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Exploring the Effectiveness of Concept-Based Instruction Versus Deductive Methods in Teaching English Grammar

Ponna Wang ^a, Buehler Ricard ^b, Zhou Guang ^c

^a Cambodian Education Forum Phnom Penh, Cambodia

^b Battambang Teacher Education College, Battambang, Cambodia

^c School of Geographic and Environmental Sciences, Tianjin Normal University, Tianjin, China

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ABSTRACT

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Correspondence Author:

Ponna Wang

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Objective: This study investigates the impact of Concept-Based Instruction (CBI) compared to deductive methods on English grammar knowledge, student engagement and overall student teacher satisfaction in Sihanoukville, Cambodia.

Methods: A quasi-experimental design was used with two groups of student teachers. In the CBI group, the experimental group was taught using CBI, while the control group used deductive methods. Grammar knowledge was assessed with pre- and post-tests, and student engagement and satisfaction were measured through observation and surveys. Statistical analyses were performed on the data to evaluate the effect of each teaching method.

Results: The results showed that the CBI group significantly outperformed the control group in grammar knowledge, and they also reported significantly higher levels of engagement and satisfaction. Through CBI, students learned in an active, collaborative and meaningful way, thus improving learning outcomes.

Novelty: By extending the evidence base for the effectiveness of CBI in language teaching in Cambodia, this study adds to the growing body of data supporting these claims, particularly in relation to the practice of CBI in teaching in Cambodian contexts. It also explores how a task and collaborative learning perspective can be applied to improve student outcomes in English language teaching.

Theoretical and policy implications: The study confirms that CBI is effective in English language teaching and is consistent with the principles of constructivist learning theories. Based on the findings, they reflect on the implications for policy makers and educators and suggest that CBI could be integrated into language curricula to create more dynamic and effective learning environments.

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1. Introduction

Grammar instruction has long been a staple of language education, yet it is also one of the most problematic and contentious issues in the teaching and learning of language (Caldwell-Harris & MacWhinney, 2023; Macswan, 2019). While recent improvements in education across Southeast Asia are promising, we still struggle with students' appalling English grammar skills (Hargreaves et al., 2023; Walshe et al., 2022). Cambodia continues to expose low national-level outcomes in the domain of English proficiency EF English Proficiency Index, 2023, positioning at either the lowest place of this skill, globally and regionally (Haenssger et al., 2023; J. Liu & Steiner-Khamsi, 2022). A case in point is Sihanoukville, a developing urban area of Cambodia that exemplifies this trend, indicating the necessity of effective methods to teach grammar to improve learners' communication ability in English. Innovative pedagogical approaches concept-based instruction (CBI), have recently shown promise to transform the way we acquire a language to encourage reflective and practical learning (Myrset, 2022; Park, 2022; Vorderobermeier et al., 2024). Despite mixed results though (Bell & Cui, 2023; Maketo et al., 2023; Sibbett, 2022), the ease and familiarity of the deductive approach have helped ensure its continued dominance in classroom practice. Such contrasting methodologies illustrate the changing nature of grammar instruction and the need for a contemporary pedagogical reimagination (Mendelowitz & Govender, 2024; Sools et al., 2022; Truong & Nguyen, 2024).

The deductive approach, which is often used in Cambodia Liang & Jun Zhang (2024), Nhep et al. (2024), begins with the explanation of grammar rules & students are expected to use them as they go through structured exercises. Though useful in that it can be clear and systematic in terms of grammatical structures covered, this appears to leave communicative competence and critical thinking by the wayside (Matthiessen et al., 2022; Nhep et al., 2024). Due to students' overreliance on rote memorization of grammar rules, they often find grammar rules and concepts challenging to internalize and apply in authentic contexts (Gholami, 2022; Long & Ding, 2024). Unlike the chapter approach, CBI



focuses on big ideas and pattern connections, which promote comprehension and purpose (J. E. Liu et al., 2023; Rosário & Dias, 2023). However, the implementation of CBI cannot be widespread in the classrooms in Cambodia when the materials and teachers are lacking and teachers are not familiar with new methodologies (Al-Hazaima et al., 2024; Shaw et al., 2019). Compounding these issues are socio-economic challenges and the absence of empirical evidence demonstrating the efficacy of CBI in local contexts, such as Sihanoukville. To address these issues, a comparative analysis of both approaches is necessary to evaluate their respective merits and applicability in enhancing the outcomes of grammar instruction (Apridayani et al., 2024; Ding & Zou, 2024; Su & Zou, 2024).

Concept-based instruction (CBI) represents an outgrowth of cognitive constructivist theory that argues learning is more meaningful when students actively construct knowledge through experiential learning (Erickson, A. T., 2019). Because CBI promotes thematic links and critical thinking, it fits within Vygotsky's concept of the Zone of Proximal Development (ZPD), in which learners move to higher order cognitive functions when guided (Harun et al., 2017). In contrast, the deductive approach is based on the theory of behavioral learning which identifies frequency and reinforcement as the key factors to the learning of grammatical rules (Ivar Lovaas & Smith, 1989; Skinner, 1984). Although both methods have their own theoretical bases, CBI is better aligned with the holistic language acquisition theory (Butcher & Jameson, 2016), Rapp et al. (2021), since it emphasizes the conceptual understanding behind the content the students are learning. This theoretical divide highlights the necessity of conducting empirical research that examines the effectiveness of these strategies in particular educational settings, especially in developing countries such as Cambodia.

The literature reported inconsistent results, and this, on one side, led to an ongoing debate on methodologies involved in grammar instruction. Research supporting the deductive method reports its ability to deliver clear elaborated instruction and aid rule memorization (Cheng et al., 1986; Qi & Lai, 2017). However, many of these studies observe shortcomings regarding the promotion of communicative competence and learner autonomy (Cramer-Petersen et al., 2019; Tammenga-Helmantel et al., 2014). On the other hand, supporters of CBI highlight the aforementioned advantages related to critical thinking and context-based grammar practice, resulting in greater language use in real-world situations (Erickson, A. T., 2019; Harun et al., 2017; Shipilova et al., 2022). However, CBI has faced critiques of its complexity and the very high amounts of teacher prep it requires (Trojan et al., 2017). Methodological comparisons of these approaches remain under-investigated in particular settings, like Cambodia, where little is known about which works best (McNaughton et al., 2001). Previous research conducted in high-income countries may overlook critical socio-cultural and economic challenges found in Cambodian classrooms, such as access to teaching materials and inadequate training for educators (Silva-Laya et al., 2020). Bridging this gap will help provide evidence-based recommendations on how to improve grammar teaching in Sihanoukville, an international city with a rising demand for English proficiency. This study aspires to offer new insights regarding the contextual applicability of both deductive and concept-based approaches, ultimately assisting educators in implementing strategies tailored to their learners' needs by contrasting the outcomes of both methods.

The study pay attention to examining whether deductive or concept-based approach was more effective in teaching English grammar in Sihanoukville, Cambodia to student teachers. It aims at assessing their impacts on grammar knowledge, critical thinking and overall language skills of the learners so as to provide empirical evidence for local pedagogy in the region.

2. Method

Using a matched control experimental design ([Kumar, 2018]), this study explores the relationship between the use of a Concept-Based Instruction (CBI) approach (compared to a Deductive Teaching Approach (DTA) with the learning outcomes of primary student teachers from Sihanoukville, Cambodia. In this design, experimental and control groups were created from similar pre-treatment characteristics of participants, like placement test scores. It aims to explore the impact of the two teaching methods on students grammar achievement and interest.

The said study assumes that, due to exposure to CBI, the experimental group would be more engaged and perform better as far as grammar is concerned than the control group taught through DTA. Data till October 2023 backs this expectation (as in Chong, 2019, reporting that CBI leads to higher order cognitive skills and retention of forms):

The study was carried out with Year 1 primary student teachers from a teacher education program in an institution in Kota Sihanoukville, Cambodia. All the participants were split into experimental and control groups, according to their scores from a placement test, such that both groups have similar baseline grammar abilities. They each received two 90-minute instructional sessions on the past simple and past perfect simple tenses. Concept-Based Instruction (CBI) was applied for the experimental group and Deductive Teaching Approach (DTA) was used for the control group. All the teaching sessions were recorded for observation and analysis. After the instruction sessions, the participants then took a post-test to assess their grammar abilities. Moreover, the experimental group answered a satisfaction questionnaire to give an opinion about their learning with CBI.

Ninety primary student teachers (63 females, 27 males) from three different classes in Kota Sihanoukville, all in their first year of the teacher education program, participated in the study. Inclusion criteria such as being enrolled in the



program and not having taken a formal English proficiency test were used to select participants, as was lack of English proficiency as determined by a placement test. To maintain comparability, participants were divided into two groups, 45 each, using a matching process based on the grammar ability as measured by the placement test. The demographic features of subjects are illustrated in the below table to elucidate participants' distribution and demographic features.

Table 1: Student teacher demographics in Kota Sihanoukville

Demographic Information	Frequency	Percentage (%)	Age Range
Gender			
Male	27	30.00	18-20
Female	63	70.00	21-24
Age			
18-20 years	35	38.89	25-30
21-24 years	45	50.00	
25-30 years	10	11.11	

Data Source: Results of Researcher Observations 2024

Data were collected from various sources for a comprehensive understanding of the impact of the intervention on the participants. Placement and post tests were adopted from Lim (n.d.) to assess participants' grammatical proficiency before and after the instructional sessions. A checklist for classroom observation based on the one created by Cassar and Jang (2010) was used to assess student engagement during lessons, revealing aspects of the participants' active engagement in the learning process. The experimental group also filled out a questionnaire about satisfaction (based on Huang, 2016), which provided useful information on how they felt about Concept-Based Instruction (CBI). These varied data sources permitted a comprehensive appraisal of the effectiveness of the instructional techniques as well as participants' learning experiences.

Data analysis consisted of a mixed-methods approach; both quantitative and qualitative approaches were taken. Quantitative analysis application as below where independent sample t-tests were used to test any differences in scores of the experimental and control group pre and post-test. To provide a detailed view of student engagement and perceptions, data from the engagement observation checklist and satisfaction questionnaire were summarized using descriptive statistics. For qualitative analysis, open-ended responses from the satisfaction questionnaire were transcribed, and then systematically coded and analyzed thematically to identify the major patterns and themes. All quantitative analyses were performed using SPSS 21 software, and Microsoft Word was used for the processing of qualitative data. We employed this combined approach to allow for a comprehensive multi-dimensional assessment of study outcomes.

3. Results

The results part, also illustrated in the following section, provides a detailed view of the differences in the effectiveness of both deductive teaching and concept-based instruction (CBI) teaching methods on grammar knowledge, student teachers' engagement, and student teachers' overall satisfaction. Concept-based teaching: Analysis through the data are categorized in three primary domains: (1) post-test performance, (2) engagement, and (3) satisfaction with concept-based teaching. This significant difference in grammar performance concerned the post-test performance in the control group, which used the deductive approach, and the experimental group, which was using the Concept-Based Instruction, CBI. The means for the experimental group were higher (19.14) than for the control group (16.88) showing a mean difference of 2.26, as presented in Table 2. Results showed that the experimental group significantly improved (2-tailed t-test $t = 2.115$, $p = 0.039$) in grammar knowledge when compared to other groups. Consequently Concept-Based Instruction showed significantly better grammar acquisition over Deductive Teaching Approach.

Table 2: Comparison of Post-Test Score

Group	N	Mean	SD	Mean Difference	t	p-value
Experimental (CBI)	35	19.14	4.89	2.26	2.115	0.039
Control	35	16.88	5.21			

Data Source: Results of Researcher Observations 2024



Engagement of the students in the idea lessons was measured with a checklist that two observers filled out, assessing metrics like effort, initiative, and disruptive behaviors. Results, presented in Table 3, indicated a high level of engagement among participants in the experimental group. The average scores for effort (4.16) and initiative (4.12) are relatively high and confirm that students are actively participating and demonstrating motivation. On the other hand, the means for disruptive behaviors (1.45) and inattentiveness (1.29) were low, meaning that classroom disruption (1.61) and overall focus (1.67) was much better. This positive effect of CBI on student engagement led to an effective and focused learning environment and highlights the importance of CBI in enhancing student engagement.

Table 3: Engagement Observation Scores

Engagement Scale	Observer 1	Observer 2	Mean
Effort	4.12	4.20	4.16
Initiative	4.15	4.08	4.12
Disruptive	1.40	1.50	1.45
Inattentive	1.22	1.35	1.29

Data Source: Results of Researcher Observations 2024

A 5-point Likert scale was used to assess student teachers' satisfaction with Concept-Based Instruction (CBI) yielding their overall satisfaction score as seen in Table 4. However, based on the feedback received, the integration of the action segment into the training made the instructional approach enjoyable and the study effective in seeking the improvement of language skills. In particular, the item (Index 13): The activities helped me to understand English grammar scored as mean = 4.10 (SD = 0.72), which indicated the activities were helpful to governing grammar knowledge. Respondents also showed positive responses to items like, for example, "Pair work increased my confidence in speaking English" (mean = 4.02, SD = 0.65) and "Using real-life examples made learning more relevant" (mean = 4.15, SD = 0.69). All three of these statements received the highest scores: "Concept-based instruction was more enjoyable," 4.18 (SD = 0.58); and "I wish the teacher used concept-based instruction more," 4.25 (SD = 0.70). As illustrated by a mean score of 4.13 (SD = 0.67) the overall results indicate that CBI was seen by participants as a teaching method that is effective in developing their language skills and is highly engaging in comparison with other teaching methods.

Table 4: Student Satisfaction with Concept-Based Instruction

Statement	Mean	SD
The activities helped me understand English grammar.	4.10	0.72
Pair work increased my confidence in speaking English.	4.02	0.65
Group discussions encouraged collaboration.	4.08	0.67
Using real-life examples made learning more relevant.	4.15	0.69
Concept-based instruction was more enjoyable.	4.18	0.58
I wish the teacher used concept-based instruction more.	4.25	0.70

Data Source: Results of Researcher Observations 2024

The favourable impact of Concept-Based Instruction (CBI) on student teachers' learning experiences is also supported by student teachers' qualitative feedback, summarized in Table 5. Their responses fell into several key themes. First, when it comes to language skills, participants indicated that CBI contributed to their improved communication and grammar, in which one of them wrote, "[CBI] have made me more confident in how to express ideas and know grammar better while doing activities." On confidence, learners reported that in collaborative learning activities like group work and discussions, they felt their confidence in speaking English increased, as one learner shared "The group work and discussions helped me build confidence and speak English without fear of mistakes." The participants also expressed their appreciation on how relevant the lessons are because even the tasks involve real-life situations thus making the lesson more meaningful and enjoyable as stated in the quote, "Tasks related to real-life situations made the lessons more meaningful and enjoyable." The cooperative aspect of CBI was also well-received; the collaboration and sharing fostered by CBI encouraged team work, with one student putting it, "I liked how the teacher was always supportive of what's going around in the discussions and encouraged everyone to contribute, creating a cooperative learning environment. However, participants also highlighted some challenges, especially with respect to the varying English proficiency among students. It could be difficult to follow along when the instructions were only in English, remarked one participant. It would be useful to add some Khmer explanation." In general the qualitative findings corroborate the quantitative findings, emphasizing the strengths of CBI in promoting PELC, confidence, and engagement, and focusing on areas for growth related to mixed levels of proficiency.

Table 5: Qualitative Feedback on Concept-Based Instruction

Theme	Key Concept	Supporting Quote
Language Skills	Improvement in communication and grammar.	"[CBI] made me more confident in expressing ideas and understanding grammar better during activities."
Confidence	Enhanced confidence through collaborative work.	"The group work and discussions helped me build confidence and speak English without fear of mistakes."
Relevance	Connection to real-life applications.	"Tasks related to real-life situations made the lessons more meaningful and enjoyable."
Cooperation	Encouraged teamwork and sharing of ideas.	"I liked how the teacher encouraged everyone to contribute during discussions, making it a cooperative learning environment."
Challenges	Mixed proficiency levels affected engagement.	"Sometimes, it was hard to keep up when the instructions were only in English. Adding some Khmer explanations could help improve understanding."

Data Source: Results of Researcher Observations 2024

4. Discussion

Following this goal, the current study aimed at investigating the applicability of deductive and concept-based instruction (CBI) approaches to improve English grammar awareness and critical thinking skills and language proficiency of student teachers in Sihanoukville, Cambodia. The results showed that CBI has a significant and affirmative effect on student grammar scores, motivation and satisfaction. Here, we summarize the implications of these findings, contextualize them with existing studies in the language instruction field, and discuss potential advantages and disadvantages of the CBI approach in the Cambodian setting.

As shown in the comparison of post-test results between control and experimental groups, the results confirmed that there was a significant difference between means of students in deductive and CBI group performance. These results align with previous research showing that teaching grammar in a concepts-based manner is beneficial for the understanding and retention of grammar structures. (2013) American District: Why CBI encourages a more proactive learning style, and makes students do exercises and practical tasks. Unlike the passive learning of traditional deductive methods in which students are told and memorize the rules and grammar explicitly, this model is an engagement in exciting active learning. CBI aligns itself even more closely with theories of learning specifically, constructivist theories (such as those proposed by Piaget, 1973) which view knowledge as something that is actively problem solved rather than passively received; CBI promotes discovery of language rules and patterns based on experience in context, rather than on conscious instruction about them.

The findings of this work further confirm the research conducted by Duman and Tok (2019), revealing CBI played a markedly positive role in the grammar retention and the application of secondary school students. The researchers proposed that teaching grammar in the context of its broader application in real life helps students realize how to relate the rules of language to its practical use. The emphasis on task-based learning and collaborative activities in CBI may facilitate students' learning of grammar with the chance to practice grammar in some interactive and relevant contexts, thus making the process of grammar learning more contextualized and engaging (Winters, 2014).

The concept-based instruction was also supported by engagement, as measured using an observation checklist. Compared to the control group, the CBI group showed more evidence of effort and initiative, having lower disruptive and inattentive behavior scores. These findings are consistent with previous studies that indicate the benefits of CBI on student motivation and engagement (Cennamo & T, 2005; Sarac & Matejko, 2019). Hattie (2009) has found that active learning approaches as seen in CBI generate high levels of engagement among students. Active involvement in learning not only keeps students engaged but also encourages cooperation with others and a greater investment in the learning process.

The effectiveness of cooperative learning strategies, including group work and peer interactions, has also been shown to boost student engagement (Johnson & Johnson, 1994). Here, collaboration through CBI allowed students to work together, discuss ideas, and solve problems as a group, making for a much less passive learning experience. The significant level of engagement that was recorded in the CBI group supports these findings, and validates the value of collaborative learning where this is integrated in the language response.

Nonetheless, potential student engagement limitations should be noted as well. Most of the students in the CBI group were meanwhile active, but some of them criticized the group discussions were not long enough. This indicates that



some learners may need extra support to enjoy group-based interactions as much as other students do. Future research could explore more targeted means for engaging less active students, either with differentiated tasks, or closer guidance by instructors.

Additionally, the data on student satisfaction underscored the benefits of CBI in language teaching. Improved achievement across levels of both language skills and locus of control correlations was reported as students in the experimental group achieved high levels of satisfaction with aspects of the CBI approach, particularly when it came to opportunities for group work and opportunities to apply language skills in real life. These findings echo those in research on task based language teaching which have been shown to improve learners' motivation & satisfaction as well as link language learning with authentic, real word contexts (Ellis, 2003). CBI provides real-life scenarios through tasks that simulates real communication thus providing a sense of purpose and relevance and ultimately motivation and satisfaction to the students.

Additionally, the overwhelmingly positive feedback about the use of pair and group work supports the conclusions drawn by Slavin (1995), who stated that cooperative learning leads to greater levels of motivation and achievement. According to students within the study, group discussions and pair activities provided students with confidence and improved their communication skills, which demonstrates how effective the collaborative elements of CBI in working to create a positive learning atmosphere. The slight increase in the students' attitudes toward speaking the English language as a whole within the scope of the study could also be attributed to the nature of cooperative learning structures as key aspects English learning (Gass & Mackey, 2006).

However, language was also challenging, especially because the primary medium of instruction was English. These students recommended including the Khmer language in the lessons to better aid understanding. Such feedback emphasizes the need for scaffolding of language learners to help them access the content based on students' cultural backgrounds. The issue regarding mixed proficiency levels in CBI classrooms is in line with previous studies (Sato & Loewen, 2019), which showed that learners of lower language proficiency can find it difficult to meet CBI demands. In future implementation, for example, instructor may use bilingual strategy or providing extra help for less proficient English students.

Although the advantages of CBI are prominent, the research also emphasizes various hurdles during its implementation. Students said that one of the main barriers to understanding some didactic content was because, exclusively, English was used. Use of target language only may be challenging to students with lesser language proficiency (Sato and Loewen, 2019), especially in the areas where English is not the primary language. This challenge requires a measured approach that uses students' native language as needed to support comprehension and avoid frustration.

In addition, the study also indicated that give the diversity in students' ability to learn in one class this could hinder CBI success. The majority of students found the method helpful, with some asking for more time in groups for discussion and tasks. Which gives reason for personalized instruction that supports by variety learning requirement. Adding in more support for more reluctant and/or less able students, such as scaffolding group work more or tailoring tasks to different abilities, would further broaden the effectiveness of CBI to language classrooms.

5. Conclusion

Insightfully, this research gives strong support for the role of concept-based instruction in promoting grammar knowledge, engagement, and satisfaction in an English language context. Methodological Discrepancy: It appears reasonable to conclude that CBI is superior to deductive models, due to its irrespective structure in relation to real-life tasks, collaborative learning, and critically thinking. Top challenges include a lack of language comprehension among very low proficient students who are still emerging; and the varying levels of proficiency of students (some of whom may have been mostly instructed in a language other than English), which can be addressed with some planning even within mixed groups of students. Overall, findings lend support for the promotion of CBI, as a widely applicable pedagogical approach to language teaching in Cambodia and analogous settings. Further studies should focus on the longitudinal impact of CBI on language skills and explore methods for effective classroom integration across different contexts.

Limitation

There are a number of limitations to this study that must be accepted. First, the sample size was comparatively small, as participants were limited to students and teachers in specific institutions in Cambodia. This may limit the generalisability of the findings. Second, the intervention period was limited; longer studies may provide a deeper understanding of the effects of concept-based and deductive approaches. Thirdly, the research mainly investigated the teaching of English grammar, which limits the generalisability of these findings to other aspects of language teaching and possibly even to other subjects. Finally, external variables such as participants' background knowledge, pedagogical approaches and socio-cultural influences were partially controlled for and may have had an impact on the results. Future research aiming



for a larger and more diverse sample, but also longer intervention periods and consideration of the effect of external variables, should address some of the limitations of our studies.

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Author contribution

Ponna Wang conceptualized the study, designed the methodology, and contributed to the analysis of data. Buehler Ricard conducted the literature review, facilitated the data collection process, and analyzed the results. Zhou Guang provided expertise on the geographical context and assisted with the final review and editing of the manuscript.

Conflicts of Interest

The authors have not declared any conflict of interest.

Data Availability Statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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