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MEDIATING LANGUAGE AND CONTENT: TEACHER-STUDENT INTERACTION IN A CLIL PRIMARY MATH CLASSROOM

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Abstract: *This research examines the impact of teacher-student interaction on student engagement and comprehension. ing and linguistic growth in a bilingual CLIL math classroom. The research focused on investigating how these interactions facilitate learning in terms of both subject matter and language skills. This study utilized a qualitative approach that included two classroom observations and one semi-structured interview with a fourth-grade educator at SD Presiden. The results showed that the educator utilized a student-focused method via techniques like open-ended inquiries, practical illustrations, and ongoing bilingual support. These techniques greatly improved student involvement and slowly advanced their English language skills. competence in relation to the process of learning mathematics. While Indonesian continued to be the primary language for student expression, the growing prevalence of English for Key mathematical terms signified constructive language exposure. The research finds that interaction between teachers and students in a bilingual CLIL classroom is crucial. in fostering simultaneous growth in mathematical comprehension and English language acquisition through establishing an engaging, encouraging, and language-rich educational atmosphere.*

Keywords: Bilingual classroom, CLIL, Language Development, Mathematics Learning, Teacher-Student Interaction.

Abstrak: Penelitian ini menyelidiki bagaimana interaksi antara guru dan siswa memengaruhi keterlibatan siswa, pemahaman, dan perkembangan bahasa dalam kelas Matematika bilingual berbasis CLIL (Content and Language Integrated Learning). Tujuan dari studi ini adalah untuk menelaah bagaimana interaksi tersebut mendukung pembelajaran baik dari segi konten maupun bahasa. Penelitian ini menggunakan metode kualitatif dengan melakukan dua observasi kelas dan satu wawancara semi-terstruktur dengan seorang guru kelas empat di SD Presiden. Temuan menunjukkan bahwa guru menerapkan pendekatan yang berpusat pada siswa melalui strategi seperti pertanyaan terbuka, contoh-contoh dari kehidupan nyata, dan scaffolding bilingual yang konsisten. Metode ini secara signifikan meningkatkan keterlibatan siswa dan secara bertahap mengembangkan kemampuan bahasa Inggris mereka dalam konteks pembelajaran Matematika. Meskipun Bahasa Indonesia tetap menjadi bahasa utama yang digunakan siswa dalam mengekspresikan diri, meningkatnya penggunaan Bahasa Inggris untuk istilah-istilah matematika kunci menunjukkan adanya paparan bahasa yang positif. Studi ini menyimpulkan bahwa interaksi antara guru dan siswa dalam kelas bilingual CLIL memainkan peran penting dalam mendukung perkembangan ganda—pemahaman matematika dan akuisisi bahasa Inggris—dengan menciptakan lingkungan belajar yang interaktif, suportif, dan kaya secara linguistik.

Kata kunci: CLIL, Interaksi Guru-Siswa, Kelas Dwibahasa, Pembelajaran Matematika, Perkembangan Bahasa.

INTRODUCTION

Content and Language Integrated Learning (CLIL) has risen in popularity in bilingual education because of its integrated approach to combine learning subject content by using a foreign language simultaneously (Coyle et al., 2010). This approach supports both language acquisition and enhances students' understanding of subject contents. CLIL is significantly relevant in multilingual settings, where there is a high likelihood of learning subject contents via a second or foreign language which may simultaneously build academic competence and linguistic proficiency.

In CLIL classrooms, teacher-student interaction has significant influence on shaping the learning experience. Teachers provide opportunities for students to engage with both the content and the language through questioning, scaffolding, and feedback (Envitskaya, 2018). However, interacting effectively in CLIL classrooms can be challenging, particularly when students are still developing their English proficiency. Therefore, teachers need to balance content delivery with language support that caters students' needs (Dzulkurnain et al., 2024).

Several studies have explored the implementation of CLIL in European and East Asian contexts (Coyle et al., 2010; Kim & Graham, 2022; Lo, 2020), meanwhile only a few have examined how teacher-student interaction occurs in CLIL classrooms in Southeast Asian, particularly in Indonesian context (Dzulkurnain et al., 2024; Kurniawati & Atmojo, 2025). In addition, there is a little research on how teacher-student interaction strategies operate in CLIL mathematics lessons, where the teaching of abstract reasoning and subject-specific vocabulary pose challenges (Elsner & Keßler, 2013; Envitskaya, 2018). Thus, by exploring how a teacher in a 4th-grade CLIL mathematics class facilitates students' learning through teacher-student interaction, this study aims to address this gap. "How does teacher-student interaction in a bilingual CLIL mathematics classroom support student engagement, content comprehension, and English language development?" is the study seeks to answer.

LITERATURE REVIEW

Content and Language Integrated Learning (CLIL) has become popular in bilingual education because it helps students learn subject matter while also improving their language abilities at the same time (Coyle et al., 2010). A key part of CLIL classrooms is how teachers and students interact. This interaction is very important for keeping students interested, helping them understand lessons, and developing their language skills. Many studies have looked into how effective CLIL is, the teaching methods used, and how well-prepared teachers need to be for this kind of learning.

The way teachers talk to students has a big impact on how well they learn in CLIL classrooms. Interaction helps teachers see if students understand the material and also gives them support as they learn new terms and ideas (Banegas, 2012). Elsner and Keßler (2013) say that when teachers and students talk in a clear and planned way, students are more likely to take part and develop both their thinking and language skills. Dzulkurnain et al. (2024) also found that using interactive teaching methods helps students remember lessons better and think more

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critically in bilingual settings.

One teaching pattern often used in CLIL is the Initiation-Response-Feedback (IRF) model. In this model, the teacher asks a question, the student answers, and the teacher gives feedback (Evnitskaya, 2018). Although this method keeps lessons moving smoothly, some researchers say it may not give students enough chance to speak in depth unless teachers change how they use it (Lo, 2020).

To help students understand better, teachers in bilingual classes often switch between languages, using code-switching or translanguaging. This is especially useful when explaining difficult ideas or technical terms (Papaja, 2011). These practices match van Lier's idea of interactional scaffolding, where teachers adjust their language and teaching style depending on what students need and how well they understand the language.

But teachers also face challenges in creating meaningful interactions in CLIL settings.

For instance, Kurniawati and Atmojo (2025) found that not having enough teaching materials and unclear rules about which language to use can make interactive teaching harder. Lo (2020) noticed that it's tough for teachers to balance teaching content with helping students with language, which sometimes leads to shallow engagement. Sandberg (2015) also pointed out that unexpected language use in class can throw off the balance between teaching content and helping students learn the language.

Teacher training is important for dealing with these challenges. Kim and Graham (2022) say that teachers need training to handle bilingual classrooms well. If teachers aren't properly trained, they might use old teaching methods that don't give students enough chances to use the target language.

Even though more studies are being done on classroom interactions in CLIL around the world, there isn't much research on bilingual primary schools in Indonesia. Most studies in Indonesia look at curriculum or general ideas about CLIL, but not much is known about how teachers and students talk during lessons. Also, there isn't much research on math classes, where thinking abstractly and using complex language makes communication even harder.

This study looks at how teacher-student interaction helps learning in a 4th-grade bilingual math class in Indonesia. It tries to fill this gap in research.

RESEARCH METHOD

This research utilized a qualitative case study method to examine how interactions between teachers and students in a 4th-grade bilingual CLIL mathematics class promote student engagement, understanding, and language growth. The qualitative case study was chosen to examine participants' experiences within a defined context to gain a comprehensive understanding of a particular case faced by the participants (Creswell & Poth, 2013). The study took place in a private elementary school in Cikarang, Indonesia, which employs a bilingual teaching approach utilizing both Indonesian and English. The study involved one math instructor and fifteen 4th-grade pupils, chosen through purposive sampling for their active participation in the bilingual CLIL classroom.

Data was gathered through two classroom observations and a semi-structured interview with the teacher. The classroom observations sought to document the real-time interactions between teachers and students during

math classes. Field notes were recorded with a structured observation form concentrating on the teacher's questioning strategies, language usage,student reactions, and signs of engagement and understanding. These findings allowed the researcher to discern interaction patterns and examine how these patterns affected the learning process.

The teacher interview took place following the observation phase. The semi-structured format enabled the teacher to expand on instructional methods, language application, and his view on how interaction enhances student learning. Interview questions focused on three main topics: sustaining student interest, improving understanding of mathematical concepts, and aiding English language growth in the bilingual education setting (Mustafa et al., 2023).

All qualitative data underwent analysis through thematic analysis, adhering to the procedures specified by (Braun & Clarke, 2008). Observation notes and interview transcripts underwent systematic coding to pinpoint recurring themes concerning interaction strategies, student involvement, and language assistance. To improve the reliability and validity of the results, data triangulation was utilized by contrasting insights from observation and interview data sources (Creswell & Poth, 2013).

Ethical protocols were adhered to during the entire research process. Consent was acquired from the teacher and the guardians of the students, along with assent from the students. Participant identities remained confidential, and the study was carried out with complete respect for participant rights and classroom procedures.

FINDINGS AND DISCUSSION

This study attempted to explore how teacher-student interaction facilitates student engagement, understanding, and language development in a CLIL mathematics classroom. The research explored the role of teacher-student interaction in a context where English is integrated alongside students' first language through two classroom observations and one teacher interview.

a. Engagement Through Real-Life and Visual Contexts

During both observed sessions, students appeared highly engaged when the teacher connected mathematical concepts to real-life contexts. For example, in a lesson about area, the teacher asked:

Teacher: "Do you know the size of a soccer field?"

This question prompted enthusiastic responses from students who eagerly offered estimates and comparisons. In the interaction, the teacher used familiar contexts that could activate students' prior knowledge and encourage their participation, even from passive students. This finding is similar to Papaja (2011) and Aminah et al., (2025) who also highlighted that material relevance along with real-life examples can improve students' motivation and interaction in CLIL classrooms.

b. Scaffolding through Bilingual Language Support

The teacher employed code-switching to scaffold students after introducing the term "square meter." The teacher then immediately translated it:

Teacher: "*Itu artinya satu meter persegi, ya anak-anak.*" (Translation: "That means one square meter, okay

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kids?")

The scaffolding strategy assisted to develop students' understanding, particularly when the teacher introduced abstract terms. The teacher explained:

> "I use English, but for new concepts I still explain in Indonesian so they can understand."

This reflection aligns with the concept of interactional scaffolding that supports the idea of using language that can accommodate students' cognitive and linguistic levels (Envitskaya, 2018).

c. Students' English Production Remains Limited

Although the students could respond the teacher's questions actively, their use of English was limited to key terms. In one session, the teacher asked:

Teacher: "What is the area of this rectangle?"

Student: "*Itu panjang kali lebar, Pak. Dua kali lima.*" (Translation: "That's length times width, Sir. Two times five.")

The interaction described fostering awareness of English vocabulary, despite explanations still delivered in Indonesian. The teacher frequently encouraged the students to use English when answering the questions:

> "Try to explain in English, okay?"

This pattern is consistent with Zulfa et al.'s (2020) findings of gradual language exposure, where students require ample time and modeling before they can use complex English terms in CLIL contexts.

d. Interaction Patterns

From the data, it can be seen that the teacher regularly used the **Initiation–Response–Feedback (IRF)** pattern. For instance:

Teacher: "What do we call this shape?"

Student: "Rectangle."

Teacher: "Yes, rectangle. Good. *Bentuk persegi panjang*." (Translation: "Yes, rectangle. Good. A rectangle shape.")

Although IRF (Initiative-Response-Feedback) provides little space for in-depth exploration, but it helps to maintain the classroom control under control and encourage brief participation. According to Envitskaya (2018) found unless teachers deliberately provide opportunities for negotiation of meaning and more elaborative talk, CLIL classroom interactions tends to follow IRF patterns

There were several limitations of this study. First, the study observed the teacher-student interaction from two sessions only and involved only and interview with one teacher, without students' involvement in the study. Therefore, the findings cannot represent students' perceptions on the teacher-student interaction in the classroom. The short duration of the study also posed a challenge to explore further the long-term language development or variation across different lessons. Nonetheless, the study offers an insight into how teacher-student interaction can facilitate students' subject content understanding and early stages of language progress. From the findings of this study, it can be seen that strategic language use, real-life examples, and structured questioning can foster

students' classroom engagement and facilitate students' exposure to the English language without overwhelming them. For future studies, it is recommended to include more observations for a longer period of time. Student interviews or surveys could also provide deeper insights into how classroom interaction help students' English language development through. Finally, exploring different subjects may reveal how classroom interaction strategies vary across contexts within CLIL instruction.

CONCLUSION

This research sought to examine the impact of teacher-student interaction on student engagement in mathematics. comprehension of concepts and language advancement in a bilingual CLIL mathematics classroom for fourth graders. Classroom observations and a teacher interview revealed that instructional interaction is crucial. function in facilitating both content acquisition and second language growth.

The results indicate that student-focused interaction methods, the incorporation of practical examples, and bilingual assistance assist students in staying involved and achieving a deeper comprehension of mathematical concepts. While students mainly replied in Indonesian, they started to demonstrate awareness of English vocabulary. pertinent to the teachings. The teacher's application of open-ended questions, reiteration, and bilingual guidance promoted an inclusive learning environment. setting that fostered engagement while slowly incorporating scholarly language.

This research contributes to the understanding of CLIL practices in primary education, particularly in bilingual classrooms that are still in the early stages of English integration. The results also emphasize the importance of teacher interaction as a tool for supporting both learning and language exposure. The study contributes to the importance of providing professional development for teachers in bilingual scaffolding strategies, implementing flexible language policies, and offering learning resources aligned with CLIL objectives. Building a collaborative teaching culture can also support the sharing of effective interaction strategies within bilingual classrooms. Despite its contribution, the study recommends future research to conduct longer-term observations involving more classrooms and incorporating student perspectives. Such approaches would offer deeper insights into the impact of interaction on both learning and language development within bilingual CLIL settings.

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