The Effects of Project-Based Blended Learning with Communication Strategy Instruction on English Oral Communication Ability of Undergraduate Engineering Students

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Abstract

Thai undergraduate engineering students seem to have difficulty mastering English oral communication ability. This study investigated the effects of project-based blended learning with communication strategy instruction to develop English oral communication ability of undergraduate engineering students. Four communication strategies, namely asking for clarification, asking for confirmation, circumlocution, and use of fillers and hesitation devices, were taught to 20 undergraduate engineering students inside class. The participants carried out their online tasks and independent project via social platforms (e.g., Facebook, Skype, etc.). Quantitative and qualitative data collection and analyses were conducted. The participants' pretest and posttest scores were compared using the Wilcoxon signed rank test to examine their English oral communication ability development in six aspects (i.e., range, accuracy, fluency, interaction, coherence, and pronunciation) based on the Common European Framework of Reference for Languages (CEFR) 2017. The findings revealed that changes in English oral communication ability took place after the participants were taught communication strategies, thus indicating that project-based blended learning with communication strategy instruction could be used to promote English oral communication ability of language learners.

INTRODUCTION

To function fully in the 21st century, it is necessary for professional engineers including computer engineers to show excellent soft competencies such as effective oral communication ability, an understanding of ethics, teamwork, leadership, and business perspectives besides performing their mastery in technical skills (Radzuan & Kaur, 2010; Lenard & Pintarić, 2018). In Thailand, although computer engineering departments at a university level have produced a number of computer engineering graduates with varied career paths such as programmers, software developers, etc. to workforce markets, demand for computer engineering staff continues to rise now that computers have become ubiquitous in daily life as well as in all professions.

However, previous studies have suggested that language proficiency levels and communication skills of engineers including computer engineers are still in an urgent need of improvement (Rajprasit, Pratoomrat, & Wang, 2015, as cited in Rajprasit & Hemchua, 2015).

At present, computer technology plays a crucial role in the development in education. Recent studies (Rodrigues & Vethamani, 2015; Campbell, 2015) have focused on the advantages of blended learning using computer-mediated communication to improve oral communication ability of language learners. However, very few studies have emphasized the effects of blended learning on English oral communication ability of computer engineering students, especially in Thailand. In addition, communication strategy instruction and project-based language learning have been implemented in many EFL classrooms to develop learners' English proficiency, but few studies have reported the effects of blended learning with integration of communication strategy instruction and project-based language learning on learners' development of English oral communication ability.

Previous studies have revealed that the use of communication strategies can improve learners' oral communication ability (Nakatani, 2010, 2012). Besides this, it has been reported that project-based language learning not only enables EFL learners to improve oral communication ability but also help them apply content knowledge in their professional field when trying to complete their project (Kovalyova, Soboleva, & Kerimkulov, 2016).

According to the Computer Engineering Curriculum 2016 (King Mongkut's University of Technology North Bangkok, 2016) at King Mongkut's University of Technology North Bangkok (KMUTNB), oral communication skill is one of the five domains of complementary skills that engineering graduates need to master to meet requirements of workforce markets as mandated by the Association for Computer Machinery and the Institute of Electrical and Electronics Engineers Computer Society (2016). To help equip engineering students with the English oral communication ability they need for academic life while they are still in the program of studies as well as for professional life after graduation, the present study aimed at investigating the effects of project-based blended learning with communication strategy instruction on English oral communication ability of engineering students.

Research question

What are the effects of the project-based blended learning with communication strategy instruction (PBBCSI) on English oral communication ability of undergraduate engineering students?

Research objective

To investigate the effects of the PBBCSI on English oral communication ability of undergraduate engineering students.

Hypothesis

After implementation of the PBBCSI, there would be changes in the posttest mean scores of English oral communication ability of undergraduate engineering students.

LITERATURE REVIEW

English oral communication ability

English oral communication ability refers to language learners' ability to form meaningful utterances that suit the communication situations they find themselves in (Wieman & Buckland, 1980; Bygate, 1991). Furthermore, Sakulprasertsri (2014) defines oral communication ability as "the ability to use the language orally and appropriately in any circumstances as well as shared sociocultural or pragmatic suppositions" (p. 23). Based on such definitions, it can be concluded that oral communication ability refers to the ability to communicate accurately and appropriately in a given situation.

In the present study, the six aspects of English oral communication ability are adapted from the Common European Framework of Reference for Languages or CEFR (Council of Europe, 2017) which originally consists of range, accuracy, fluency, interaction, coherence, and phonology, to encompass *range*, which refers to the extent to which learners can use content words which include nouns, verbs, adjectives, and adverbs to convey meanings and ideas for assigned topics and situations; *accuracy*, which refers to the extent to which learners can make use of grammatical structures; *fluency* which refers to the extent to which learners can produce utterances with smooth and effortless flow of language despite short pauses or hesitations; *interaction*, which refers to the extent to which learners can use varied expressions to interact in a conversation; *coherence*, which refers to the extent to which learners can produce utterances using varied cohesive devices to connect separate ideas into a coherent whole of logical responding utterances appropriately; and *pronunciation*, which refers to the extent to which learners can correctly pronounce sounds, word and sentence stress, and intonation to produce utterances with comprehensibility.

Previous studies have revealed that EFL learners find it difficult to master English oral communication ability. For example, when examining the levels of English oral communication competency of civil engineering students at a Thai university of technology, Jarupan (2013) found that the participants had problems with grammatical errors, pronunciation, and the use of L1 in communication including correct pronunciation, depth and range of vocabulary, and fluency. In addition, when it comes to grammatical accuracy, Phettongkam (2017) has reported that the most frequent types of errors were omission errors because Thai students were unaware of grammatical components when producing utterances, followed by misformation errors since they employed the wrong forms of target words. Based on the linguistic description of errors, the three most frequent types of errors that the students made were plural form, article, and verb form, all of which may have resulted from Thai students' lack of target language knowledge and complexity of the English structures. With regard to pronunciation, Sahatsathatsana

(2017) has discovered that students tended to have problems with consonants, consonant clusters, linking sound, and intonation, with the main cause of pronunciation problems being the differences of the sound systems between English and Thai. Finally, as regards intonation, differences in the Thai and English sound systems can be a cause of difficulty. For instance, Isarankura (2009) has pointed out that Thai students tend to stress all words with more or less equal pitch in the utterances, and their intonation may sound flat to the interlocutors, causing pronunciation problems with intonation. In order to help language learners acquire oral communication ability, it is believed that oral communication strategies need to be explicitly instructed.

Communication strategy instruction

The Cognitive Academic Language Learning Approach or CALLA framework (Chamot, Barnhardt, El-Dinary, & Robbins, 1999) is characterized by the five stages of learning strategy instruction which include *1) preparation:* activating background knowledge of strategies, *2) presentation:* modelling the use of new strategies, *3) practice:* practicing the strategies in class, *4) evaluation:* evaluating the use of strategies, and *5) expansion:* extending the use of strategies into new situations. Furthermore, Nakatani (2010) proposes a framework that is distinguished from the CALLA framework, aiming at developing learners' communication ability with communication strategies that can be divided into five stages, including *1) review:* redoing the previous performance using the communication strategies in the previous lesson, *2) presentation:* presenting a new task topic and related communication strategies, *3) rehearsal:* planning and practicing with pairs, *4) performance:* performing with new pairs, and *5) evaluation:* reflecting on the use of previous communication strategies. Nakatani's framework emphasizes planning and practicing the taught communication strategies in target situations, while the CALLA framework is aimed at applying the taught strategies to new situations. As such, both frameworks were integrated as one communication strategy instruction in the present study via the seven learning and teaching steps in the project-based blended learning with communication strategy instruction in hope that engineering students would be able to develop their English oral communication ability by means of planning and practicing communication strategies in both target and new situations.

Over the past decades, communication strategy instruction has been investigated by many researchers. According to Kongsom (2016) and Nakatani (2010), communication strategy instruction can help students improve English oral communication ability, since they support students to deal with communication problems or breakdowns and help them keep the conversation flowing and maintain their interaction with their interlocutors.

To get more insights into communication strategy instruction, Kongsom (2016) conducted a study with Thai engineering students who received the ten-week communication strategy instruction. The findings revealed that the students were able to extensively employ verbal communication strategies to express their ideas when facing communication problems. The increased use of strategic competence components suggested that communication strategy instruction improved EFL students' English oral communication ability.

Likewise, Nakatani's (2010) study also indicated that communication strategy instruction improved students' English oral communication ability in 1) the response for maintenance strategies (i.e., providing active response and shadowing) which helped students keep the conversation smooth and make their speech more fluent, and 2) negotiation of meaning (i.e., confirmation checks, comprehension checks, and clarification requests) which enabled them to gain opportunities to check, clarify, and react to utterances during their interaction.

It could be seen that communication strategy instruction enabled students to use communication strategies to overcome communication problems and made their utterances smooth and more fluent in the conversation. Hence, communication strategy instruction should be integrated into the language instruction to promote students' English oral communication ability.

The communication strategy instruction in this study encompassed four communication strategies which were adapted from Cohen's (2010) taxonomy of communication strategies. The reason why the four communication strategies were selected to be instructed in this model was because they were more frequently used in communication, teachable, and useful for tackling oral communication difficulties (Kongsom, 2016). In the instruction, the four communication strategies were explicitly taught in each unit with seven learning and teaching steps of the first four phases of the project-based blended learning with communication strategy instruction. This helped the students understand which communication strategy should be used and how to use each of them to deal with communication problems with the six aspects of English oral communication ability (i.e., range, accuracy, fluency, interaction, coherence, and pronunciation). Thus, the students would develop their six aspects of English oral communication ability when dealing with the three online tasks and one independent project after taking the PBBCSI which included 1) *asking for clarification* to explain the previous utterances such as "What do you mean?," 2) *circumlocution* to describe the target word such as "I don't know how to say it. It is something that …(describing)…," 3) *asking for confirmation* to check if the interlocutor understood what the speaker had said such as "Do you understand those steps I told you?" or confirm what the speaker had heard or understood was correct such as "Do you mean power of the speakers?," and 4) *use of fillers and hesitation devices* to fill pauses and gain time to think such as "uhm, er, ah, well, let me see, let me think, let's see."

In order to help the students in this study acquire and practice oral communication strategies as well as the ways to do their independent projects step by step, project-based language learning was integrated into communication strategy instruction.

Project-based language learning

Over the past decades, researchers have been interested in project-based language learning and its effects on language learners. According to Xu, Kuan, Rajoo, and Chua (2017), project-based language learning is "a language teaching method which organizes instructional activities around projects and is promoted as an effective way of facilitating students' language learning, content learning, and integrated skills' development" (p. 235). It is recognized as a "powerful means for facilitating students' attainment of the high-level competencies and transferrable skills" (Ertmer & Glazewski, 2015, p. 89). When project-based learning is implemented, students

are generally exposed to authentic materials as they are guided through different learning steps or phases. While trying to complete the projects, students initially set their own problems or questions on their interests to help them investigate answers for their own projects by themselves. As such, they have more opportunities to search for answers from many resources such as surfing the Internet and interviewing or discussing with classmates, instructors, stakeholders, related people, etc. to get information for completing their projects. Also, they give and receive feedback and comments from their classmates and instructors to improve their projects. While working on their projects, their language skills, especially English oral communication ability, can be improved. To begin with, Dooly and Masats (2011) found that project-based language learning was beneficial for EFL classrooms because the students were exposed to authentic materials and opportunities to use the target language meaningfully and complete their projects through learning steps of planning, project presentation, implementation development, presentation of project product(s), and assessment. In so doing, students had opportunities to employ English language and technology to develop their projects by themselves, so they could develop their language and technological skills through working process to complete their projects. Moreover, Oranpattanachai (2018) experimented with video projects in class and found that project-based could be implemented to promote learners' language acquisition and teamwork. Besides, it enabled learners to gain valuable learning experiences and learn how to cope with challenges. To conclude, project-based language learning increases students' exposure to authentic materials and real-life situations while investigating answers for problems or questions in their projects. Therefore, students have more opportunity to employ communication strategies to cope with communication problems while working on their projects.

To enable students to have more opportunities to apply the communication strategies and to carry out the independent project in a face-to-face environment, blended learning was also utilized in this study.

Blended learning

Bonk and Graham (2006) have defined blended learning as a kind of learning that integrates face-to-face classroom instruction with computer-mediated instruction. The term can refer to any learning environment which combines face-to-face classroom and online instruction with an appropriate use of technological innovations such as the Internet and computer-mediated communication. It is generally believed that blended learning is an effective alternative form of instruction because students can reap the benefits of not only face-to-face instruction in class but also online instruction, and the weaknesses or drawbacks of one type of instruction are compensated for by the strengths of the other type of instruction. Besides this, computer-mediated communication tools including social platforms like Facebook, Skype, etc. can be integrated into the blended learning environment so that students' learning can occur anywhere and anytime in addition to traditional face-to-face classrooms (Bax, 2011). Moreover, Richards (2015) points out that computer-mediated communication tools help promote language learning because they provide increased opportunities for negotiation of meaning, a context for interaction, and a social learning environment that promotes language learning.

Researchers have studied the effects of blended learning on English oral communication ability. For instance, Chotipaktanasook (2018) carried out a study to investigate Thai EFL learners' experiences with blended learning at a tertiary level in Thailand. The data were collected from semi-structured interviews of 12 out of 215 students who were first-year students of six universities. The findings revealed that blended learning offered students more opportunities to practice and improve their language skills, especially their mastery of vocabulary.

Similarly, Pertiwi (2018) agreed that blended learning promoted vocabulary mastery of more technical terms in Mechanical Engineering students in Indonesia. In addition, Ginaya, Rejeki, and Astuti (2018) also found that blended learning with WebQuest-integrated instruction significantly increased students' English speaking ability, learning motivation, and interest through project-based tasks such as planning, action, observation, and reflection.

Another study that confirmed positive effects of blended learning on students' oral communication ability was undertaken by Ehsanifard, Ghapanchi, and Afsharrad's (2020). The findings showed the students' development in overall oral communication ability after implementation of blended learning. Likewise, Ehsanifard et. al. (2020) reported that the students of blended group showed more learning engagement in doing assignments, and the pressure of anxiety or lack of time to produce real-time language in a classroom environment could be overcome. In addition, the students with different characteristics could manage learning at their own pace in a blended learning environment.

As previously reviewed, communication strategy instruction enables students to master communication strategies necessary to deal with communication problems in different situations. When communication strategy instruction is implemented in blended learning, students have more learning opportunities to apply what they have learned in a face-to-face environment in an online environment. Furthermore, project-based language learning encourages students to do learning activities and tasks step-by-step, while having to rely on communication ability to get the project done. Therefore, a combination of the three components, namely, communication strategy instruction, blended learning, and project-based language instruction, could be effective to promote English oral communication ability including development of six aspects of range, accuracy, fluency, interaction, coherence, and pronunciation.

METHODOLOGY

Research design

The present study employed a mixed-method research design, and both quantitative and qualitative data were collected and analyzed.

Population and participants

The population of this study was composed of 20 computer engineering students who were enrolled in the English conversation course offered in the first semester of the academic year

2019. These 20 computer engineering students were also the participants who constituted one intact group assigned to the researcher. The participants had taken general English courses in their first year in the program, and their English proficiency was at an intermediate level as determined with the test scores of English 1 and 2 courses. Data regarding language use including range, accuracy, fluency, interaction, coherence, and pronunciation elicited from the six participants were analyzed to support the analysis of quantitative data collected from the 20 participants in the pretest and posttest.

Instruments

1. The project-based blended learning with communication strategy instruction

To construct the instructional model of the present study, seven essential project design elements proposed by Larmer (2019) consisting of challenging problem or question, sustained inquiry, authenticity, student voice and choice, reflection, critique and revision, and public product were synthesized to form six project-based language learning phases. These six phases were combined with the seven learning and teaching steps of the communication strategy instruction in face-to-face and online environments previously mentioned to construct the complete instructional model of project-based blended learning with communication strategy instruction (PBBCSI) (see Figure 1). The participants would be guided on how to complete the independent project in each of the six PBBCSI phases as follows:

Face-to-face environment

1) Initiation phase:
   The participants self-selected a topic and made up the driving question that emerged from the key problem for their independent project.
2) Inquiry phase:
   The participants formulated more insightful questions to research into self-selected resources (e.g., websites, interviews, etc.), collected information (e.g., interview, survey, questionnaire, etc.).
3) Analysis phase:
   The participants analyzed the results.
4) Solution phase:
   The participants gave solutions to the problems to answer the driving question.

Online environment

5) Assessment and reflection phase:
   The participants continued doing their project, presented the project, assessed the project, and provided comments and feedback for their project reflection.
6) Revision and publication phase:
   The participants revised their independent project according to peers' comments and feedback, as well as their own reflection, before sharing it on their Facebook page.

Each of the first four PBBCSI phases: 1) initiation, 2) inquiry, 3) analysis, and 4) solution was administered in face-to-face and online environments through the seven learning and teaching steps of the communication strategy instruction which included preparation, presentation, rehearsal, performance, feedback, expansion, and evaluation that were explicitly explained to the participants to make sure they understood which communication strategies were needed to overcome communication problems or maintain the conversations to achieve the communication purposes. How to perform the independent project in each of the first four PBBCSI phases was also discussed. In the face-to-face environment, the students applied the background knowledge they were prepared in *step 1 'Preparation'* to study and carry out the activities in *step 2 'Presentation'* in which the instructor presented new contents related to some aspects of English oral communication ability including vocabulary, coherence, pronunciation, as well as one of the four communication strategies in each phase via "language expressions" in the learning materials which explicitly instructed them how to employ these strategies to deal with communication problems in association with the aspects of English oral communication ability previously described. This was necessary for doing the communication activities in step *3 'Rehearsal'* during which the participants applied what they had learned in the previous steps to perform the communication activity. The participants had more practice of the six aspects of English oral communication ability in *step 4 'Performance.'* Then, in *step 5 'Feedback,'* the participants received instructor's feedback and comments based on the English oral communication ability test rubric on their activities as the model when they presented in front of class to ensure that they could give feedback and comments on their peers' tasks in step 7 'Evaluation.' After that, in online environment for the blended learning, they applied what they learned and practiced in previous steps in face-to-face environment to conduct their online tasks in *step 6 'Expansion'* in which the participants had to select appropriate technology to perform the three online tasks such as communication social platform (e.g., Skype, Facebook Messenger, Discord, etc.), screen saving programs (e.g., Ocam, Bandicam, etc.), and Internet resources. Moving to *step 7 'Evaluation,'* they gave feedback and comments on their peers' online tasks posted in the Facebook group that they learned in step 5 'Feedback.' They also rated their online tasks against the task and project rubric, and gave reflection on their tasks on the student log to improve them in the following PBBCSI phases.

Concerning the online tasks and the project, the participants needed to conduct three online tasks in the online environment in blended learning phase by phase to further practice communication strategies and complete the project. They posted their videos of online tasks and gave comments and feedback on their peers' online tasks in the Facebook group based on the rubrics on task and project quality and English oral communication ability. The descriptors and levels of six aspects of English oral communication ability were similar to those of the English oral communication ability test rubrics of the pretest and posttest. In addition, the participants' online tasks were also assessed by the instructor according to the same task and project rubrics.

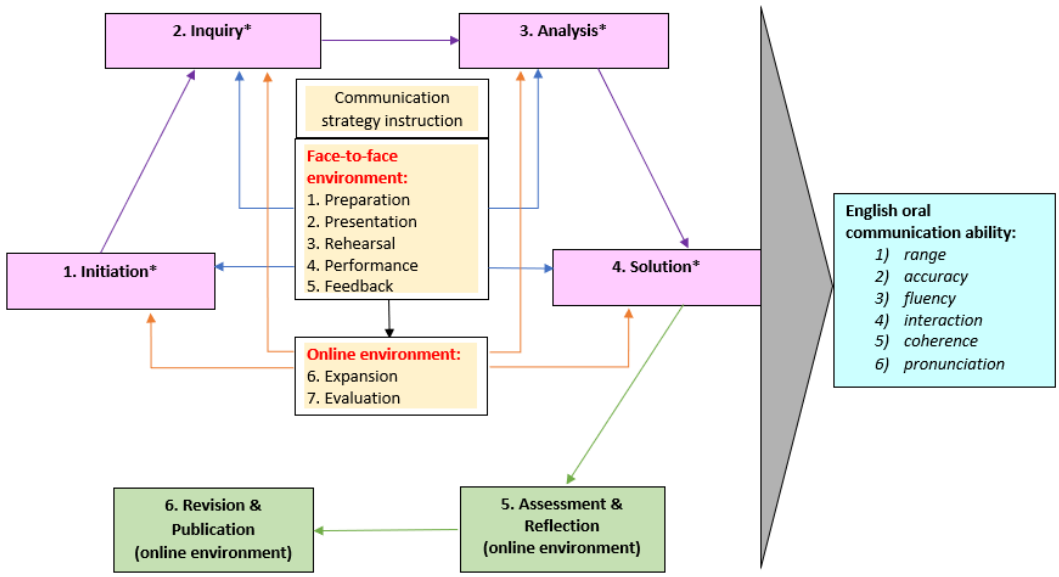

Figure 1 Project-Based Blended Learning with Communication Strategy Instruction (PBBCSI)

Note. *Each of the 'Initiation,' 'Inquiry,' 'Analysis,' and 'Solution' phases, each phase included seven learning and teaching steps consisting of: learning and teaching steps in face-to-face environment (preparation, presentation, rehearsal, performance, and feedback) and the online environment (expansion and evaluation).

2. The English oral communication ability pretest and posttest

The pretest and posttest used in this study were designed based on document analysis of 1) Computer Engineering Curriculum 2016 (Thai version) (King Mongkut's University of Technology North Bangkok, 2016), 2) Pinphet's (2017) study involving the analysis of needs and problems of computer engineering students at KMUTNB, and 3) Rajprasit and Hemchua's (2015) study focusing on the analysis of needs and problems of Thai computer engineering professionals in the international workplace on their English language proficiency. As for test construction, the three test tasks (i.e., description and solution, interview, and presentation) were developed in line with the four job functions derived from the previous document analysis, consistent with the contents and objectives of the four study units, as well as the objectives of the three online tasks and one independent project that the participants had completed in this study.

3. The English oral communication ability test rubric

The English oral communication ability test rubric consisted of six aspects of range, accuracy, fluency, interaction, coherence, and pronunciation adapted from the CEFR (Council of Europe, 2017) in terms of range, accuracy, fluency, interaction, coherence, and phonology. The five proficiency levels and the descriptors of the test rubric were also adapted from the CEFR, ranging from level 0 (very low), level 1 (low), level 2 (moderate), level 3 (high), to level 4 (very high).

As for validation of the English oral communication ability test and the rubric, they were submitted to a panel of three experts who evaluated them using the item-objective congruence index before they were revised according to the experts' comments and suggestions. Then, the instruments were tried out with six electrical engineering students whose characteristics and background knowledge were similar to the target participants. The English oral communication ability test and the rubric were revised according to the problems detected and pilot students' comments and suggestions. The participants' performances of each test task were video-recorded and independently and analytically rated against the English oral communication ability test rubric by two raters.

The pretest was conducted in week 1 before the participants were exposed to the PBBCSI and the posttest was administered in week 15 after the PBBCSI was completed. The participants went through three main steps for doing each test task. They read the test task design for the test to ensure they understood the test objective, job functions related to the study unit, purpose context, participants' role, assessor's role, preparation time, performance time, and assessment. After that, they read the information sheets of each test task and performed the test. Their performances of each test task were video-recorded for subsequent rating.

Regarding the rating system against the test tasks of the pretest and posttest, the researcher and one Thai instructor of English with experiences in assessing speaking skills assessed each test task. The raters had a briefing session on how to administer and assess the test task and then watched the VDO clips. Of each test task of the pretest and posttest, the two raters independently and analytically rated each participant's performances as 0, 1, 2, 3, or 4 for each aspect as previously explained. Concerning interrater reliability of the three test tasks, the obtained correlation coefficient values indicated that the pretest and posttest scores were reliable for further analysis ($r_{s\ pretest}$ = .95, .84, and .76, respectively and $r_{s\ posttest}$ = .95, .91, and .73, respectively, $p < .01$).

Regarding the English oral communication ability test rubric (see Appendix A), the test rubric consisting of six aspects: range, accuracy, fluency, interaction, coherence, and pronunciation was adapted from the CEFR (Council of Europe, 2017) previously described to make sure it was appropriate for the participants' needs and characteristics, as well as the Thai context. The descriptors of each level of English oral communication ability were constructed in line with the definitions of the six aspects of English oral communication ability which were also similar to the six aspects of English oral communication ability task and project rubric.

Data analysis

Quantitative data of the pretest and posttest scores were analyzed using the Wilcoxon signed rank test because of the small sample size ($n < 30$) (Kuntz, 1997). According to Field (2009), the Wilcoxon signed rank test "is used in situations in which there are two sets of scores to compare, but these scores come from the same participants" (p. 552). Field (2009) also argues that non-parametric tests are distribution-free tests, and they require no assumptions or are less restrictive in making assumptions about the data distribution than their parametric counterparts. This suggests that non-parametric tests do not need to assume that the data

come from the normally distributed population. Therefore, the distribution tests were not applied for the non-parametric tests in this study. As such, with small sample size, this study applied the Wilcoxon signed rank test to see the differences between the two sets of ranked scores from the three test tasks of the pretest and posttest.

As for the effect size r or r coefficient of each pairwise comparison referring to "an objective and (usually) standardized measure of the magnitude of observed effect" (Field, 2009, p. 56) was applied and calculated as follows (Rosenthal, 1991, p. 19):

$$r = \frac{Z}{\sqrt{N}}$$

in which Z referred to the z-score produced by SPSS and N referred to the number of observations in the comparison. The interpretation of the effect size r was adapted from both Cohen (1988) and Rosenthal (1996) as shown in Table 1 below.

Table 1

The effect size r and interpretations

The effect size r	Interpretation
.10 to .30 or -.10 to -.30	small
.31 to .50 or -.31 to -.50	medium
.51 to .70 or -.51 to -.70	large
≥ .70	very large

Furthermore, medians are the appropriate statistics when the data are in the ordinal scale (Field, 2009). The data of this study were converted into ranks which were also in the ordinal scale for the non-parametric tests, thus the medians were reported as the main statistics for the results of this study.

Concerning the qualitative data, they were elicited by means of video recording of language use which were transcribed and coded into target categories based on the six aspects of English oral communication ability, namely range, accuracy, fluency, interaction, coherence, and pronunciation.

FINDINGS

Effects of the project-based blended learning with communication strategy instruction (PBBCSI) on English oral communication ability

This study aimed at investigating the effects of PBBCSI on English oral communication ability of undergraduate engineering students in six aspects, namely range, accuracy, fluency, interaction,

coherence, and pronunciation. The data obtained from the pretest and posttest of the three test tasks were analyzed and shown in Table 2.

Table 2

Pretest and posttest scores of overall aspects of English oral communication ability and overall test tasks

	Mean (M)	Median (Mdn)	Meaning (median-based)[a]	Mean Diff[b]	Median Diff[c]	Z[d]	p (2-tailed)	Effect Size r
Pretest	1.95	1.94	Moderate	.70	.62	-3.92	.00*	-.62
Posttest	2.56	2.56	High					

Note. *p < .05, n = 20, a Meaning (median-based) refers to the interpreted level of English oral communication ability: 0.00-0.80 = very low, 0.81-1.60 = low, 1.61-2.40 = moderate, 2.41-3.20 = high, and 3.21-4.00 = very high, b Mean Difference, c Median Difference, d Z refers to the test statistic value calculated by SPSS.

Comparison of the overall pretest and posttest scores of the English oral communication ability test revealed that the participants' overall mean score of English oral communication ability improved with statistical significance (Z = -3.92, p < .05) in six aspects and three test tasks after the 15-week implementation of the PBBCSI. Their overall mean score of oral communication ability increased from a moderate ($Mdn_{pretest}$ = 1.94) to a high level ($Mdn_{posttest}$ = 2.56). Furthermore, the effect size r of the pretest and posttest median scores was -0.62, which was considered a large effect size (Cohen, 1988; Rosenthal, 1996). This also indicated significant improvement of the participants' English oral communication ability after the implementation of the instruction. Therefore, the Research Hypothesis of the Research Question, i.e. *After implementation of the PBBCSI, there would be changes in the posttest mean score of English oral communication ability of undergraduate engineering students* was accepted.

To determine if the PBBCSI significantly improved the pretest and posttest scores of each aspect of English oral communication ability of overall test tasks, another Wilcoxon signed rank test was conducted. The findings of each aspect of English oral communication ability are shown in Table 3.

Table 3

Pretest and posttest scores of each aspect of English oral communication ability of overall test tasks

English Oral Communication Ability Aspect	Mean (M)	Median (Mdn)	Meaning (median-based)[a]	Mean Diff	Median Diff	Z	p (2-tailed)	Effect Size r
Range $_{pre}$	2.28	2.33	Moderate	.79	.67	-3.87	.00*	-.61
Range $_{post}$	3.07	3.00	High					
Accuracy $_{pre}$	1.82	1.83	Moderate	.53	.50	-3.56	.00*	-.56
Accuracy $_{post}$	2.35	2.33	Moderate					
Fluency $_{pre}$	1.83	1.67	Moderate	.75	.66	-3.62	.00*	-.57
Fluency $_{post}$	2.58	2.33	Moderate					
Interact $_{pre}$	1.98	2.00	Moderate	.70	.67	-3.36	.00*	-.53
Interact $_{post}$	2.68	2.67	High					
Coherence $_{pre}$	1.88	2.00	Moderate	.67	.67	-3.87	.00*	-.61
Coherence $_{post}$	2.55	2.67	High					
Pronun $_{pre}$	1.90	2.00	Moderate	.20	0	-2.51	.01*	-.40
Pronun $_{post}$	2.10	2.00	Moderate					

Table 3 exhibits the participants' pretest and posttest scores of each aspect of English oral communication ability of overall test tasks. The findings reflected the participants' significant improvement in all six aspects of range, accuracy, fluency, interaction, coherence, and pronunciation ($Z = -3.87, -3.56, -3.62, -3.36, -3.87$, and -2.51, respectively, $p < .05$) after the implementation of the instruction with changes in their levels of English oral communication ability from a moderate to a high level in three aspects, namely range ($Mdn_{pretest} = 2.33$, $Mdn_{posttest} = 3.00$, $r = -.61$), interaction ($Mdn_{pretest} = 2.00$, $Mdn_{posttest} = 2.67$, $r = -.53$), and coherence ($Mdn_{pretest} = 2.00$, $Mdn_{posttest} = 2.67$, $r = -.61$), all with a large effect size.

Despite the significant improvement, there were no changes in the participants' levels of English oral communication ability, staying at the moderate level in three aspects, namely, 1) accuracy ($Mdn_{pretest} = 1.83$, $Mdn_{posttest} = 2.33$, $r = -.56$), 2) fluency ($Mdn_{pretest} = 1.67$, $Mdn_{posttest} = 2.33$, $r = -.57$), both indicating a large effect size, and 3) pronunciation ($Mdn_{pretest} = 2.00$, $Mdn_{posttest} = 2.00$, $r = -.40$), reflecting a moderate effect size.

To summarize, after taking the PBBCSI, the participants showed significant improvement in all aspects of English oral communication ability which indicated that the PBBCSI had positive effects on participants' development in the six aspects of English oral communication ability, including range, accuracy, fluency, interaction, coherence, and pronunciation. In addition, the three aspects of English oral communication ability demonstrated high development with changes in their levels of English oral communication ability in range, interaction, and coherence from a medium to a high level, and with no changes in their levels of English oral communication ability by staying at a moderate level in accuracy, fluency, and pronunciation due to the fact that their increased scores were not enough to achieve higher levels, suggesting that the participants still needed improvement with those aspects.

To gain better understanding of development of the six aspects of English oral communication ability in the pretest and posttest, qualitative data were analyzed from the English oral communication ability pretest and posttest of the three test tasks previously described.

Range

Concerning range, the findings revealed that the participants used all of the four categories of content words (i.e., nouns, verbs, adjectives, and adverbs) both in the pretest and posttest, and new vocabulary items in the posttest, mainly related to computer technology and computer engineering, to respond to different topics or functions of all test tasks such as 1) nouns: *sequence, component, chatbot, developer, objective, etc.*, 2) verbs: *optimize, focus, develop, filter, etc.*, 3) adjectives: *compatible, physical, automatic, discrete, etc.*, and 4) adverbs: *anywhere, anymore, also, actually, sometimes, etc*. Variation in parts of speech, as well as an increase in new word items in the posttest, indicated the participants' development in English oral communication ability in range in the posttest. Likewise, the quantitative findings showed that the participants had significant improvement in range of overall test tasks with changes in levels of English oral communication ability from the moderate level to the high level after taking the PBBCSI.

Accuracy

Regarding accuracy, the findings showed that the participants faced grammatical problems with all of the four main types of errors based on the surface structure descriptions (Dulay, Burt, and Krashen, 1982) both in the pretest and posttest, namely, omission, addition, misformation, and misordering. They tended to have grammatical problems the most with omission such as "…I recommend… er…*[ ] solid state device" (participant 2, posttest task 1) in which the participant omitted the article "a" in front of the countable noun "solid state device." Moreover, they had the problems with all of the ten specific types of errors based on the linguistic descriptions (Phettongkam, 2017) both in the pretest and posttest, namely, word form, verb form, article, preposition, pronoun, subject-verb agreement, plural form, question, tense, and negation.

When communicating in the test tasks of the posttest, the participants had grammatical errors which affected their accuracy in the posttest in spite of the quantitative findings showed that the participants had significant improvement in accuracy of overall test tasks with no changes in levels of English oral communication ability, remaining at the moderate level after taking the PBBCSI which meant they needed further improvement when it came to accuracy.

Fluency

When considering fluency, the findings showed that the participants employed fillers and hesitation devices such as "er," "ah," "uhm," and "well" both in the pretest and posttest, and the new one "actually" in the posttest only with short and long pauses to buy time to think before continuing further utterances. As for the posttest, these fillers and hesitation devices, as well as pauses reflected the participants' development of English oral communication ability in fluency. Quantitative findings revealed that the participants had significant improvement in fluency. However, they remained at the moderate level as their improvement was not enough to move them to a higher level of English oral communication ability.

Interaction

As for interaction, the findings revealed that to achieve different communication purposes of different situations, the participants employed only three communication strategies both in the pretest and the posttest, namely, asking for clarification, asking for confirmation, and the use of fillers and hesitation devices. The circumlocution strategy was not used.

When considering the asking for clarification strategy, the participants employed more varied forms of clarifying questions in the posttest than in the pretest for 1) tackling the target problem utterances (e.g., "Er…what about ... what [does] it look like?" (participant 1, posttest task 1) and 2) the problem utterances related to the word meaning or range (e.g., "What is [the] mean[ing of] er invent'?" (participant 6, posttest task 2). The participants used only one form of clarifying questions in the pretest to deal with the problem utterances related to the word meaning or range (e.g., "What is [the meaning of] 'budget'?" (participant 6, pretest task 2) and "Uhm what [does] it mean?" (participant 4, pretest task 3).

In terms of the asking for confirmation strategy, the participants also used more different confirming questions in the posttest than the pretest by employing 1) confirmation check to confirm what the interlocutor understood or heard was correct (e.g., "You mean … my invent[ion]?" (participant 6, posttest task 2), "OK…er looking for something for your notebook?" (with rising intonation, participant 2, posttest task 1) and 2) comprehension check to make sure if the speaker understood what the interlocutor said (e.g., the yes-no question "Can you remember? (participant 4, posttest task 1).

Regarding the use of fillers and hesitation devices, the participants often employed non-lexical words "er," "ah," "uhm" and lexical words "well" and "actually" to buy time to think before they could continue further utterances in the conversation.

As the findings showed more forms of the use of communication strategies in the posttest than in the pretest when the participants had to tackle their communication problems to achieve communication purposes, it could be concluded that the participants had significant improvement in interaction, thus confirming the quantitative findings. Furthermore, their level moved up from the moderate level to the high level after taking the PBBCSI.

Coherence

Regarding coherence, the participants employed various cohesive devices such as "and," "so," "because," and "but" both in the pretest and posttest. It was detected that new cohesive devices such as "such as," "first," "next," "then," "also," "like," and "for example" appeared in the posttest. Various cohesive devices and the increase in new cohesive devices in the posttest improved the participants' English oral communication ability in coherence in the posttest, which was similar to the quantitative findings. Their level of English oral communication ability from the moderate level moved up to the high level after taking the PBBCSI.

Pronunciation

As for pronunciation, most of the participants produced the utterances with pronunciation errors in some consonant and vowel sounds in all word positions, word and sentence stresses, and intonation both in the pretest and posttest.

Regarding the consonant sounds, similar to the pretest, most of the participants had the pronunciation problems with some consonant sounds in the posttest like /r/, /v/, /θ/, /ð/, /dʒ/. They replaced the correct sounds with the closest Thai sounds such as "rice" /l/ instead of /r/, "invent" /w/ instead of /v/, "other" /t/ instead of /ð/, and "storage" /d/ instead of /dʒ/. The participants also had problems with consonant cluster pronunciation in all word positions by deleting one sound of the clusters such as "create" /k-/ instead of /kr-/, "drink" /d-/ instead of /dr-/, "defragment" /-f-/ instead of /-fr-/, and "help" /-p/ instead of /-lp/.

Concerning the vowel sounds, like in the pretest, most of the participants had pronunciation errors with some vowel sounds in the posttest like /e/, /ə/, /æ/, /ɛ/, and /ʊ/ by substituting the correct vowel sounds with the incorrect ones such as "dangerous" /æ/ instead of /e/,

"problem" /æ/ instead of /ə/, "their" /e/ instead of /ɛ/, "defragment" /a/ instead of /æ/, and "graduate" /u/ instead of /ʊ/.

As for the pronunciation of word and sentence stress, similar to the pretest, the participants seemed to stress all words of the utterances with more or less equal pitch for normal sentence stress, indicating that they spoke without giving the primary stress (ˈ) on the last content word of phrases or sentences and the secondary stress (ˌ) on other content words such as "**'Flash 'drive 'can 'storage** er **'the 'data 'that 'you** 'want" (participant 2, posttest task 1) instead of "ˌFlash ˌdrive can ~~storage~~ [store] er the ˌdata that you 'want."

Concerning the intonation pronunciation, most of the participants had pronunciation problems with intonation on statements and wh-questions in the pretest and posttest since they incorrectly spoke them with flat intonation instead of rising-falling intonation. However, they had pronunciation problems with yes-no questions only in the pretest in which flat intonation was used instead of rising intonation.

In the posttest, the participants showed pronunciation errors with sounds, word and sentence stresses, and intonation, but the utterances were still comprehensible. Their pronunciation errors also affected their development in English oral communication ability in pronunciation in the posttest in spite of the quantitative findings which showed that the participants had significant improvement in pronunciation without changes in their level of English oral communication ability, remaining at the moderate level after taking the PBBCSI.

DISCUSSION

The quantitative findings showed that the participants significantly improved in each aspect of English oral communication ability, including range, accuracy, fluency, interaction, coherence, and pronunciation. Moreover, the qualitative findings revealed more detailed information that yielded support to the quantitative findings of each aspect of English oral communication ability. It could be seen that the findings of the present study showed the positive effects of the project-based blended learning with communication strategy instruction on the participants' development of each aspect of English oral communication ability. One plausible explanation is that the use of project-based language learning encouraged the participants to apply the use of communication strategies they had learned and practiced in the three online tasks phase by phase and eventually one independent project. The findings of this present study were consistent with Xu et al.'s (2017) concept of project-based language learning that it is "a language teaching method which organizes instructional activities around projects and is promoted as an effective way of facilitating students' language learning, content learning, and integrated skills' development" (p. 235). In addition, when the participants worked with their pairs, their English oral communication ability could be improved as the project-based language learning can be a "powerful means for facilitating students' attainment of the higher-level competencies and transferable skills" (Ertmer & Glazewski, 2015, p. 89). The findings were also in congruence with Dooly and Masats' (2011) study which reported that project-based language learning enabled the students to get exposed to authentic materials and gave them more opportunities

to exercise their English language meaningfully. The participants of this study employed authentic materials such as social platforms and resources to conduct their outside class tasks and the project corresponding to different computer engineering job functions, thus more meaningful practices of English oral communication ability since they could apply what they did to their future careers. Moreover, the findings were also consistent with Oranpattanachai's (2018) study that the video project developed the students' vocabulary, grammar, speaking, and listening, all of which were the language skills considered as English oral communication ability in the present study.

In addition, the findings of the present study revealed the positive effects of the blended learning on the participants' development of each aspect of English oral communication ability. One plausible explanation is that working in the online environment for blended learning in this study enabled the students to overcome restrictions in on time, place, and pace in a face-to-face learning environment. In a blended learning environment in this study, the participants could work with their peers anywhere and anytime via their self-selected technology such as social communication platforms such as Discord, Skype, etc. where they could control their own time to complete their tasks and projects at their own pace of working. This finding was in line with Bax's (2011) concept of utilizing computer-mediated communication tools to support life and learning that computer-mediated communication tools in blended learning can facilitate students' learning anywhere and anytime in addition to traditional face-to-face classrooms, and also lent support to Richards' (2015) suggestion that communication-mediated communication tools enable students to have more opportunities for negotiation of meaning, a context for interaction, and a social learning environment, thereby contributing to the participants' development of six aspects of English oral communication ability. Moreover, the findings of this study concurred with previous studies (Chotipaktanasook, 2018; Pertiwi, 2018) that blended learning increased students' opportunities to exercise and develop their English oral communication ability, especially mastery of vocabulary, as it could be seen that the participants of the present study demonstrated their highest improvement in range or vocabulary.

Furthermore, the findings of the present study also indicated the positive effects of the communication strategy instruction on the participants' development of each aspect of English oral communication ability. One plausible explanation is that the communication strategy instruction enabled the participants to employ the taught communication strategies in order to cope with communication problems related to six aspects of English oral communication ability to achieve their communication purposes in different situations. The findings of this present study were consistent with previous studies that communication strategy instruction encouraged the students to extensively use communication strategies to express their ideas when coping with communication problems (Kongsom, 2016) and helped them keep the conversation floor smooth and made their speech more fluent. It also promoted negotiation of meaning through their use of communication strategies, ensuring more opportunities to check, clarify, and react to utterances in interaction (Nakatani, 2010). In addition, the findings yielded support to Puripunyavanich's (2017) study that communication strategies enhanced students' English oral communication ability, especially in their presentation skills that were also included in one test task of the present study.

In summary, project-based language learning, blended learning, and communication strategy instruction had positive effects on the participants' development of English oral communication ability.

IMPLICATIONS

The findings of this study have several pedagogical implications. To begin with, the PBBCSI improved the participants' English oral communication ability. One of the components that yielded such findings is the challenging problem or the driving question of the project which is the heart of the project (Larmer, 2019). When implementing this, instructors need to keep in mind that the project should be meaningful for the students to make them feel motivated and interested. As Dooly and Masats (2011) have suggested, when students are exposed to practice English oral communication tasks which are meaningful and interesting, such as with a clear association with their fields of study or future careers, they are more likely to carry out their tasks, so their English oral communication ability can be improved.

The findings of the present study reflected the fact that the project-based blended learning enabled the students to significantly develop their English oral communication ability, except for accuracy. The participants still had a lack of target language grammatical knowledge and grammatical errors in conversations made it difficult for the interlocuters to comprehend their utterances in communication. It is therefore necessary for instructors to keep in mind that they cannot focus only on English oral communication ability development at the sake of grammar accuracy. Grammar instruction related to the topics the students are learning in conversation courses are needed to increase their likelihood to produce grammatical and comprehensible utterances to ensure effective communication.

Finally, the students of the present study still had pronunciation problems after taking this model. This might have been due to the differences in sound systems between Thai and English. To deal with such problems, Sahatsathatsana (2017) pointed out that instructors should offer students more intensive exercises, activities, and multimedia uses to solve the students' problems caused by the differences in sound systems between the mother tongue and the target language. Also, instructors should deal with factors affecting English pronunciation acquisition such as instruction and motivation with care. To solve these problems, instructors should supplement the lessons with more pronunciation instruction and offer students chances to further practice what seem to be problematic such as some particular sounds that do not exist in Thai, the cluster sounds of all word positions, word and sentence stresses, and intonation. Moreover, multimedia technology and computer-mediated communication tools such as social platforms and websites should be integrated into conversation courses in order to raise the students' to understand the significance of pronunciation as well as how to improve it.

RECOMMENDATIONS FOR FURTHER RESEARCH

In this study, only four types of communication strategies were included in the instruction. Further studies should be conducted with instruction of other communication strategies to better determine which strategies could be more effectively developed with project-based blended learning. Moreover, different proportions of in-class and online communication strategy instruction should be investigated so as to determine the proportion that best promotes development of oral communication ability. Also, further research should be undertaken to see if project-based blended learning could be used to develop learners' written communication ability in addition to oral communication ability. Finally, a true experimental research design may be employed in further studies to further explore the effects of PBBCSI on development of oral communication ability of different groups of learners in addition to computer engineering students.

CONCLUSION

This study investigated the effects of PBBCSI on English oral communication ability of undergraduate engineering students. The findings support previous studies on the benefits of blended learning, communication strategy instruction and project-based language learning on English oral communication ability. Blended learning enables students to have more chances to exercise their English oral communication ability in face-to-face and online classrooms while conducting their online tasks and independent projects using their self-selected social platforms and online resources. Communication strategy instruction encourages students to more extensively employ communication strategies to express their ideas when dealing with communication problems and help them sustain the conversation floor smoothly, hence more fluent speech. Project-based language learning enables students to engage in authentic and meaningful tasks and projects. In brief, the integration of those three instructional methods results in positive effects on engineering students' development on English oral communication ability in this study.

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APPENDIX A

English oral communication ability test rubric

Criteria	Level 4 (very high)	Level 3 (high)	Level 2 (moderate)	Level 1 (low)	Level 0 (very low)	Notes
Range ☐ Pretest[1] ☐ Expected Posttest[2] Varied words items: verbs, nouns, adjectives, and adverbs	- Can use **a large number of varied word items*** to convey meaning and ideas for topics and situations **with complete comprehension.** - **No mistakes or few mistakes of word choice** are made, but **do not obscure the meaning** of utterances.	- Can use **a sufficient number of varied word items** to convey meaning and ideas for topics and situations **with good comprehension.** - **Some mistakes of word choice** are made, but **do not or hardly obscure the meaning** of utterances.	- Can use **a certain number of varied word items** to convey meaning and ideas for topics and situations **with fair comprehension.** - **Some mistakes of word choice** are made and **sometimes obscure the meaning** of utterances.	- Can use **a limited number of varied word items** to convey meaning and ideas for topics and situations **with limited comprehension.** - **A lot of mistakes of word choice** are made **which obscure or not obscure the meaning** of utterances.	- No responses or responses are not related to the stimulus.	
Accuracy ☐ Pretest ☐ Expected Posttest	- Can employ grammatical structures and usage in communication with **very high accuracy.** - **No mistakes or few minor mistakes**[3] are found, but **do not obscure the meaning** of utterances.	- Can employ grammatical structures and usage with **high accuracy.** - **Some minor mistakes** are found, but **do not or hardly obscure the meaning** of utterances.	- Can employ grammatical structures and usage with **medium accuracy.** -**A lot of minor mistakes** are found, but they **do not obscure the meaning of utterances.** - **Some minor and major mistakes**[4] are found. Those major mistakes **obscure the meaning** of utterances.	- Can employ grammatical structures and usage with **low accuracy.** - **A lot of mistakes** are found and **obscure the meaning** of utterances.	- No responses or responses are not related to the stimulus.	
Fluency ☐ Pretest ☐ Expected Posttest	- Can produce **long utterances with smooth and effortless flow of language.** - While doing each test task, the speaker **never or rarely looks at and/or reads** the information on the test task paper **(0-3 times, less than 5 seconds each).** - **Some short pauses or hesitations**[5] occur **with an appropriate number (not too many) of fillers and hesitation devices for every or most short pauses or hesitations** to continue further related information.	- Can produce **quite long utterances with smooth and effortless flow of language.** - While doing each test task, the speaker **occasionally looks at and/or reads** the information on the test task paper **(4-5 times, less than 5 seconds each).** - **Some short pauses or hesitations** occur **with a certain number of fillers and hesitation devices for some short pauses or hesitations** to continue further related information.	- Can produce **short utterances with smooth and effortless flow of language.** - While doing each test task, the speaker **often looks at and/or reads** the information on the test task paper **(6-7 times, less than 5 seconds each).** - **Some short and long pauses or hesitations**[6] occur, and **the messages are left unfinished or occur with too many or without fillers and hesitation devices** to continue further related information.	- Can produce **isolated utterances with difficulty.** - While doing each test task, the speaker **looks at and/or reads** the information on the test task paper **almost all the time or all the time (less than 5 seconds, more than 8 times).** - **A lot of pauses or hesitations** occur and **the messages are left unfinished or occur with too many or without fillers and hesitation devices** to continue further related information.	- No responses or responses are not related to the stimulus.	
Interaction ☐ Pretest ☐ Expected Posttest	- Can use **a large number of varied expressions** in interactions *(e.g. What do you mean?, Do you mean....?, Well, Really?, etc.)* with **appropriate turn-taking** that the speaker **usually initiates** the topics and/or ideas, and **takes the turns** in a conversation.	- Can use **a sufficient number of varied expressions** in interactions with **appropriate turn-taking** that the speaker **often initiates** the topics and/or ideas, and **takes the turns** in a conversation.	- Can use **a certain number of varied expressions** in interactions with **relatively appropriate turn-taking** that the speaker **sometimes initiates** the topics and/or ideas, and **takes the turns** in a conversation.	- Can use **a limited number of varied expressions** in interactions with **inappropriate turn-taking** that the speaker **never or rarely initiates** the topics and/or ideas, and **takes the turns** in a conversation.	- No responses or responses are not related to the stimulus.	

Criteria	Level 4 (very high)	Level 3 (high)	Level 2 (moderate)	Level 1 (low)	Level 0 (very low)	Notes
Coherence ☐ Pretest ☐ Expected Posttest	- Can produce utterances with **an appropriate number (not too many) of varied cohesive devices**[7] to organize thoughts and ideas logically.	- Can produce utterances with **a sufficient number of varied cohesive devices** to organize thoughts and ideas logically.	- Can produce utterances with **a certain number of varied cohesive devices** to organize thoughts and ideas logically.	- Can produce utterances with **a limited number of varied cohesive devices** to organize thoughts and ideas logically.	- No responses or responses are not related to the stimulus.	
Pronunciation ☐ Pretest ☐ Expected Posttest	- Can produce **excellent pronunciation** of word and sentence stress, and intonation patterns **with no or very few pronunciation mistakes (sounds, stress, and intonation)**, but they **do not affect comprehensibility.**	- Can produce **good pronunciation** of word and sentence stress, and intonation patterns **with a small number of pronunciation mistakes (sounds, stress, and intonation)**, and they **little affect comprehensibility.**	- Can produce **fair pronunciation** of word and sentence stress, and intonation patterns **with a certain number of pronunciation mistakes (sounds, stress, and intonation)**, and they **relatively affect comprehensibility.**	- Can produce **poor pronunciation** of word and sentence stress, and intonation patterns **with a lot of pronunciation mistakes (sounds, stress, and intonation)**, and they **much affect comprehensibility.**	- No responses or responses are not related to the stimulus.	

Note. Adapted from CEFR, Council of Europe, 2017, pp. 155-156

[1] **Pretest** refers to pretest score rated by the researcher.

[2] **Expected Posttest** refers to expected posttest score rated by the students themselves.

[3] **minor mistakes** refer to the mistakes that make the utterances still comprehensible and do not change or almost do not change the meaning of utterances such as subject-verb agreement, omission of the articles "a, an, the," omission of the plural morpheme <-s or -es> of the countable plural nouns, omission of the auxiliary verbs "do, be, have" in the question, statement, and negative forms, , and misordering the words that does not affect the meaning of utterances (e.g. It was constructed with "materials heat-resistant" instead of "heat-resistant materials.").

[4] **major mistakes** refer to the mistakes that make the utterances nearly incomprehensible or incomprehensible and change the meaning of utterances such as incorrect numbers of persons and things, misordering the words (e.g. "He high specifications the CPU needs of").

[5] **short pauses or hesitations** refer to short periods of time (less than 3 seconds) that a speaker stops in his/her speech and then continues it again with related information, which do not include short pauses or hesitations for emphasizing important points, changing new topics, and having other interlocutors look at some information or think about something.

[6] **long pauses or hesitations** refer to long periods of time (more than 3 seconds) that the speaker stops in his/ her speech and leaves it unfinished or continues it with related information (but more than 3 seconds), which do not include long pauses or hesitations for having other interlocutors look at some information or think about something.

[7] **cohesive devices** in this study are various types of linking words including 1) Addition: "*and*" and "*also*," 2) Result: *"so,"* and *"because,"* 3) Exemplification: *"for example," "such as,"* and *"like,"* 4) Sequencing: *"first," "second," "next," "then,"* and *"finally,"* 5) Contrast: *"but"*).