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ผลของการสอนแบบสารเสวนาในวิชาวิทยาศาสตร์ตามแนวคิดการบูรณาการเนื้อหาและภาษาต่อความสามารถในการสื่อสารด้วยวาจาเป็นภาษาอังกฤษของนักเรียนชั้นประถมศึกษาในหลักสูตรภาษาอังกฤษ

The Effects of Dialogic Teaching in CLIL Science Subject on English Oral Communication Ability of Primary Students in English Program

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บทคัดย่อ

การศึกษาครั้งนี้มีวัตถุประสงค์ 1) เพื่อศึกษาผลของการสอนแบบสารเสวนาในวิชาวิทยาศาสตร์ตามแนวคิดการบูรณาการเนื้อหาและภาษาต่อความสามารถในการสื่อสารด้วยวาจาเป็นภาษาอังกฤษของนักเรียนชั้นประถมศึกษาในหลักสูตรภาษาอังกฤษ 2) เพื่อสำรวจความคิดเห็นของนักเรียนต่อการสอนแบบสารเสวนาในวิชาวิทยาศาสตร์ตามแนวคิดการบูรณาการเนื้อหาและภาษา โดยกลุ่มตัวอย่างคือนักเรียนชั้นประถมศึกษาปีที่ 3 จำนวน 40 คนในหลักสูตร English program จากโรงเรียนเอกชนแห่งหนึ่ง ในจังหวัดพระนครศรีอยุธยา ประเทศไทย เข้าร่วมการทดลองเป็นระยะเวลา 11 สัปดาห์ เครื่องมือวิจัยที่ใช้ในการเก็บข้อมูล ได้แก่ 1) แบบทดสอบความสามารถในการสื่อสารด้วยวาจาเป็นภาษาอังกฤษก่อนและหลังเรียน 2) เกณฑ์การประเมินแบบแยกส่วนของความสามารถในการสื่อสารด้วยวาจาเป็นภาษาอังกฤษ และ 3) คำถามสัมภาษณ์เกี่ยวกับความคิดเห็นของนักเรียนต่อการสอนแบบสารเสวนาในวิชาวิทยาศาสตร์ตามแนวคิดการบูรณาการเนื้อหาและภาษา ผลการศึกษา พบว่า 1) ความสามารถในการสื่อสารด้วยวาจาเป็นภาษาอังกฤษของนักเรียนหลังการทดลองเพิ่มขึ้นอย่างมีนัยสำคัญ 2) นักเรียนส่วนใหญ่มีความคิดเห็นในเชิงบวกต่อการสอนแบบสารเสวนาในวิชาวิทยาศาสตร์ตามแนวคิดการบูรณาการเนื้อหาและภาษา

คำสำคัญ : การสอนแบบสารเสวนา, วิชาวิทยาศาสตร์ตามแนวคิดการบูรณาการเนื้อหาและภาษา, ความสามารถในการสื่อสารด้วยวาจาเป็นภาษาอังกฤษ

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Abstract

This present study aimed 1) to investigate the effects of dialogic teaching in CLIL Science subject in enhancing English oral communication ability of third grade students studying in an English program and 2) to explore the opinions of students towards dialogic teaching in CLIL Science. The study employed a one group pretest-posttest research design in which forty third grade students studying in an English program at a private school in Phra Nakhon Si Ayutthaya Province participated in the study for a total of 11 weeks. The research instruments employed were 1) an English oral communication ability pretest and posttest 2) an English oral communication ability analytic rubric and 3) students' opinions interview questions. The results of this study indicated that 1) the students' English oral communication ability significantly increased after the treatment and 2) most students have positive opinions towards dialogic teaching in CLIL Science subject.

Keywords: Content and language integrated learning (CLIL) Science, Dialogic teaching, English oral communication ability

Introduction

Oral communication is the ability to express, state, clarify, define and explain information (Zuheer, 2008). In English program (EP) context, English oral communication ability plays an important role in students' learning, especially in content and language integrated learning (CLIL) subjects in which English is used as a medium of instruction. This is because students are to use English to orally communicate with peers and the teacher as a part of a learning process.

Dialogic teaching, as proposed by Alexander (2010); Alexander (2018), is an approach with an aim to encourage students-centered instruction, underscored by providing supportive and joint interactional spaces in the classroom for students and the teacher to critically exchange ideas and information, so as to co-construct knowledge as a part of a learning process. To put simply, dialogic teaching could lead to collaborative and active interactions amongst students and the teacher for new knowledge co-construction in CLIL subjects. This approach consists of five key principles namely: collective, reciprocal, supportive, cumulative and purposeful (Alexander, 2010; Alexander, 2018). "Collective" refers to when the teacher encourages students to take part in classroom communication and learning activities. "Reciprocal" refers to when the teacher encourages opinion giving, sharing of ideas and questions asking. "Supportive" refers to when the teacher provides

supportive teaching and learning environment by scaffolding when needed. “Cumulative” refers to when the teacher supports students’ cognitive skills to construct new knowledge and lastly, “purposeful” refers to when the teacher guides interactions to achieve learning outcomes.

Several previous studies on dialogic teaching have been carried out in the English as a Second Language (ESL) learning context and English as a Foreign Language (EFL) learning context to enhance English classrooms’ dialogue and participation, vocabulary knowledge, reading, and writing abilities (Ang et al., 2019; Chow et al., 2021; Lee, 2016; Muhonen et al., 2018; Shea, 2019; Yin et al., 2020). However, there is a lack of study of dialogic teaching in enhancing English oral communication ability of primary students in CLIL context.

CLIL could enhance the content and the language aspects within dialogic interactions as CLIL is a dual-focused approach that emphasizes the developments of content knowledge and language (Do Coyle et al., 2010). This dual-focused approach has a framework known as the ‘4C’s framework’ and consists of four interrelated components namely: Content, Communication, Cognition and Culture (Coyle, 2007). “Content” refers to content knowledge of the subject. “Communication” refers to usages of a language in the subject. For instance, language of learning, language for learning and language through learning. “Cognition” refers to higher-order thinking skills tasks, example, discuss and hypothesize. Finally, “Culture” refers to relationship of subject matters and the world. These components work together in influencing the learning environment to be content and language focused to support students’ developments in content and language.

However, it was found from preliminary observations in CLIL Science subject in primary EP classrooms that foreign teachers often put less emphasis on the development of English oral communication ability despite how important it is for CLIL Science learning. For instance, classroom interactions were largely presented as fact-recalling and Initiate-Respond-Feedback (IRF) sequences (Evnitskaya, 2018; Sinclair & Coulthard, 1975). These types of classroom interactions put limitations not only on students’ language development but also on students’ cognitive development. Brown (2014) also indicated that it is essential for classroom instruction to emphasize interactions to construct learning as well as to emphasize students being active participants in interactions for learning. Thus, students’

language and cognitive development could be enhanced through interactional spaces provided (Vygotsky, 1978; Vygotsky, 1980).

Since CLIL promotes content and language developments and dialogic teaching promotes collaborative and active interactions for new knowledge co-constructions, these two approaches could work together in enhancing English oral communication ability in CLIL Science subject. Specifically, in dialogic teaching in CLIL Science lessons, the four components in 4C's framework of CLIL shaped the learning outcomes to be content and language outcomes. For instance, 4C's learning outcomes include students orally explaining a life cycle of an animal and discussing ways to protect a life cycle of an animal. As for the five key principles of dialogic, they were to shape interactions amongst students and the teacher to be collaborative and interactive for new knowledge co-constructions in CLIL Science subject. For instance, for a lesson on a life cycle of an animal, students and the teacher were to interact via observation sharing and question asking about each stage of a life cycle as well as how to keep an animal safe in its life cycle.

Thus, in addressing the importance of English oral communication ability for EP students and the gap from previous studies, this study was conducted to investigate the effects of dialogic teaching in CLIL Science subject on English oral communication ability of primary students in English Program in a private school in Phra Nakorn Sri Ayutthaya, Thailand.

Research Objectives

This study pursued two objectives:

1. To investigate the effects of dialogic teaching in CLIL Science in enhancing English oral communication ability of third grade students of English program.
2. To explore the opinions of third grade students of English program towards dialogic teaching in CLIL Science subject.

Methodology

Research Design

The study employed a single-group pre-test — post-test research design.

Population and Samples

The population of this study was primary students in English Program at a private school in Phra Nakhon Si Ayutthaya province, Thailand. The samples were forty third grade students who studied in English Program in the second semester of the 2020–2021 academic year. They were an intact group from two English program classes and were selected based on convenience sampling.

Research Instruments

English oral communication ability tests

The pretest and posttest were Question Cards of open-ended questions from the units on Life Science and Physical Science in which each test was consisted of four topics and eight questions. The topics were 1) Living Things vs. Non-living Things, 2) Life Cycles, 3) Materials and 4) Forces. There were two questions under each topic. The tests were parallel in difficulty level and in question formats. Hence, in administrated parallel tests, students received similar questions card on both times. In other words, students who received a question on life cycle of one animal on pretest would receive a question on life cycle of a different animal on posttest. The tests were also administered individually, so each student received up to 10 minutes to orally respond to the questions in English. Follow-up questions were prepared and asked when an elaboration or clarification was needed. The tests were validated by three experts, using IOC (Item-Objective Congruence), yielding 0.67, which indicated validity.

Analytic rubric for English oral communication ability

Students' English oral communication ability was evaluated using an analytic rubric adapted from TOEFL Junior Speaking Scoring Guide in speaking-listening task. The criteria of evaluation were content, fluency, grammar, and vocabulary. The analytic rubric to evaluate English oral communication is ranged from 1 as the lowest to 4 as the highest. The rubric was validated by three experts, using IOC (Item-Objective Congruence), yielding 1, which indicated validity. As for reliability, Cohen's Kappa was carried out to test for inter-reliability. The results were 0.80 and 0.90 respectively, which indicated that two raters had an almost perfect agreement.

Interview questions

To seek the opinions of third grade students towards dialogic teaching in CLIL science subject, a semi-structure interview was conducted in the eleventh week of the study, after the completion of posttest. Interviewees were 6 students who were selected randomly from two classes based on their posttest scores. Specifically, two students from the low performance group, two students from the middle performance group, and two students from the high performance group. The semi-structure interview was conducted in Thai to prevent language barrier and took about 10 minutes per session. The rubric was validated by three experts, using IOC (Item-Objective Congruence), yielding 1, which indicated validity.

Data Collection

Data were gathered over an 11-week period by the researcher. Ten dialogic teaching in CLIL Science lessons were constructed and implemented through in-person lessons, each lesson lasting one hour. The pretest was administrated during the first week. The posttest and the semi-structure interview were administered in the last week. The procedure of instruction was as follows.

Initiation Phase

Students were encouraged to share their prior knowledge on the subject matter in dialogic interactions with peers and the teacher. Dialogic principles involved in this phase were collective, reciprocal, purposeful and supportive. Elements in 4C's CLIL framework involved in this phase were content, communication and cognition.

Inquiry Phase

Students were encouraged to discuss the possible hypothesis based on the question posted. Then, students were encouraged to interact in dialogic interactions with peers and the teacher to build new knowledge on the subject matter. Dialogic teaching principles involved in this phase were collective, reciprocal, purposeful, supportive, and cumulative. Elements in 4C's CLIL framework involved in this phase were content, communication and cognition.

Reviewing Phase

Students were encouraged to discuss with peers and the teacher about the hypothesis and the answer to the question posted using the new knowledge co-constructed

previously. Moreover, students were encouraged to make a connection between the new knowledge and the world. Dialogic teaching principles involved in this phase were collective, reciprocal, purposeful, supportive, and cumulative. Elements in 4C's CLIL framework involved in this phase were content, communication, cognition, and culture.

Data Analysis

The data analysis involved both quantitative and qualitative data. To investigate the effects of dialogic teaching in CLIL Science in enhancing English oral communication ability of third grade students of English program, the scores of both pretest and posttest were analyzed using a paired-sample *t*-test. Descriptive statistics (means and standard deviation) were computed to find the differences in students' English oral communication ability, in overall and in four aspects namely: content, fluency, vocabulary and grammar.

To analyze the qualitative data, content analysis was used to analyze the interview data. Specifically, responses from the semi-structure interviews were transcribed and emerged themes from the data were used (Hsieh & Shannon, 2005).

Results

Quantitative

To investigate the effects of dialogic teaching in CLIL Science in enhancing English oral communication ability. The data from English oral communication ability pretest and posttest were analyzed. The mean scores from pretest and posttest were compared using a paired sample *t*-test. The analyzed results are presented and discussed in below.

Table 1

Comparison of mean scores in English oral communication ability using Paired Sample t-test

English oral communication ability		Paired Differences		*t*	df	Sig.
		M	*SD*			
Overall	Posttest - Pretest	4.10	1.13	22.99	39	.00**

*$p < .01$

Table 1 illustrated that dialogic teaching in CLIL science enhanced English oral communication ability significantly (*p*-value = .00). Specifically, after the implementation of dialogic teaching in CLIL science, the different of the mean scores on the pretest and on the posttest was 4.10 (*SD* = 1.13). This means that most students' posttest scores increased on

the average of 4.10 points. Furthermore, considering that t-value is 22.99, the statistical result indicated that dialogic teaching in CLIL science enhanced English oral communication ability significantly.

Next, to examine the difference in English oral communication ability in analytical view of the investigated aspects, the mean scores from pretest and posttest of each aspect of English oral communication ability were compared using a paired sample t-test. The analyzed results are presented and discussed in Table 2 as shown.

Table 2

Comparison of mean scores in English oral communication ability using paired sample t-test

English oral communication ability		Paired Differences		*t*	df	Sig.
		M	*SD*			
Content	Posttest - Pretest	1.08	0.66	10.37	39	.00**
Fluency	Posttest - Pretest	0.95	0.85	7.10	39	.00**
Grammar	Posttest - Pretest	0.83	0.78	6.68	39	.00**
Vocabulary	Posttest - Pretest	1.18	0.75	9.95	39	.00**

*$p < .01$

Table 2 illustrated that dialogic teaching in CLIL science could enhanced English oral communication ability in all four aspects significantly (*p*-value = .00). Vocabulary, content, and fluency (1.18, 1.08, 0.95) were aspects that students improved on the most whereas, grammar was the aspect that students improved the least (0.83).

Data from the interview

In exploring opinions of the students towards dialogic teaching in CLIL Science subject, the data derived from content analysis indicated that most students had positive opinions toward dialogic teaching in CLIL Science subject. Specifically, two themes namely: satisfaction and difficulty emerged.

Satisfaction

4 out of 6 students reported satisfaction towards the instruction in aspects of collaboration, interactions, and better comprehension of the learning content. These students were from the middle and high performance groups. The result is shown and elaborated as follows.

Satisfaction towards collaborations

Students expressed satisfaction towards collaborations in dialogic teaching in CLIL Science lessons. Specifically, students reported that they enjoyed being involved with peers and the teacher in the learning process. Examples of excerpts are as shown below,

M2: "I like to learn this way because we were involved in learning by interacting, asking questions, and finding answer together".

H1: "I like to learn this way because the teacher had us do things together with the teacher such as talking, answering questions and asking questions about what we learned".

Satisfaction towards interactions

Students expressed satisfaction towards interactions from dialogic teaching in CLIL Science lessons. Specifically, they reported that they enjoyed taking part in dialogic interactions via opinion giving, sharing of ideas and question asking. Examples of excerpts are as shown below,

M1: "I like to learn this way because I like how we were able to talk or ask questions related to what we learn all the time".

H2: "I like to learn this way because it was fun when we all could talk, share ideas and ask questions. I liked to learn by interacting than just listening".

Satisfaction towards better comprehension of the learning content

Students expressed satisfaction towards better comprehension of the learning content. Specifically, they reported that the instruction could enhance their comprehension of CLIL Science content from being actively involved in the learning process. Examples of excerpts are as shown below,

H1: "Learning this way help me to understand CLIL Science content because we were able to interact and ask questions with peers and the teacher".

H2: "Learning this way helped me to understand CLIL Science content because the teacher allowed me to think and share ideas with peers and the teacher. We sought for answers together as if we were learning together".

Difficulty

Interestingly, 2 out of 6 students reported initial difficulty towards the instruction in the same aspects (i.e., collaborations, interactions, and comprehension of the learning

content). These students were in low performance group. The result is shown and elaborated as follows.

Difficulty towards collaborations

Students expressed difficulty towards collaborations as they found that collaborations with peers and the teacher to be difficult in the beginning. An example of excerpts is as shown below,

L1: "Learning this way was difficult at first because we had to often be involved in the learning process. Thus, I had to focus more often".

Difficulty towards interactions

Students also expressed difficulty towards interactions in the beginning as they found taking parts in dialogic interactions were difficult due to their English proficiency. An example of excerpts is as shown below,

L2: "At first, I found it difficult to interact and listen to English all the time because I was not good in speaking".

Difficulty towards comprehension of the learning content.

Students also expressed difficulty towards comprehension of the learning content initially as they had trouble in following the conversation and comprehending information in dialogic interactions. An example of excerpts is as shown below,

L1: "At first, I was not able to follow the conversations well and comprehend CLIL Science information, so it was difficult for me at first to learn with this instruction".

All in all, these aspects appeared less difficult for these students overtimes as they became more exposed to the instruction, which helped them adjust to the procedures and expectations.

Discussion

The discussion based on the findings will be discussed in two aspects as follows.

1. Students' English oral communication ability

The finding from the quantitative data analysis indicated that dialogic teaching in CLIL Science increased students' English oral communication ability significantly (p-value = 0.00). This could be the result of dialogic teaching in CLIL Science implemented as an instruction. The finding can be explained as follows.

First, the five key principles of dialogic teaching proposed by Alexander (2010); Alexander (2018) and communication component in 4C's framework of CLIL (Coyle, 2007) shaped dialogic interactions in all teaching phases of the present study to be collaboratives and interactives. Hence, students' English oral communication ability increased due to sufficient opportunities to use the language, English, to construct new knowledge with peers and the teacher. For instance, during dialogic interactions, students were encouraged by the teacher to actively participate in new knowledge co-constructure by sharing inputs consisting of ideas, opinions, and questions. In turn, the teacher was the facilitator of dialogic interactions who scaffolded students by providing follow-up questions and probing as well as proving sentence stems and supported visuals. In this way, students were able to achieve learning outcomes that were content and language outcomes. The finding of the present study was consistent with the finding revealed in the studies of Van der Veen et al. (2017); Van der Veen et al. (2021); Van der Wilt et al. (2021) in regard that dialogic teaching instruction could improve young learners' oral communication ability when they were frequently encouraged to use the language in interactions that were dialogic.

Next, vocabulary was the aspect of English oral communication ability that students demonstrated the most improvement on after the implementation of the instruction. This could also be the result of dialogic teaching in CLIL Science implemented as an instruction. Specifically, given that CLIL Science subject emphasized on the development of CLIL Science content and English (Dorothy Coyle et al., 2010) and dialogic teaching emphasized on active participations for new knowledge co-constructions in CLIL Science, the instruction implemented led to frequent usages of content specific vocabulary as means to co-construction new knowledge in dialogic interactions. For instance, in learning about the life cycle of a butterfly, students were exposed to content specific words for life cycle of a butterfly and English words used to explain the life cycle of a butterfly via teacher' scaffolds then, students were able to practice using these words to co-construct knowledge about the life cycle of a butterfly during dialogic interactions. With sufficient exposure and usages of content specific vocabulary through interactions, students' vocabulary increased. The finding was consistent to the finding revealed in the study of Chow et al. (2021), which indicated that students' English expressive vocabulary knowledge was improved due to ample opportunities provided for students to use new words in dialogic interactions with peers and

the teacher. Regarding an increase of vocabulary knowledge as a result of CLIL, the finding was consistent with the finding revealed in the study of Huang (2020), which showed that CLIL Science could increase vocabulary size of young learners.

2. Students' opinions towards the instruction

Data from the interview indicated that most students reported positive opinions toward dialogic teaching in CLIL science subject. Specifically, students expressed satisfaction towards the instruction in aspects of collaborations, interactions, and better comprehension of the learning content. The finding can be discussed as follows.

Students' satisfaction towards the instruction in aspects of collaborations and interactions could be caused by the key principles of dialogic teaching namely: collective, reciprocal, and supportive and a component in 4C's framework of CLIL namely: communication. Specifically, collective, and reciprocal principles led to jointed collaborations in taking parts in the classroom interactions amongst students and the teacher. Finally, supportive principle promoted scaffoldings provided by the teacher. This led to students' collaborations and interactions for learning. Additionally, communication was one of the learning outcomes in the lessons; thus, interactions were emphasized. Consequently, when communication component in CLIL and the key principles of dialogic teaching worked together, students' collaboration and interactions for CLIL Science learning were promoted positively, which led to students' satisfaction towards the instruction.

Next, students' satisfaction towards better comprehension of the learning content could be cause by all five key principles of dialogic teaching principles and all four components in 4C's framework of CLIL. Specifically, purposeful principle drove dialogic interactions to have specific purpose to achieve learning outcomes while, cumulative principle led to new knowledge co-construction between students and the teacher. As for components of CLIL, in addition to communication component, content emphasized CLIL Science subject, cognition emphasized higher level thinking and finally, culture emphasized connection of CLIL Science content and the world. Consequently, when the five key principles of dialogic teaching and the four components in 4C's framework of CLIL worked together in dialogic interaction in CLIL Science lessons, interactions amongst students and the teacher were collective and interactive, which resulted in new knowledge co-construction in CLIL Science subject. Interestingly, students who reported satisfactory toward

these aspects were in the middle and high performance groups. This could be interpreted that students' English oral communication proficiency could impact the satisfaction towards the instruction. The finding was consistent with previous studies of Black (2005); Sedlacek and Sedova (2017); Teo (2016) in which dialogic interactions were reported by students as being helpful in content comprehension, increase learning opportunities and increase participations.

Nonetheless, students' initial difficulty towards the instruction in the aspects of collaborations, interactions and comprehension of the learning content can be discussed as follows. First, collaborations with peers and the teacher was reported to be difficult for students because students were not familiar with being actively involved with the teacher and peers in sharing inputs related to the content. As for interactions, students reported difficulty in this aspect due to the lack of confidence in their English oral communication ability. As for difficulty in comprehension of the learning content, it could be due to students' unfamiliarity with the learning process and their English proficiency. Finally, it was only students in the low performance group who reported initial difficulty towards the instruction in these aspects. This could be interpreted that students in the low performance group may need additional scaffolds to not only feel more comfortable in collaborating and interacting with peers and the teacher but also to follow along and comprehend the learning content better.

Limitations and Recommendations for Future Research

Although this study has successfully achieved its objectives, some limitations and recommendations for future research were found and discussed as follows.

First, time was the limitation as the study was carried out in a short period of time (10 weeks of instructions). Next, the participants were another limitation as they were conveniently selected; thus, the result of the study cannot be generalized. Regarding the recommendations for future research, it is recommended for future researchers to conduct a longitudinal study and to collect data through classroom observations to strengthen the data from the interview. Finally, it is also recommended for future researchers to investigate the effectiveness of dialogic teaching in CLIL Science towards affective factors in Second Language Acquisition to gain deeper insights into dialogic teaching in CLIL Science subject.

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