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Fostering Critical Thinking through Concept-Based Instruction: ORID and the Six Facets of Understanding

Sophon Hieng[1], Chan Hum[2], Sopha Soeung[3], Sela Chen[4], Sandom Thlang[5], Rany Sam[6]

[1,2,6] National University of Battambang (NUBB), Battambang, Cambodia
[3] National Institute of Education (NIE), Battambang, Cambodia
[4,5] Department of Language, Faculty of Social Sciences Education, Battambang Teacher Education College (BTEC), Cambodia

Correspondence: Sophon Hieng, National University of Battambang (NUBB), Battambang, Cambodia
Email: hieng.sophon.btec@moeys.gov.kh

Abstract
Concept-based instruction (CBI) can help achieve learning objectives and improve 21st-century abilities. This study looks at how well CBI improves student instructors' critical thinking and grammar proficiency. It employed a quasi-experimental research design, where the student teacher sample was divided into two groups: an experimental group of 21 student teachers and a control group of 23 student teachers. The experimental group was taught using CBI, while the control group was taught the traditional teaching methods. The pre-test and post-test were administered to measure their grammatical competence. A self-administered survey questionnaire, modified from Facione (2013), was utilized to assess the critical thinking abilities of student instructors. The finding indicates a statistically significant difference between the mean scores of the two groups in their grammatical competence. The experiment group achieved a higher mean score than the control group. Student teachers enhanced their proficiency in Interpretation, Explanation, Perspective, and Application, while showing a tendency towards competency in Self-knowledge and Empathy. The research highlighted collaborative work, investigation and evaluation, inquiry and dialogue, presentation, and interaction as methods to enhance critical thinking. Additional studies on CBI are suggested to evaluate its effectiveness across different areas within the BTEC program.

Keywords: CBI, English Grammar, ORID Questions, Six facets of Understanding questions

1. Introduction

1.1 Present of the Problems

There is increasing concern that some traditional teaching methods are being disadvantaged since there is low participation in the Cambodian educational context. In 2007, while around 90 percent of children completed primary education, only 35 percent completed lower-secondary education, and only 15 percent progressed to upper-secondary education and beyond (Yorozu, 2017). As demonstrated by Children's competence in reading, writing, and mathematics by SEA-PLM (2019), which showed that just 11% of grade 5 students had band 6 and above in reading proficiency, the traditional teaching technique is a major contributor to low student learning outcomes. Fifty percent of fifth-graders fell into the three lowest bands, indicating that they are capable of producing simple or repetitive phrases as well as limited writing related to personal or local context. The fact that 61% of fifth-graders were in a band below six indicates that they are still trying to grasp basic mathematical concepts 1% of grade 5 children were in the band below 6, which shows that they are still working towards mastering fundamental mathematical skills (UNICEF, 2020).

English BTEC teacher educators need to possess a great deal of knowledge in grammar teaching methodology, for only 15% of their learners expressed their satisfaction with their teacher educators' ways of teaching grammar (CCDO, 2021). One of the main obstacles is that some teacher-centered, traditional teaching approaches are being disadvantaged. For instance, the Battambang Teacher Education College (BTEC), where students are trained to be prospective teachers, the student teachers are not actively learning grammar and are not as comfortable answering their lecturers' questions, there is less interaction in the classroom, and a lot more Teacher Talking Time (TTT) during grammar classes (Lecturer poll, 2020).

According to empirical data, teaching grammar via a concept-based approach may have positive outcomes. CBI may assist L2 learners in becoming more proficient in grammar and communication because it facilitates their understanding of the target language's structural forms and semantic meaning (Harun et al., 2017). Recent evidence suggested that learners may be able to articulate the conceptual nature of grammatical forms by using them to start their cognitive schemata (Hill, 2007). Additionally, teachers could assist students in making connections between the concepts they acquired in school and their practical actions by employing concept-based instruction and curriculum (Giddens & Brady, 2007; Ignatavicius, 2017). Existing research recognizes the crucial role played CBI, being able to foster conceptual awareness of the motivated nature of particle use makes CBI instruction more advantageous (Lee, 2012) and it is a three-dimensional; that is, it focuses on what students will be able to know, understand (conceptually), and do (skillfully) after a lesson, whereas traditional curriculum and instruction have been more two-dimensional in design, focusing on knowing and being able to do (Erickson et al., 2017). According to Lyndon's (2012) research, teaching English grammar via a computer-based conceptual method works well. Wiggins and McTighe conducted a study in 2005 examining the application of the six facets of understanding to promote critical thinking. The study found that students taught with the six-facet curriculum outperformed those in the standard curriculum on critical thinking tests. Grant and Jay (2014) conducted another investigation into applying the six facets of understanding to enhance critical thinking. The results showed that teachers who completed the program felt much more confident in their ability to teach critical thinking, and they also observed increased evidence of critical thinking in their students' work. The studies of Lee and Willson (2018) the importance of CBI on students' l higher levels of thinking, such as assessing, analyzing, and processing, thereby increasing critical thinking and clinical judgment.

Recently, investigators have examined the effect of CBI on critical thinking as noted by Ditto (2014) Critical thinking is enhanced in the classroom by concept-based teaching. CBI was reported in the studies of Compernolle and Henry (2015) the intentional development of L2 pragmatic skills is encouraged by concept-based training. Previous research has shown that CBI can help students improve critical thinking and problem-solving skills. It also promotes sustained learning and helps students develop a conceptual understanding of subjects (Hissan & Ntow, 2021). Amer and Iryna's 2020 study indicated that CBI can better assist teachers in observing language learners' concept development and abstract thinking than other instructional methods. Students gained a deep understanding of concepts after being taught via a concept-based approach.

There seems to be a lack of studies comparing CBI to other teaching methods, which could clarify its relative effectiveness. Additionally, research on the long-term effects of CBI has yet to be conducted. This ongoing study spans eight weeks and assesses its impact on student teachers' learning outcomes, including academic achievement

and critical thinking skills. While some research on concept-based instruction (CBI) has been conducted in Cambodia, this remains a relatively new area. More comprehensive studies are needed. For example, Hieng et al. (2023) found that CBI was more effective than a deductive approach in teaching English grammar, fostering deeper understanding and the ability to apply concepts in new situations. Khiev and Khuon (2021) investigated how CBI could increase abilities like problem-solving and creative thinking, offer extensive knowledge sources, and introduce new learning techniques. Given their resources for implementation, Meng (2021) suggested that CBI be piloted in New Generation Schools. A quasi-experimental study involving two groups of student teachers, where one received CBI instruction and the other deductive methods, showed that the CBI group demonstrated significantly better grammar knowledge and higher engagement and satisfaction levels, with active, collaborative, and meaningful learning outcomes. Overall, research on CBI in Cambodia is still emerging. However, existing studies suggest that CBI has the potential to be an effective approach to teaching and learning. Longer-term studies are needed to fully assess its impact on academic performance and critical thinking.

This study has two key aims. Firstly, to devise and put into practice an ORID and six facets of understanding in CBI that foster critical thinking through the study of grammar. Secondly, to verify the effectiveness of CBI.

1.2. Research Questions

This research seeks to address the following questions:

1. What is the effect size of ORID and the six facets of understanding integrated into CBI on students' critical thinking in grammar learning?
2. Is there a statistically significant difference in grammar achievement scores between students taught using CBI and those taught using traditional methods?

In particular, this study will examine two main hypotheses:

1. Applying ORID questions and six facets of understanding, the learners' critical thinking is fostered.
2. The learning outcomes of the experimental group applying CBI are higher than the control group.

1.3. Literature Review

1.3.1. History of concept-based instruction

A considerable amount of literature has been published on CBI, and it is a common condition that has a considerable impact on learning. CBI is an approach to curriculum design that places more emphasis on "a large concept" or themes that cut across several subject areas or disciplines than on subject-specific (two-dimensional) content (Erickson, 2007). The concept-based approach not only makes information acquisition easier, but it also makes comprehension and action easier (Latham, 2020). There is evidence that CBI plays a crucial role in advancing critical thinking, as raised by Erickson (2007) that concept-based curricula and instruction significantly support the growth of students' critical thinking or synergistic thinking, which transcends factual knowledge. Factual and conceptual knowledge and comprehension are related; the studies have revealed that a student's capacity to solve a new problem is hampered by a lack of conceptual understanding (Hestenes et al., 1992). CBI enhanced students' capacity to internalize and appropriately externalize their understanding of the majority of phrasal verb meanings in the research of different age groups from several nations, categorized by educational attainment level, such as elementary, secondary, and tertiary. The guessing rate has decreased, and their performance has significantly improved. Furthermore, transfer to new particles and objects occurred (Lee, 2012). A concept-based curriculum is created expressly to help teachers understand the aim and help students grasp concepts. They resolve to carefully craft the lesson that promotes the interaction of ideas, knowledge, and abilities, specifically synergistic thinking(Erickson et al., 2017). Besides this, the use of the Concept-based instruction (CBI) approach can aid in the acquisition of passive in English as well as the capacity to transmit meaning through language structure, making the process of learning EFL more meaningful and purposeful (Gal'perin & AIu, 2010). The structure of CBI used the model of Understanding by Design (Wiggins & McTighe, 2005) as below:
Stage 1: Identify desired results: unpack the content standards and "content", focus on the big idea.

a- Big ideas are macro-concepts -they offer a means of connecting and recalling knowledge.
b- A Concept is an organizing ideal or mental construct, universal, abstract, represented by a few words or a short sentence, and shares common attributes.
c- A learning goal is linked to the big ideas and concepts. They should be more in-depth in nature and integrated with the concept.
d- Essential questions guide teaching and engage students in uncovering the important ideas at the heart of a topic of study.
e- Knowledge and skills

Stage 2: Determine that acceptable evidence is used to analyze multiple sources of evidence, aligned with stage 1. The three kinds of assessments and the performance task are used to respond to the question. How will I know that they know what I want them to know?

a. Assessment for learning: the teacher provides feedback to students about their learning and how to improve.
b. Assessment as learning: In order to reflect on their learning, solidify their comprehension, and progress toward their learning objectives, students employ self-assessment and teacher feedback.
c. Assessment of learning: help teachers evaluate students' performance in relation to learning objectives using evidence of student learning.
d. Performance Task: is the application of knowledge and abilities to a task or problem that occurs in the "real world." customized for a particular audience and evaluated against a precise benchmark or result for achievement.

Stage 3: Lesson plans that are inferred from stages 1 and 2 are created using the learning activities, which are tailored to each subject. More significantly, it is designed to consider the results from stages 1 and 2. Planning steps to help achieve unit needs is referred to as WHERETO, which serves as an analytical tool for checking the elements of the design rather than a recipe or sequence for how to construct the design. (see Appendix)

- W: Make sure the pupils understand WHY and WHERE (W1) the unit is going.
- H: Grab their attention right away and hold it throughout
- E1: Give the student the experiences, resources, information, and skills they need to succeed.
- R: Give students the experience they need and lots of opportunities to RETHINK their big ideas and REFLECT
- E2: Give students the chance to evaluate their own development and self-evaluation.
- T: be customized to suit each person's needs, interests, talents, and styles.
- O: Be well-organized to maximize in-depth comprehension rather than cursory covering.

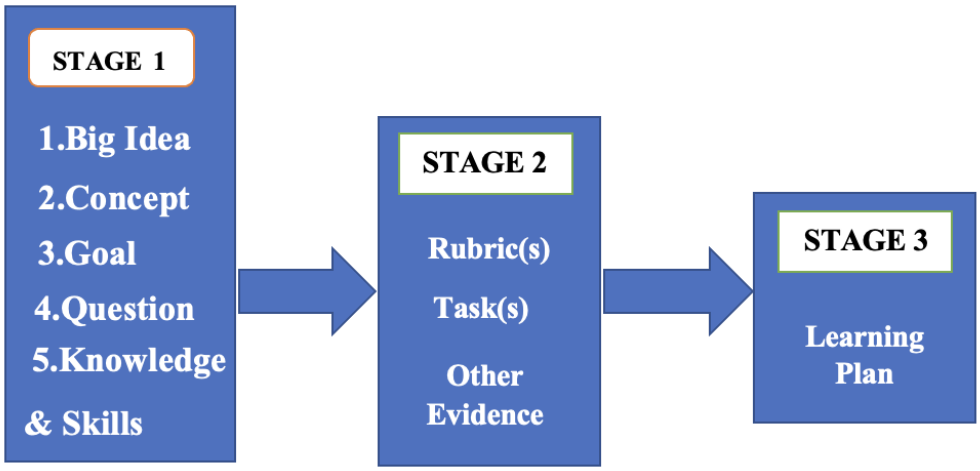

Figure 1: Alignment of Desired Results, Assessment Evidence, and Learning Plan in Understanding by Design (UbD)

1.3.2. What is the connection between critical thinking and CBI?

Determining the impacts of CBI on critical thinking is important for the future of Cambodia's education. Critical thinking skills are vital for students to develop 21st-century solutions for the issues facing our planet. There is a growing body of literature that exhibits the importance of critical thinking skills. These skills have become prominent in language education in the 21st century (Li, 2016; Van Laar, Van Deursen, Van Dijk, & De Haan, 2017). Empirical evidence suggests that critical thinking is among the most important factors in an educational setting; advancing critical thinking enhances language proficiency by going beyond language skills and memorization (Sannavi & Tarighat, 2014). Critical thinking is viewed as a process of self-regulatory judgement, involving problem-solving, drawing conclusions, and making decisions through cognitive activities and reasoning (Jone Jr., et al., 1995; Harlpern, 1980; Cottrell, 2005; Noddlings, 2006).

Across the world, having strong critical thinking skills is essential (Graffin et al., 2012). Critical thinking is said to have various aspects (Michita, 2003). Thinking—quality thinking—must be our top priority as educators as it is the primary factor that determines the quality of our lives. It is the primary factor that determines our students' quality (Erickson et al., 2017). It is often acknowledged in the field of education that critical thinking skills are necessary for people to overcome new challenges in a society that is always changing and where reasoning and evaluative abilities are seen to be necessary for sound judgment (Rashid & Qaisar, 2016). Critical thinking is the intellectually disciplined process of deliberately and skillfully conceiving, applying, analyzing, synthesizing, and evaluating knowledge obtained from or generated by observation, experience, reasoning, or communication as a basis for beliefs and actions is known as critical thinking (Scriven & Ogilvie, 2007). Everyone gains when we learn together as growing thinkers and strive to advance our thinking to the next level and beyond. At that point, education becomes what it was intended to be—a place to unlock the potential of lifelong learning. To start, practice, and develop as thinkers should be the main objectives we support for each one of our students. Paul and Elder (2010). Paul and Elder (2005) assert that there is a relation between critical thinking and learning; human thinking is the capacity that is used to learn. When we can learn well, we think well, or vice versa. Similarly, Brown and Freeman (2000) demonstrated that Critical thinking requires connection and collaboration, which are aspects of learning.

One way to foster critical thinking in the classroom is through concept-based instruction (CBI)—an approach of teaching that focuses on helping students to develop a deep understanding of the key concepts by connecting the concepts to students' prior knowledge and experiences, and by providing students with opportunities to apply the concepts to real-world problems. Research recognizes the critical thinking role played by questioning during the teaching process (Bradford et al, 1999). Alaine and Abeshi (2013) emphasized that researchers assign some cognitive skills, such as generating questions, recognizing the main problem, making judgments, and solving

problems, to critical thinking, despite some minor discrepancies across different definitions. Results from earlier studies (e.g., Author, 2022) demonstrate a strong and consistent association between questioning and critical thinking. When the teacher asked thought-provoking questions and gave students the chance to practice assignments, engage in discussions, and openly express their opinions, the student teachers actively and critically participated in the class. When teaching students critical thinking skills, school becomes a place for the learners to experience the power of lifelong learning, and they should have this as their main objective: to start, practice, and improve as thinkers (Elder & Paul, 2010).

1.3.3. Questions' function in critical thinking

Since "thinking is question-driven," CT revolves around inquiry (Paul & Elder, 2002). One of the finest approaches to teaching is to encourage inquiries (Elder et al., 2002). Furthermore, questioning has played a crucial role in stimulating learners' critical thinking and in uncovering answers by drawing on learners' existing knowledge in relation to the lesson topic. Besides this, classroom interaction involves a significant number of teacher questions directed to learners (Brown & Warschauer, 2006). Moreover, the ability to ask questions is a bridge from ignorance to knowledge(McKenzie et al., 1997). Johns (2007) asserts that there are many different kinds of inquiries, and each is important. Divergent questions, right/wrong response questions, and fundamental knowledge level all need to be balanced. According to her, the most flexible and effective teaching strategy is inquiry. "Good questioners inspire their students, spark critical thinking, foster creativity, and improve their own and their students' self-concept." Additionally, asking questions facilitates the exploration and scaffolding of ideas, the interpretation of data, and the direction of thought processes (Chin, 2004), and it encourages the mind to make connections and patterns between things and concepts. When asked inquisitive questions, students are encouraged to explain and suggest answers for items or circumstances that seem confusing.

The focused Conversation, also known as the ORID approach, is a four-stage procedure that enables group facilitators to pose a series of questions and elicit answers that help a group go from a topic's surface level to its deeper implications (Wee, 2006). The four levels of questions are: the objective level, the reflective level, the interpretative level and the decisional level. According to Wiggins and McTighe (2005), questions based on the six dimensions of understanding—explain, interpret, apply, and observe from several points of view—can foster deep learning and critical thinking. sympathize with different individuals and approach each topic or research component metacognitively. Wigging added that the entire development of all six types of understanding is excellent for complete and mature comprehension in transfer-oriented learning. An effective adult teaching-learning method is ORID, a structured questioning approach that consists of Objective, Reflective, Interpretive, and Decisional questions (Wooden, Sharon;1994). Baptiste and Nancy (1995) argue that early childhood professionals require efficient communication tools for staff meetings, parent meetings, individual talks with coworkers, and parent meetings. explains ORID, a concentrated discussion technique that heightens participants' understanding of how thought can be translated into action by using objective, reflecting, interpretative, and decisional questions.

The six facets of understanding were developed by Wiggins and McTighe. There are Application- Learners can use knowledge in real situation. Perspective-Learners can see different viewpoints and think critically. Empathy-Learners understand others' feelings, experiences, or cultural contexts. Self-knowledge- learners understand their own strengths, weaknesses, and learning process. It is defined as the act of understanding as being able to "teach it, use it, prove it, connect it, explain it, defend it, [and] read between the lines". Training that includes asking questions aloud during classes is more effective (Dalton-Puffer, 2007). Questionings are used as the strategy to promote higher-order thinking skill (HOTS) (Conklin, 2011) and cultivate critical thinking skills (Ur,1996). One of the most important tools for accelerating student learning and enabling teachers to create their own methods for raising students' performance and critical thinking is the use of questions (Astrid et al., 2019). Students are more engaged in the classroom when given open-ended questions that encourage them to think aloud and further their understanding of the material (Toni & Parse, 2013). Explanation: Learners can make meaning from information, concepts, and facts. Interpretation-Learners can use knowledge in real situation. In each stage of lesson plan, ORID questions and six facets of understanding were used to elicit the answer from the questions and to draw learners'

attention as well as to increase learners' talking time. The essential questions are applied after the ORID questions have been asked to wrap up what they have comprehended.

1.3.4. Conceptual Framework

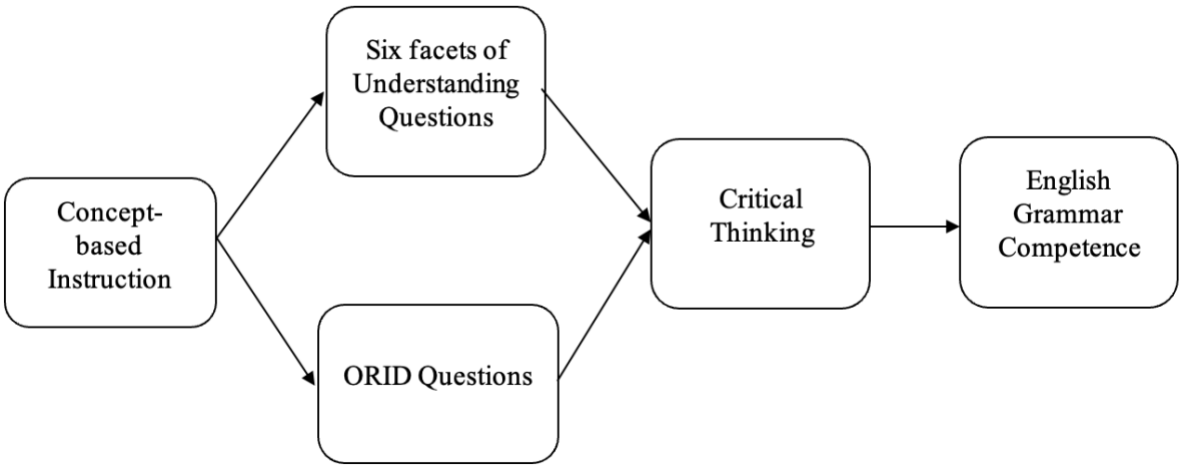

Figure 2: Conceptual Framework of CBI

2. Methods

2.1. Research design

A researcher is interested in finding out how concept-based instruction effects on student teachers 'learning outcome and their critical thinking. The student teachers from the same grade level are assigned to either the experimental group or the control group. The concept-based instruction is given to the experimental group while traditional teaching method is given to the control group. Experiments conducted in classrooms where a research team collaborates with a teacher to take on responsibility for instruction (Cobb,2000; Confrey &Lachance,200; Gravemeijer, 1994). At the start of the study, the researcher gives both experimental group and the control group a pre-test in tenses system. At the end of the study, the researcher administers a post-test in English grammar to both groups. The researcher then compares the mean pre-test and post-test scores of the experimental group and control group. If the experimental group has a significantly higher mean post-test score than control group, then the researcher will conclude that concept -based instruction is effective in improving student achievement in learning English grammar. Performance task is used for every three session and six facets of understanding questions are employed to assess to what extent the student teachers 'critical thinking has advanced. This study can be used to demonstrate this design if we restrict our attention to the two types of schools (trained vs. traditional). 3.*.2 Sample and Sampling technique*

The study was carried out with 44 student teachers studying at Battambang Teacher Education College (BTEC) in the first semester of the 2023-2024 academic year. The two classes were assigned to the control group(n=23) and the experience group (n=21). Both groups were administered a pre-test on the topic of the tense system. The experience group was then taught English grammar on the tense system using a new teaching method. The control group was taught the same topic using a traditional teaching method. After eight weeks of instruction, both groups were administered a post-test on the topic of the tense system. The results of the pre-test and post-test were compared to determine whether the new teaching method had a significant effect on student learning. Additionally, the student teachers in the experiment group were assigned to do the performance tasks which six facets of understanding questions were given to assess to what extent their critical thinking had advanced. The rubric adopted from Wiggin and Tigh was used to assess their critical thinking.

Table 1: Student teachers' demographic information

Demographic information		Frequency	%
Gender	Male	12	27
	Female	32	73
Age	18-20 years old	2	4.5
	21-24 years old	35	79.5
	25-30 years old	7	16

2.2. Research design and instrument

During the experimental procedure preparation phase, 16 hours intensive training was provided to experimental about concept-based instruction. The controlled group was instructed by homeroom teacher and the experimental group was taught by the teacher who was equipped with CBI. The theoretical framework of this training is adapted from Wiggins & McTighe (2005). The title "Ten systems" was designed by the researchers for 16 hours in 8 weeks based on the UbD. In this context, understandings, essential questions, knowledge, and skills were determined, and WHERE TO elements and desired result were listed by creating activities for the learning plan.

Grammar test: The use of the multiple-choice-plus-rotten-justification format is used. There were 54 multiple choice questions from Understanding Grammar and requested a brief written justification of the student's answer to each. One benefit of this intriguing structure is that certain critical thinking skills can be examined, such as the ability to conclude with appropriate caution, which is not well tested on current multiple-choice exams. Another benefit is that, if properly justified, answers that deviate from those in the key can still obtain full credit. (reference)

Test items for both pretest and post-test were adapted from Understanding and challenging English 4-in-1(lim,2017). There were 54 multiple-choice questions in which each item are made up of the elements of six facets of understanding questions:13 items are analysis, 10 items are applications, 6 items are evaluation, 7 items are explanations, 3 items are perspective, 10 items are interpretation and the last 5 items are empathy. The test focused on tenses system: past simple, past continuous, present perfect, past perfect, present simple, present continuous and present perfect continuous, which were covered during the experiment and took one hour to complete. The post test was administered after the four sessions of teaching in each group. The most effective way to measure critical thinking is to use the validated Critical Thinking Test to assess the skills used in problem solving and decision making. The researcher developed the Understanding and Challenging English 4-in-1 (Lim, 2017) to measure the effect of Concept-based instruction on student teachers' academic achievement. The 54 multiple-choice questions pertaining to the unit's eight learning objectives were then created. Six aspects of understanding questions served as the basis for the creation of the questions. After the results of expert review were obtained, the Index of Item Objective Congruence (IOC) was analyzed. Items with an IOC equal to or greater than .67 were included in the test to be tried out. There were 55 items with the IOC equal to or greater than .67, while the other 6 items had the IOC lower than .67. Therefore, 55 remaining items were piloted. The test was tried out with a group of 52 students at COERR in Battambang.

Students' Perceived Critical Thinking Proficiency: At the conclusion of treatment, the experimental group was given a questionnaire that was modified from Huang (2015). It was divided into three sections. Students scored the provided assertions on a 5-point Likert scale in Part 1, which focused on the development of critical thinking. 1. Not competent, 2. somewhat competent, 3. uncertain, 4. competent, and 5. highly competent. Part 2 was about activities in which the open-ended questions asked students to provide their comments on their activities, which can foster critical thinking skills, and what the main activities developed after the experiment. Part 3 was about students' perception on the level of critical thinking before and after the experiment.

Lesson Plan: Based on two instructional approaches—the concept-based approach and the traditional method—eight distinct sets of lesson plans were developed for each groups' training. These lesson plans were reviewed and adjusted for subject validity based on feedback from five professionals who have taken a course on concept-based curriculum and instruction.

2.3. Experimental Procedure

Wiggins & McTighe serve as the foundation for the theoretical framework of instruction. Researchers created the unnamed "tense system" lesson plans for 16 hours over the course of eight weeks, using the UBD paradigm. Understandings, key questions, knowledge, and skills were identified in this context, assessment evidence was produced, and the WHERE TO components and the intended outcome were enumerated.

The pilot scheme's data collection method, pre-test, post-test, and post-test for each session, experimental process, post-test, in the first semester of the 2023–2024 academic year. During this process, the researcher educated 21 BTEC student teachers who were majoring in math. The concept-based instruction and its goal were explained to the student teachers prior to the pilot program. At the conclusion of the pilot program, the elements that the students found enjoyable, thought-provoking, easy to learn from, or difficult were identified by asking them to complete the survey and respond to the questions.

2.4. Data collection

A pre-test and post-test were developed to measure the students' learning outcomes. The researchers also developed a rubric for a performance task adopted from the Wiggins and Tighe rubric model. The pre-test was given to both the experimental group and the control group at the start of the study. The post-test was given to both groups by the researcher at the conclusion of the study. Additionally, the researcher gave the performance challenge to the experiment group for every three sessions and graded these according to the criteria to measure the level of critical thinking. The researcher then compared the results of the experimental group with the control group on the pre-test, post-test, and performance task after conducting a data analysis. The experimenter will determine whether the concept-based instruction was successful in raising student teachers' accomplishment if the experimental group significantly outperformed the control group on the post-test and performance task conducted with the experiment group is high the researcher concludes that Concept-based instruction fosters the student teachers' critical thinking.

Table 2**:** The implementation of the experimental procedure

Groups	**Pre-test**	**Experimental Process**	**Post-test**
Control group	Grammar	Routine practices	Grammar
Experimental group	Grammar	UbD practices	Grammar

As seen in Table 2 above, the pre-test was initially administered to both groups after the pilot programs. After that, 16 hours of experimental procedures were conducted for two hours every week for eight weeks. The post-test was administered to the group after the experimental teaching procedure. The experiment group was given the post-test, which was modified from Lim and Understanding, four weeks after it was implemented, in order to gauge its efficacy.

2.5. Data Analysis

Quantitative and qualitative data were collected and analyzed using the following methods:

- **An independent-samples t-test** was used to compare the pre-test mean scores of the two groups. If the two groups were not statistically significantly different on the pre-test, then we might assume that they were equivalent at the beginning of the study.
- **Independent sample t-test** was used to compare the mean scores of the two groups on the statistically higher mean score on the post-test than the control group and the mean score of the performance. Paired t-test is used to find the mean score and standard deviation of both groups. If the experimental groups on the post-test have a statistically higher mean score on the post-test than the control group, then we can

conclude that the concept-based instruction intervention was effective in improving student teachers' learning outcomes and critical thinking.

- **A paired sample t-test** was used to analyze the performance task of the experimental group on each of the six facets of understanding. This was done by calculating the mean and standard deviation on each facet and then comparing it to the pre-performance task using an independent sample t-test. If the experiment group had a statistically higher mean score than the pre-performance task on any of six facets, then we could conclude that the intervention was effective in improving student teachers' critical thinking skills.
- **Frequency and Mean:** Data from student satisfaction surveys and the degree of student instructors' involvement were analyzed using frequency and mean.
- **Qualitative analysis:** Student teachers' responses to Part 2 of the satisfaction questionnaire were translated into English and analyzed qualitatively by following these steps: developing and applying codes; identifying themes, patterns, and relationships; and summarizing the data.

While Microsoft Word was used to examine qualitative data, SPSS 21 was used to assess quantitative data.

3. Results

3.1. Research Question 1: Does CBI improve learner learning outcomes?

The table below shows the results of the Independent-Sample T-test, which was used to ascertain if the experimental group's gain scores with the CBI practices and the control group's scores for the English grammar lesson differed significantly.

Table 3: The results of the pre-test and post-test of the control group and the experiment group

Group	N	Pre-test	Post-test	SD	P-value
Control Group	23	18.73	23.08	9.41	p=0.00
Experiment Group	21	21	31.09	8.53	

As shown in Table 3 above, there was a statistically significant difference between the post-test scores of the experimental group (M=31.09, SD=8.53) and the control group (M=23.08, SD=9.41), $p=0.00<0.05$, in favor of the experimental group. As a result, it can be said that CBI instruction using the UbD model improved students' academic performance.

3.2. Research question 2: To what extent did the learners' critical thinking improve when ORID questions and six facets of understanding in CBI were applied?

The survey's six primary aspect questions and eighteen attitudes were based in part on Facione's (2013) model of critical thinking. Based on Wiggin Taight, the researchers created a description of these six aspects of questions. As a result of this, six aspects of understanding were modified, which consisted of eighteen items. The first part focused on interpretation, containing three items that student teachers were able to interpret in relation to a situation or problem raised. The second part consisted of three items focusing on explanation. Student teachers can explain when they can clearly present their arguments, defend their position, and justify their conclusions. The third part consisted of three items that considered different perspectives and points of view, having big ideas and seeing and hearing points of view through critical eyes and ears, which emphasizes the importance of having a perspective. The fourth part focused on empathy, which consisted of three items: understanding and sharing the feelings of others, perceiving sensitively based on prior direct experience, and finding value in what others might find odd or alien. The fifth part consisted of three items: applying my knowledge and skills, generating creative solutions to problems, and effectively using and adapting what I know in diverse and authentic contexts, which focused on

application. The sixth section, which focuses on self-knowledge, consists of three items: exhibiting metacognitive awareness, reflecting on learning and experience, and being aware of what we do not comprehend.

1. Not Competent 2. Somewhat Competent 3. Uncertain 4. Competent 5. Highly Competent

Table 4: The result of critical thinking from the students ' survey

Items	M	SD
1. Interpretation		
See the significance in ideas	3.76	0.43
Provide a revealing history or personal dimension to ideas or event.	3.90	0.62
Make object of understanding personal or accessible through images, anecdotes, analogies and models.	3.76	0.53
2. Explanation		
2.1 Clearly present your argument	3.66	0.73
2.2 Defend your position	3.61	0.74
2.3 Justify your conclusion	3.71	0.46
3. Have perspective		
3.1 Consider different perspectives and points of view.	3.66	0.57
3.2 Have big picture	3.52	0.51
3.3 See and hear points of view through critical eyes and ears.	3.71	0.64
4. Emphatic		
4.1 Understand and share the feelings of others.	3.90	0.76
4.2 Perceive sensitively on the basis of prior direct experience.	3.71	0.56
4.3 find value in what others might find odd, alien, or implausible.	3.47	0.51
5. Application		
5.1 Apply my knowledge and skills to new situations and problems.	3.80	0.51
5.2 Generate creative solutions to problems.	3.61	0.58
5.3 Effectively use and adapt what we know in diverse and real contexts.	3.90	0.62
6. Self-Knowledge		
6.1 Are aware of what we do not understand.	3.66	0.65
6.2 Reflect on the meaning of learning and experience.	3.95	0.86
6.3 Show metacognitive awareness.	3.90	0.62
Total Means	3.70	0.60

The descriptive analysis of the six aspects of understanding and depositions yielded the following results: interpretation (M=3.80, SD=0.52), explanation (M=3.68, SD=0.64), perspective (M=3.63, SD=0.57), emphatic (M=3.83, SD=0.61), application (M=3.77, SD=0.57), and self-knowledge (M=3.83, SD=0.71). The results indicate that, overall, the participants felt quite competent in their critical thinking ability. This result shows that the student teachers excel at interpretation. They were able to find meaning in ideas by adding context and using relevant examples. The student teachers achieved an average of 3.83 on self-knowledge and empathy, which means they are skilled at understanding and sharing the feelings of others.

Table 4: Students' perception of the activities to develop critical thinking

Theme	**Key Concept and supporting quote**
Group work	The student teachers collaborate, discuss, identify the problem and share information.

	Supporting quote The activity that developed my critical thinking is work in group[S2], The activities developed my critical thinking ability are collaboration, work group[S4], The activities that can advance critical thinking are thinking in depth , try to find argument via group discussion[S19]
Research and analysis	The student teachers conducted the research and analysis the information to find information, analyze it and share.
	Supporting quote Activities developed my critical thinking is: by teacher show the picture and ask student to explain and research and share knowledge to group and share answer to other group[S6], Activities that develop my critical thinking is find the problem and then try to find out the solution[S13], The activities developed my critical thinking ability are collaboration ,work group , find the information from internet and then analyze information share information to class, explain what we know and happy to get information or new knowledge from other sharing[S4].
Presentation and communication	The student teachers have an opportunities to explain ideas, communicate effectively and present their information to other or to the whole class.
	I work in group and do presentation[S3], I got new experience with method from teacher and especially I got the general knowledge also grammar skill. One more thing I have a collaboration, sharing knowledge to each other, solution to problem, creativity , critical thinking , communication with classmates and discuss in group.[S11]
Questioning and Discussion	The teacher employed the questions for the exploring different perspective and having thoughtful discussion
	The activities that have developed my critical thinking ability are studying by using questions that all the questions related to our life that we see and face with it everyday [S7], try to understand what they ask and what they want [S13],
Active learning	The student teachers are actively participating in class activities assigned by the teacher. it goes beyond memorization and applying knowledge.
	Activities developed my critical thinking is allowing us to make better discussion, practicing active learning and listening More understanding and reading[S5]. Encouragement, active participation, new creation[S17], Group work helps by analyzing or task video and personal experience, sharing role in group[S10]

4. Discussion

This study has confirmed its original hypothesis. Firstly, the study aims to assess the current implementation of CBI in learning English grammar at BTEC. There is a significant difference between the experimental group with CBI practices and the control group with traditional practices, based on the mean scores of the pre-test and post-test of the experimental group, analogous to the control group. It is inevitably presumed that implementing CBI through the UbD model in teaching English grammar effectively increases students 'academic achievement. The use of the Concept-based instruction (CBI) approach can aid in the acquisition of passive in English as well as the capacity to transmit meaning through language structure, making the process of learning EFL more meaningful and purposeful(Gal'perin & AIu, 2010). Additionally, it can be alleged that questioning is used with ORID. ORID questions, which were developed by Laura Spencer, are an excellent technique to organize a survey, interview, presentation, or discussion using the ORID method. Guiding participants through an experiential learning process

can be helpful. It enables individuals to think logically and draw conclusions about the circumstances or subject under consideration. It follows the natural course of human communication (Laura, 2017). According to an analysis of the satisfaction survey, the experimental group felt "satisfied" with CBI. They acknowledged that, despite the challenges posed by the language of teaching and the requirement for peer cooperation, CBI might help them become more proficient in grammar and provide them with the confidence to acquire it (Sophon et al., 2022). The second aim of this study was to investigate the practice of six facets of understanding in fostering critical thinking among student teachers. The findings revealed that student teachers increase their competence in Interpretation, Explanation, Perspective, and Application, and they tend toward competence in Self-knowledge and Empathy. The six facets of understanding encompass the ability to explain, interpret, apply, take a perspective, empathize, and possess self-knowledge. According to Wiggins and McTighe, a complete and mature comprehension "ideally encompasses the full development of all six forms of understanding" when teaching for transfer (Wiggins et al., 2005). This investigation aims to identify that group work, research and analysis, questioning and discussion, presentation, and communication are the most important activities that foster critical thinking. The study's findings, as demonstrated by Fuad (2017), showed that various models require distinct critical thinking abilities. Students who used a mind map in conjunction with a varied science inquiry paradigm for their learning achieved the highest levels of critical thinking proficiency. The results indicated that concept-based grammar training was generally practical; however, they also highlighted significant variations in learners' comprehension of applying animate versus inanimate objects (Lyndon, 2011). Employing various activities during the teaching process, it seems the teacher provided them with great energy, which they will bring back tomorrow (Brown, 2012).

5. Limitations and Suggestions

The sample size of the experimental group was insufficient. In addition, there was a mixed ability in language proficiency, which impeded slow learners' understanding of the lessons, as a language immersion approach was employed during the teaching process. Further research should be conducted to assess students' teacher understanding through performance tasks, and it should be encouraged to apply this approach throughout the stream. The tool measuring the level of student teachers critical thinking was not adapted from other researcher it was personally crated with the six facets of understanding questions then asked three experts to check and piloted with the English students and find the validity before it was administered with both control group and experiment group which resulted in biased or unreliable in measuring the level of student teachers critical thinking. This tool can be used for other research on the six facets of understanding questions.

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