure 7 shows group 12's analysis of their activity designs. They used the theories or concepts introduced in the class including elements of the lesson plans, child-centered lesson, and input approach as in Figure 8.

What methods we use in these activities

1. Lesson plans include warm-up, presentation, practice, production, wrap-up. We use these lesson plans to design our teaching activities to help students learn English step by step.
2. To teach children English, using active teaching is better than only use the textbooks. Through variety activities let students expose in our classes to English so they can understand at present or that is just beyond their present level.
3. Transform the input approaches into the output approaches. We don't want only focus on the input of language from the material or from the regulation, but give them opportunities to try their best.

Figure 7. Group 12's analysis of activity design

Figure 8 was the class PowerPoint slide on the input approach. According to the input approach, learners should be exposed to input at or beyond their present level. Participants in group six used the input approach they learned in the Children's English class in analyzing their scenario.

Input Approaches

1. We should expose the children in our classes to English so they can understand at present or that is just beyond their present level.
2. They should not be expected to produce new words and patterns until they feel ready to do so.
3. We can introduce new words and patterns through physical demonstration and we should encourage the children to be physically active.

Figure 8. Input approaches

Discussions and Implications

This study explored 45 Taiwanese undergraduates' learning about elementary school English education through PBL in scenario analysis in a teacher education program in a university in northwestern Taiwan. The data analysis on the documentation, questionnaires, and participants' projects revealed the following findings. First, the most significant learning the participants gained was teamwork and developing interests in elementary school English education. Hopefully, the

PBL will help learners develop their content knowledge in English education as in Chambers (2001) and Mishan (2011). Participants who engaged in tasks in Chambers (2001) developed their content knowledge through the decision-making process in dealing with the instructional technology issues. PBL helped language teachers in Mishan (2011) develop their creative engagement with language teaching materials and critical application of second language acquisition theory into practice.

Secondly, discussion with peers was regarded the most useful facilitation for PBL in scenario analysis. Such finding was in accord with Fong et al. (2007) that pre-service teachers' knowledge and competence could be obtained through collaborative teamwork in the problem solving process on the video scenario analysis. In order to effectively integrate scenario analysis into the language teacher education program, three essential elements should be taken into consideration in terms of peer learning, authentic scenarios, and bridging the theories and practice.

Importance of Peer Learning in Scenario Analysis

In this study, participants regarded "teamwork" as the most important learning and support. Based on the assigned scenario, each group analyzed the scenario, designed activities, evaluated the activities, and demonstrated the activities to the whole class. Such finding was in accord with empirical studies (e.g. Fong et al., 2007; Mishan, 2011) that language teachers appreciated the opportunity to develop teamwork skills and improve their collaborative skills through PBL. Therefore, peer learning should be highly valued in PBL in the scenario analysis in teacher education.

There was no right answer to any of the scenarios. Participants also commented on other groups' activities and reflected on the scenario analysis. Learners were expected to learn from considering and critiquing the activities of other groups based on the PBL approach (Chamber, 2001). Finally, these recommendations can be compiled for pre-service teachers to construct their content knowledge and pedagogical competence relevant to elementary school English education. Such collaboration and teamwork can influence pre-service teachers' experience and learning not only from the scenario analysis, but also from discussion among the groups and the whole class (Chambers, 2001). Tobin and Tippins (1983) claimed that learning is construed as "a social process of making sense of experience in terms of what is known" (p. 8).

Efforts on Designing Authentic Scenarios

In this study, eight scenarios in Table 1 were designed in terms of alphabet instruction, pronunciation instruction, classroom management, phonics instruction, writing instruction, and grammar instruction. Scenarios should be relevant to the English teaching situation in order to help pre-service English teachers build theory–practice alignment. Therefore, Patrick and McPhee (2014) suggest that scenarios should mirror the complexities inherent in teaching situations (p. 8).

Fong et al. (2007) recommended that real life scenarios could be designed for the pre-service teachers to explore, particularly in classroom management, stress, or time management. As for the TESOL profession, scenarios can be designed based on different language skills (listening, speaking, reading, writing), instructional foci (i.e. vocabulary, alphabet, phonics, grammar), or classroom management (i.e. students' behavior, cooperative learning).

Values of Theories on Scenario Analysis

In this study, 80% of the groups did not achieve the full points, because they did not use the class reading and discussion on theories to analyze the scenarios and their activity designs. They

demonstrated only craft-based skills and adopted some activities that the instructor modeled in the class. Ure (2009) claimed that pre-service teachers had difficulties in linking theory with practice and regarded the academic content of the initial teacher education program as least helpful in preparing them to teach. The practice of craft-based skills is not enough for pre-service teachers to construct their competence (Martyn, Terwijn, Kek, & Huijser, 2013; Patrick & McPhee, 2014). Both scholarship and teaching practice are highly emphasized in PBL, so pre-service teachers can blend theory with practice (DeSimone, 2008; Patrick & McPhee, 2014).

Theories on language acquisition, curriculum development, instruction on language skills (i.e. listening, speaking) and foci (i.e. phonics, alphabet), child psychology, or educational psychology should be introduced into the Children's English classes, so pre-service teachers will be equipped with Shulman's (1987) knowledge base in terms of content knowledge, general pedagogical knowledge, or curriculum knowledge. Teacher educators should model the pedagogical theories that they introduce (Ruyes, Defruyt, Rots, & Aelterman, 2013). Therefore, teacher trainers and educators as facilitators in PBL should take responsibility to model an instructional approach that their learners may want to adopt in their future teaching (Pourshafie & Murray-Harvey, 2013). Through PBL in scenario analysis, pre-service teachers can engage in theory-building by linking new knowledge in university courses with practical skills in elementary school English education.

Conclusions

This study analyzed 45 Taiwanese undergraduates' responses to the questionnaires, projects on scenario analysis, and documentation in class handouts and PowerPoint slides and explored participants' learning from and facilitation needed in PBL in scenario analysis in a teacher education program in northern Taiwan. This study supported current empirical studies on the importance of scenario analysis for pre-service teachers' knowledge construction. Rather than using only questionnaires or reflections to assess participants' attitude as in some studies (i.e. Patrick & McPhee, 2041), the triangulation added knowledge to the field of teacher education by providing empirical findings regarding the importance of using PBL in scenario analysis to help pre-service teachers link theories to future practice, writing authentic scenarios from the real elementary school English classes, and fostering peer learning during PBL.

This study explored the relationship between scores on participants' final projects and their learning about elementary school English education through PBL in scenario analysis. Other factors might affect their learning, such as past English learning experience, teaching experience, English proficiency, or courses that they have taken. These factors might be included to explore undergraduates' learning and expand the parameters of the knowledge base in language teacher education.

Scenario analysis was employed in this study. A few empirical research findings reveal that video can be a more useful and suitable medium for PBL (i.e. Choi & Johnson, 2005, 2007; Choi & Yang, 2011). Video clips recorded in elementary school English classrooms can be used for PBL in language teacher education programs. A further study might compare and contrast between undergraduates' learning about elementary school English instruction under problem-based video instruction and problem-based text instruction.

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