



EXPLORING THE 4CS IN PRACTICE: A STUDY OF CLIL IMPLEMENTATION IN A PRIMARY CLASSROOM

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Abstract

In recent years, Content and Language Integrated Learning (CLIL) has gained increasing prominence as a pedagogical trend in many educational systems. The centerpiece of CLIL is the 4C framework- Content, Communication, Cognition, and Culture, which provides a foundation for conducting lessons that support language and subject learning. This study examined how the 4C was integrated into a science class that used English as the language of instruction among first-grade primary school students. The teacher's lesson plan and classroom observations were used to gather data for this qualitative study design. Findings revealed that teachers were integrating the 4C into classroom teaching. Visual aids, language simplification, and repetition were provided to support content learning. Communication was fostered with the active use of language through classroom activities such as group work and hands-on experiments that could also engage students in cultivating thinking skills. Lastly, global examples that were pertinent to the subject matter were used to introduce cultural features. This study highlighted the potential of the 4C framework to be actualized among young learners. The implications of this study suggested the significance of deliberate planning to realize the CLIL principles in an integrated manner. Furthermore, this study showed that young learners can actively participate in cognitively and linguistically rich learning environments if provided with adequate support from teachers.

Keywords: 4Cs framework, CLIL, primary context, young learners

INTRODUCTION

Communicating in multiple languages has become crucial in today's increasingly interconnected world. This has led to the education system emphasizing the development of language competency. One practical approach to cater to this need is Content and Language Integrated Learning (CLIL), which has been widely adopted. CLIL is an educational approach that integrates subject content and language learning simultaneously (Coyle et al., 2010). This approach involves teaching non-language disciplines like science, math, and history in a foreign language (Bekirogulları et al., 2022; Martens et al., 2023). Muniroh et al. (2023) mentioned that this is a curricular model typically practiced in bilingual education that incorporates English into teaching the subject. Through the dual focus of this approach,

the teaching process emphasizes both content and language mastery (Pham & Unadi, 2022). In this way, CLIL promotes students' understanding of academic content and reinforces their language skills in a contextualized setting, preparing them for the demands of a complex and ever-changing globalized world.

With its emphasis on dual-focus learning, CLIL, which first appeared in Europe, has spread throughout the world and is used in a variety of educational systems with a wide range of linguistic and cultural backgrounds (Banegas, 2011; Devos, 2016; Renau & Martí, 2019). This broad adoption of CLIL also includes contexts where English is a foreign language (EFL) in many Asian classrooms, including Indonesia, which has gained popularity recently. Educational institutions, starting from primary to higher education, have incorporated CLIL into their curricula (Gilanyi et al., 2023). In this context, implementing CLIL brings a synergized combination of language and content learning that distinguishes it from the traditional EFL classroom. This creates an environment where students engage with English to comprehend and discuss the topic. Dalton-Puffer (2011) also stated that the CLIL educational program promotes a more authentic learning environment than traditional EFL classrooms. A goal for the use of language is integrated into the content being studied.

Furthermore, the essence of the CLIL framework is the 4C model proposed by Coyle et al. (2010), which describes its core principles and directs effective implementation. This includes Content, Communication, Cognition, and Culture. Within this framework, content refers to the knowledge or subject matter that students should acquire, the use of the target language for interaction and learning is known as communication, cognition relates to the thinking process, and lastly, culture is a means to foster global viewpoints and intercultural awareness. These four components are interconnected to ensure a meaningful and successful CLIL experience.

Notwithstanding the strong theoretical foundation of CLIL and the increasing number of schools adopting this approach, there are still notable gaps in the literature concerning its practical implementation, particularly at the primary school level. Several studies have centered on CLIL implementation and its effectiveness. Bauedin (2021) found that students expressed positive attitudes, enjoyment, and increased motivation toward learning through CLIL. This finding is consistent with other studies showing that CLIL practices are generally satisfying and well-received by students, showing the program's strengths and opportunities (Huang, 2020; Khamkhien & Kanoksilapatham, 2019; Nguyen, 2023). The CLIL approach has been shown to offer numerous gains, both in terms of content mastery and language proficiency improvement (Mattheoudakis, 2024; Sari et al., 2024; Lee et al., 2025; Yani et al., 2023; Zhu et al., 2024). In line with this point, Mattheoudakis (2024) showed that students in CLIL classes performed better than students in non-CLIL classes, indicating that the use of English did not hinder content comprehension. Research by Zhu et al. (2024) supported this finding, in which CLIL students' average scores were higher, indicating a more profound cognitive process that resulted in better content mastery. In terms of language, Sari et al. (2024) reported that implementing CLIL positively impacted students' English language skills, ranging from basic to advanced levels. Students showed satisfactory achievements in writing, listening, and general language use. CLIL provides rich exposure to an L2 environment while allowing students to acquire English by actively practicing in real contexts (Sari et al., 2024; Yani et al., 2023).

Previous studies have made significant contributions to the understanding of CLIL effectiveness. The main focus of those studies has been on perceptions of CLIL in general and student learning outcomes. Concerning this, there is still limited research that

specifically investigates how teachers implement the CLIL approach in daily classroom practice, especially in integrating the main elements of the 4C (Content, Communication, Cognition, and Culture). It is at the core of the CLIL approach and plays an essential role in ensuring meaningful learning and a balance between content acquisition and language development. Therefore, this present study addresses this gap by examining the 4C model in daily classroom practice. Observational studies are essential to provide insight into how teachers interpret and implement the 4Cs during instruction.

This study aims to provide insight into the practical application of the CLIL framework in the context of primary education. This research was conducted in one of the primary schools in Malang City that has been implementing the CLIL approach since 2006 through its international class program. In this program, subjects such as Mathematics and Science are taught using English as the language of instruction. This school was chosen because it has been implementing the CLIL approach consistently for a long time, allowing researchers to observe the nuance of CLIL that has been thoroughly integrated into learning practices. The focus of this research was to investigate the way teachers specifically integrate the four main elements in the 4C (Content, Communication, Cognition, and Culture). As such, this research is intended to contribute to the development of CLIL practices at the primary education level, as well as to fill a gap in the literature related to the CLIL 4C in everyday classroom contexts in Indonesia.

METHOD

Utilizing a qualitative methodology, this research investigated the use of Content and Language Integrated Learning (CLIL) concepts, namely the 4Cs (Content, Communication, Cognition, and Culture), in a primary school science classroom. The selection of this study allowed for a thorough, contextualized analysis of instructional processes in their natural setting (Creswell & Creswell, 2018). This study's descriptive nature aimed to give a comprehensive and in-depth account of CLIL's implementation without attempting to draw generalizations beyond the particular context.

The participants of this study were a CLIL teacher and first-grade students at a private elementary school in Malang City, with students aged 6-7 years. There were roughly 26 to 28 students in each lesson that was observed. The students were predominantly Javanese and spoke Javanese as their first language, while the language of instruction in the classroom was English. In this study, the teacher taught a science subject using English as the language of instruction. She was purposefully selected based on her experience teaching CLIL for more than five years and her willingness to be observed as part of the research. Prior to data collection, the researchers followed ethical procedures. A letter of request was addressed to the principal of the school where the study was carried out. The researcher coordinated with the teacher to arrange the observation session after receiving approval.

Two meetings of the science class were used to conduct this research. The researchers observed the class without participating in the instructional activities to preserve a natural learning environment. The teacher's lesson plans were gathered and examined in addition to classroom observations to complement the observational data and provide insights into how the 4C model was incorporated into teaching planning. While this study used lesson plans and classroom observations as primary data sources, interviews with teachers or students were not conducted. This absence limits the depth of the analysis. In this present study, data were gathered through the use of two primary instruments: an observation checklist and a document. The 4Cs framework served as the foundation for the development of the two

instruments (Coyle et al., 2010), consisting of indicators that represent each of the four dimensions: Content (e.g., integration of subject matter), Communication (e.g., use of target language and interaction), Cognition (e.g., development of thinking skill), and Culture (e.g., understanding perspectives of other cultures). With the teacher's approval, each session of classroom observation was also recorded to provide a more thorough and accurate picture of the dynamics in the classroom. Video recordings allow researchers to review interactions and instructional practices multiple times for deeper analysis. Field notes were gathered during the observations to record initial observations and contextual information in addition to the checklist and recordings.

Thematic analysis was utilized in the data analysis process (Creswell and Creswell, 2018). This approach was chosen due to its flexibility and capacity to recognize and analyze patterns in a variety of qualitative data sets. The analysis process entailed familiarization with the data, initial coding according to the 4C model, and defining emerging themes that illustrated how the four components were implemented. These themes were reviewed, refined, and interpreted to enable a comprehensive understanding of integrating the 4Cs in CLIL teaching. Overall, the combined classroom observation and lesson plan analysis were interpreted through thematic analysis, allowing the researcher to make insightful conclusions regarding the incorporation of the 4Cs in a science classroom, aligning with the study's aim to capture the reality of CLIL practice in a setting for young learners.

RESULTS AND DISCUSSIONS

This part presents the results from the analysis of teachers' lesson plans and classroom observations conducted in a CLIL class within a Science subject at the first-grade level of primary school. This analysis is structured based on the 4C (Coyle et al., 2010). Classroom activities that demonstrate how the 4Cs were implemented in classrooms are used to explain each theme.

Content: Making Content Comprehensible

The teacher implemented CLIL by delivering science content in English while maintaining accessibility for first graders. The learning focus was on key science concepts and emphasizing the language. During the classroom observations, the teacher was teaching a lesson about magnetism. To support comprehension of the lesson, the teacher used simplified language, repetition, and visual representations throughout the lesson. The following is a description of the classroom observation and data taken from the teacher's document of the lesson plan.

The teacher avoided complex grammar and long sentences when introducing the main content. Instead, she broke down the explanation into short, clear phrases. For example, during a lesson on magnets, the teacher said: "This is a magnet. Magnets have two poles. Magnets can attract or repel objects" (Classroom observation, meeting 1).

The explanations were repetitive and consistent, allowing students to focus on the new concept without being overburdened by the structure, helping students understand the core science content through English. Additionally, during the observed session, the teacher often used realia and visual aids to explain the subject matter.

When introducing the concept of magnetic and non-magnetic materials, the teacher brought in real objects such as magnets, paper clips, spoons, scissors, and leaves. Additionally, the use of videos shown through a projector was also given to help

students comprehend science concepts taught in English. (Classroom observation, meeting 2).

Lesson plans included specific content learning objectives, such as "Students can identify which objects attract or repel magnets." "Students can conclude the different materials that can attract or repel the magnet". The use of media such as slides and videos, and real objects to support the learning process, was also included in the lesson plan. (Teacher's lesson plan)

This finding reflected the Content component of the 4C framework, where subject knowledge is deliberately presented with the use of accessible language and resources to ensure young learners can engage with academic material in a foreign language.

Communication: Language as a Tool for Learning

The teacher in the CLIL science class that was observed made active use of language as a tool to promote content acquisition and language development. Language is not merely a medium of instruction but also an object of learning. In the classroom, an emphasis on key vocabulary related to the material and interactions was applied. Findings from classroom observations showed that language support was systematically embedded throughout the lesson. Teachers consistently taught key vocabulary related to the content being learned; this was done by showing several vocabulary terms through PowerPoint slides as well as emphasizing important terms written on the board. An example from the observation notes is shown below:

During a science lesson on magnetism, before exploring the content in depth, the teacher first provided important vocabulary such as attract and repel repeatedly, these vocabularies were displayed through PowerPoint slides along with their meanings. After explaining the science concept, the teacher and students also practiced pronouncing the words together. (Classroom observation, meeting 2)

From the illustration above, the teacher regularly modeled key vocabulary and expressions related to the science topic, ensuring that students had the language required to engage with the content. In addition, despite the young age of the students, speaking opportunities were integrated into the lessons through short question-and-answer sessions and group work. Students were encouraged by the teacher to use language in meaningful ways.

At the beginning of the lesson, before introducing the core material, the teacher asked the students to connect their previous knowledge. They were asked to give examples of objects around them that use magnets, some students answered this question, such as "The refrigerator uses magnets". (Classroom observation, meeting 1).

Opportunities for meaningful interaction provided by the teacher were able to encourage students' language use and served to reinforce science ideas through conversation. Generally, teachers made language an inherent part of the learning process.

Cognition: Developing Thinking Skill through Tasks

The observed science class provided students with a valuable opportunity to practice fundamental scientific reasoning about the content learned using English as the primary language of instruction. Before getting students to experiment, the students were asked to make predictions about whether particular objects would be attracted to the magnet. The

teacher used the following simple guiding questions, which were reflected in the observation notes below:

“When the magnet touches the paper clip, what will happen? Will it attract or repel?”

“When the magnet touches the paper, what will happen? Will it attract or repel?”

(Classroom observation, meeting 1).

Students were encouraged to use English to formulate hypotheses and think critically as a result. Following their predictions, students tested a variety of classroom items, including coins, crayons, spoons, and pins, and reported their findings on the worksheet. With this hands-on activity, students started dividing items into magnetic and non-magnetic categories, employing English to explain their investigations. These activities strengthen content-related competence in English while fostering the growth of cognitive skills, including prediction, categorization, and synthesis. The tasks in this lesson naturally link language with thinking and doing, allowing young children in a CLIL setting to engage in appropriate cognitive processes.

Culture: Connecting Learning to the World Surrounding

In science lessons, the teacher incorporated cultural components by making a connection between a scientific concept about magnetism with students’ real-life experiences and global awareness. The teacher presented well-known items like coins, spoons, crayons, and pins, frequently seen in classrooms or homes, to encourage students to investigate both magnetic and non-magnetic objects. This provides students with the opportunity to develop scientific knowledge based on their local surroundings. In order to expand cultural and global connections, the teacher additionally included cultural aspects in her lessons. The observation notes which follow demonstrate this:

At the beginning of the lesson, the teacher showed the students a brief video on the projector screen. The video provided examples of real-world magnetic applications, including sweeper road trucks that use magnets to collect metal debris from the street, and high-speed trains that rely on magnetic levitation. The teacher pointed out that several nations, like China and Japan, already use them. (Classroom observation, meeting 1 and 2).

In the teacher's lesson plan, it was also written, “We might also relate to the benefits of magnets in the modern era in our daily lives today” (Teacher’s lesson plan)

The students' curiosity was sparked by these examples, which also expanded their understanding of the various industries and countries that use magnets. By combining everyday local objects and global examples, the lesson bridged students' cultural backgrounds with the wider context of technology and the environment. Early intercultural understanding and global perspective are fostered by teachers who assist students in recognizing the connections between science and the world outside of the classroom, along with helping them obtain content knowledge.

Discussion

The results of this study provide a distinct viewpoint on CLIL in young learners, broadening the current body of research. Considering that the purpose of this study was to investigate how a primary school teacher employed the 4Cs of CLIL in a science class with first-graders, according to the findings, the teacher combined the four elements, which promoted conceptual understanding and language development. This result aligns with the

instructional guidelines presented by Coyle et al. (2010), which stress that effective CLIL teaching entails conveying the subject matter in the second language and the targeted development of language and thinking skills in culturally meaningful contexts. As Chang (2023) and Lasagabaster and Sierra (2010) mentioned, this study demonstrated the specificity of the CLIL process that integrates contextual content, communication skills, cognitive development, and cultural awareness into teaching.

This study's findings indicated that content was addressed through the use of simplified English, visual aids, and repetition. This reflected the Content component of the 4C, where understanding of the subject is purposefully fostered through the use of comprehensible language and resources, consequently making academic content in a foreign language accessible to young learners. The idea of scaffolding appears to support this finding, as many scholars concur that the objective of scaffolding is student autonomy (van de Pol, Volman, and Beishuizen 2010). This is accomplished with specialized help from a teacher or more capable peers (Lin et al., 2011). In this context, the use of visual aids and simplified language assists students in bridging the gap between the intricacy of the academic content being taught and their language. Linia et al.'s study (2025) also found that visual aids were used to increase engagement and comprehension. This assistance is dynamic, according to Meyer (2010), as students become more independent in their comprehension of the subject matter, its amount and intensity are progressively reduced. In addition to the Content aspect, the findings in this study also showed a close relationship with the Communication component in the 4Cs framework. Language serves as both an object of learning and a tool for learning material. This is reflected in how teachers actively teach key vocabulary relevant to the subject topic to support content understanding. Besides, the teacher also builds meaningful interactions through question-and-answer activities and group work. This finding aligns with the studies of Mahan (2022); Metlí and Akis (2022), which showed that CLIL teachers often provided students with supporting materials and consistently used, defined, and encouraged subject-specific terminology. Thus, the results of this study confirm that language and content corroborate each other in the learning process.

Another striking aspect of this study is the development of students' thinking skills, which relates to the third dimension of CLIL, cognition. Teachers incorporated tasks that encouraged students' thinking skills through prediction, classification, and experimentation. Although thinking skills are frequently seen as difficult for students, particularly when learning a second language (Charunsri, 2020), this study showed that such cognitive engagement is possible when tasks are direct and structured. This finding strengthened the assertion of Rachmajanti et al. (2023) that studying content subjects in English encourages students to think deeper, go beyond what they see, and understand and retain knowledge better. Their ability to think critically and creatively is improved through these processes.

Furthermore, an unexpected finding emerged, in which using examples from everyday life with cultural components in the classroom could stimulate students' interest. These cultural components are manifested through local and global connections. Along with Meyer (2010), students need to be given the opportunity to learn about the cultures of other countries to expand their perspectives. From this study, the idea of technologically and environmentally advanced countries being linked to subject content was shown to arouse curiosity and trigger discussions in the classroom. This shows that students, even at the primary school level, can be formed global awareness and connections through CLIL learning. The study by Garzón-Díaz (2021) also supported these findings by showing students' positive perceptions of CLIL

and emphasizing the importance of explicitly integrating cultural components, especially in science lessons.

CONCLUSION

This study aimed to explore how the 4Cs of CLIL-Content, Communication, Cognition, and Culture were realized in a first-grade science classroom. According to data gathered from lesson planning and observations conducted in the school, the teacher carefully integrated CLIL principles. This was accomplished by delivering content that enabled students to comprehend the material, presented through simplification and visual support, language as a tool for learning, including tasks that supported students' thinking skills, and cultural references that were both locally and globally relevant. Through this study, it was confirmed that CLIL may benefit even young learners if it is properly designed and tailored to their developmental stage. The 4Cs integration not only supported students' understanding of scientific concepts but also promoted the use of English meaningfully as a medium for communicating and thinking. Students' learning experiences were further enhanced by the incorporation of cultural components, which relate lessons learnt to real-world situations.

This study contributed valuable insights into the way the 4C framework can be actualized in practice, offering practical models that teachers can adapt to cultivate effective CLIL teaching for young learners. Teacher can modify their lesson plan by integrating both content and language objectives, designing cognitively engaging tasks that go beyond memorization to promote analysis and problem-solving. Furthermore, cultural components can be incorporated into courses by offering global viewpoints that are pertinent to the subject matter or by making connections across contexts. These adaptations help students strengthen their language skills while also promoting a deeper comprehension of the material and an awareness of other cultures. Based on these insights, it is recommended that teacher training programs include modules on designing CLIL lessons that balance content, communication, cognition, and culture, particularly those tailored to the developmental needs of young learners.

However, it should be acknowledged that the study has several limitations. One teacher, along with one subject matter, was the focus of this study, which restricted the generalizability of the findings. Additionally, the perspectives and learning experiences of the students were not thoroughly examined in this study. A more complete picture of CLIL implementation and its effects on learning could be obtained by future studies that broaden their focus by involving more classes, subjects, or teachers alongside student perspectives.

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