

IMPLEMENTATION OF CONTENT AND LANGUAGE INTEGRATED LEARNING (CLIL) IN TEACHING ENGLISH TO TECHNICAL STUDENTS IN ALGERIAN HIGHER EDUCATION

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Abstract:

Content and Language Integrated Learning (CLIL) has become a crucial construct in the context of teaching and learning worldwide. Despite this, relatively limited research has been undertaken to explore its implementation in Algerian tertiary education. The latter has witnessed, more recently, an increased interest in the development of technical graduates' English language skills and content knowledge necessary both in academic and professional scopes. This paper aims to provide insights on the effectiveness of CLIL as an innovative approach in Algeria. It seeks first to explore students' attitudes towards learning English in the faculty of technology at the University of Medea in Algeria. Second, based on the data of an experimental study collected through a questionnaire, pretest and posttest, and class observation, this paper investigates the impacts of CLIL implementation to improve technical students' English language competence, content learning as well as their attitudes towards English. The sample of participants included 30 students divided into an experimental and a control group. The study's findings revealed that students possessed deficient subject-specific content knowledge and exhibited notably low interest in the course, both of which contributed to their negative attitudes toward English. The results emphasized the significant role of CLIL implementation in promoting content knowledge and language proficiency of the experimental group students over the control group, as well as in improving their attitudes towards English. This paper concludes with several implications regarding ways to implement CLIL in teaching both content and language for technical subjects in Algerian higher education

Key Words: Content and Language Integrated Learning; English Language Competence; Attitudes; Faculty of Technology; Process Pharmaceutical Engineering; Higher Education.

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INTRODUCTION

In the past few decades, English has emerged as the global lingua franca, becoming the language of international communication. As a global language, English plays a significant role in higher education enabling international academic exchanges and programs, academic collaborations, educational and professional opportunities as well as the dissemination of knowledge. Moreover, English is the language of science, as research findings and academic breakthroughs are now easily accessible in this language to the global academic community.

In the realm of higher learning, universities and institutions have recognized the significance of incorporating English into their curricula, and as a result, numerous approaches have been explored to harness its potential fully. Some institutions offer English language courses as a prerequisite to admission, ensuring that students possess the necessary language proficiency to thrive in an English-medium learning environment. Other approaches involve offering courses or programs entirely in English, to enhance students' knowledge and language skills and also prepare them for the global job market, where English proficiency is increasingly valued by employers.

In the Algerian context, the ministry of education has implemented policies aimed at teaching English as a foreign language starting from primary school. Similarly, the Ministry of Higher Education and Scientific Research has also called for the integration of English as the medium of instruction in tertiary institutions. It has set English B1–B2 levels a requisite for students, which has in part triggered the raise of English as Medium of Instruction (EMI) programs. Undergraduate and postgraduate students are not only required to learn and produce English, but also to manage the academic discourse and knowledge of their disciplines, in order to succeed academically (Airey et al., 2017; Navarro, 2019) as it allows students to create and disseminate knowledge in their field of studies appropriately.

One innovative approach to teach language and content simultaneously that has gained traction in recent years is Content and Language Integrated Learning, commonly known as CLIL. CLIL is a dual-focused educational approach that integrates language learning and disciplinary content learning. In CLIL, students learn a specific academic discipline in the target language, usually English (Lim & Low, 2009). This approach allows students to acquire both language competence and subject knowledge concurrently, fostering deeper learning and critical thinking. CLIL originated in Europe in the 1990's. It aimed to help students develop increased proficiency in one or more languages in addition to their first language. As such, CLIL proved to be a promising educational approach which integrates learning content along with a foreign language (Mehisto et al., 2008; Coyle et al., 2010; Ikeda, 2013; Airey, 2016).

Following the formal introduction of EFL (English as a Foreign Language) classes at Algerian primary schools in September 2022, and as the medium of instruction in higher education technical faculties in universities and institutions, a need to determine effective strategies for language education arose. In this context, it seems crucial to investigate whether the positive outcomes of CLIL implementation, reported in numerous studies worldwide, could have implications for higher-level education in Algeria. To date, there is no central educational policy for CLIL and there are no studies which have investigated CLIL classes in the Algerian university. This paper examines CLIL implementation in Algeria with a focus on tertiary education. It reports the results of a study conducted as part of a master's research endeavor seeking to experiment with CLIL integration in a Process Pharmaceutical Engineering (PPE) English class in the faculty of technology at the University of Medea, Algeria.

Content and Language Integrated Learning (CLIL)

Content and Language Integrated Learning (CLIL) an increasingly popular approach which first originated in Europe gaining later global prominence (Marsh, 2002; 2008). The term was coined European language experts and educators, during the 1990s (Coyle, 2008; Coyle et al., 2010; Pérez-Cañado, 2012). The motivation behind this approach was based on the bilingual initiatives, i.e. immersion education and content-based instruction, established in Canada and the Americas in the 1960's (Johnson & Swain, 1997; Marsh et al., 2012). Hence, driven by the European endorsement of multilingual education to foster improved language proficiency and cultural awareness, CLIL was developed and implemented by educators and language experts in various European countries in response to the European Commission (1995) recommendations. Yet CLIL was not built only upon educational perspectives but also on political perspective in conjunction with the EU:

According to Dalton-Puffer (2011, p.183) CLIL is "an educational approach where curricular content is taught through the medium of a foreign language, typically to students participating in some form of mainstream education at the primary, secondary, or tertiary level". In other words, this approach aims to develop students' proficiency in an additional language, while also learning subject-matter content. Echoing this definition, Coyle et al. (2010, p.3) stated that "CLIL refers to situations where subject or part of subject are taught through a foreign language, with dual focused aims namely the learning of content and the simultaneous learning of foreign language". Dalton-Puffer (2011, p. 183), outlined the characteristics of standard CLIL programs:

- CLIL is about using a foreign language or a lingua franca, not a second language (L2).
- The dominant CLIL language is English.
- CLIL implies that teachers will normally be nonnative speakers of the target language. They are not, in most cases, foreign language experts, but instead content experts.
- CLIL lessons are usually timetabled as content lessons (e.g., biology, music, geography, mechanical engineering), while the target language normally continues as a subject in its own right in the shape of foreign language lessons taught by language specialists.
- In CLIL programs typically less than 50% of the curriculum is taught in the target language.
- CLIL is usually implemented once learners have already acquired literacy skills in their first language (L1), which is more often at the secondary than the primary level.

Building upon the definition and objectives of CLIL, the 4Cs curriculum (Coyle et al, 2010, p. 41) outlines vital components for a successful CLIL lesson:

- Content: Progression in knowledge, skills and understanding related to specific elements of a defined curriculum.
- Communication: Using language to learn while learning to use language.
- Cognition: Developing thinking skills which link concept formation (abstract and concrete), understanding, and language.
- Culture/community: Exposure to diverse perspectives and shared understandings, which deepen awareness of oneself and otherness.

Through the incorporation of these core components (language, content, culture/community, and cognition), CLIL instruction has the potential to enhance students' proficiency in foreign languages and subject-matter content. In addition, this approach aims to build and reinforce learners' knowledge of other disciplines while using the language to solve problems and develop critical thinking. The approach was conceived to enable learners to improve their communicative (i.e. person-to-person and intercultural) and cognitive skills

while they are building knowledge of both the language and content they are studying (Coyle, 2002, 2008, 2013; Coyle et al., 2010; Dalton-Puffer, 2007; Mehisto et al., 2008).

CLIL Learning Outcomes

CLIL approach has become increasingly popular in higher education, especially within European higher education institutions, and has been implemented across various academic disciplines such as law, business, humanities, medicine, economics, and engineering (Papaja, 2023). In parallel with increased interest in CLIL practices, research in this area has been growing. Research in CLIL across various educational levels has focused on a variety of issues related to the implementation of this approach. Several researchers have examined how CLIL instruction can improve students' mastery of a second or a foreign language by means of the 4Cs of CLIL (see for e.g. Coyle et al., 2010; Darn, 2009; Gabillon & Ailincal, 2015; Mehisto et al., 2008; Marsh & Hartiala, 2001). Moreover, studies conducted on CLIL implementation have shown that the fusion of content and language instruction not only enhances the development of linguistic and academic skills but also yields numerous cognitive and motivational advantages (Arnandiz et al. 2022; Doiz et al., 2014; Pablo & Jiminez, 2018).

Numerous researchers have underscored the positive impact of CLIL on students' attitudes and perceptions toward language courses in higher education (Lasagabaster & Sierra, 2009). For instance, Papaja (2012) presented evidence from the Polish context, illustrating how 108 CLIL students experienced a shift in their perceptions of language classes at the Department of Psychology at the University of Silesia, Poland. In Greece, research findings revealed a similar trend, with students responding favorably to CLIL classes, which contributed to the progress of 65 students in both language acquisition and content knowledge within the Speech and Language Therapy Department at the Epirus Institute of Technology (Soulioti, 2014). A study conducted by Södergard (2006) unveiled that Finnish students participating in a CLIL program showed favorable attitudes, high satisfaction levels, and notably heightened confidence. Similarly, studies have shown that this innovative approach positively influenced not only how students absorbed content but also their motivation levels and the degree of attention they devoted to lessons (San Isidro, 2019, p.36).

In the realm of higher education foreign language learning, research has demonstrated the effectiveness of CLIL in enhancing both comprehension and production skills among foreign language learners (Dalton-Puffer, 2007). Other studies have shown that the approach increases foreign language proficiency while not adversely impacting students' first language (L1) acquisition or their comprehension of subject matter (Lasagabaster & Ruiz de Zarobe, 2010; San Isidro & Lasagabaster, 2018). Research has also revealed the positive impacts of CLIL on students' four skills. Regarding speaking, CLIL students performed better than non-CLIL students (Admiraal et al. 2006; Lasagabaster, 2008). As regards writing, a study conducted in Thailand (Chansri & Wasanasomsithi, 2016) illuminates how CLIL can bolster the writing skills of 27 students majoring in Agriculture, showcasing marked improvements in their comprehension of agricultural content delivered through CLIL courses. Regarding reading and listening skills, although studies in this area are limited, there have been indications of positive outcomes (Lasagabaster, 2008; San Isidro & Lasagabaster, 2018).

Drawing upon the findings of numerous studies, the CLIL approach has received acclaim for various reasons including its positive impact on foreign language competence, the absence of detrimental effects on students' first language or content learning, as well as improved perceptions and motivation among students and teachers.

Method

The Study

The present study is conducted to address the two main objectives:

1. It aims to gauge the effects of an experimental intervention by evaluating the outcomes of CLIL implementation. These outcomes will be measured in terms of PPE students' performance, specifically assessing their language skills and their grasp of subject-specific content within their target discipline.
2. It seeks to examine the extent to which PPE students' attitudes toward the English language change as a result of the CLIL intervention. This involves analyzing any observable shifts in their perceptions and attitudes toward English during the course of the study.

Research Design and Participants

This study utilized an experimental research design to quantitatively measure and evaluate the effectiveness of the CLIL approach. In addition to quantitative data, qualitative data were collected through classroom observations. The experimental design was structured as a factorial experiment, incorporating two key factors:

1. **Between-Subjects Factor:** This factor involved the division of participants into two distinct groups: the experimental group and the control group.
2. **Within-Subjects Factor:** This factor included repeated measures, conducted through Pre- and **Post**-tests, to gauge changes and improvements over time within the same group.

The study comprised first-year students majoring in Process Pharmaceutical Engineering (PPE). A total of 30 students participated, with this cohort further subdivided into two research groups: a) Experimental Group (CLIL Group) consisting of 15 participants exposed to the CLIL intervention, and b) Control Group (Non-CLIL Group), comprising 15 participants who did not receive the CLIL intervention. The participants in both groups were selected based on their enrollment in PPE courses and their willingness to participate in the research study. This division allowed for an investigation of the CLIL intervention's impact on the experimental group in contrast to the control group.

Data Collection Methods and Data Analysis

To gather comprehensive data for this study, three distinct research methods were employed. First, a pre-experiment questionnaire was administered to both the experimental (EXP) and control (CTR) groups of students. This questionnaire was conducted prior to the experiment and aimed to gather demographic data from 18 students. Its purpose was to assess participants' proficiency in the target language and gain insights into their attitudes and perceptions regarding their English class. Second, a pre- and post-test was employed to measure the effects of the CLIL intervention. This test assessed participants' performance in both content and language proficiency, aligned with their syllabus, and was administered before and after the experimental phase, although the number of students who underwent the test was reduced to 15 due to absences. Lastly, classroom observations were conducted throughout the study, enabling the systematic observation of EXP and CTR students' behavior, practices, and interactions. These observations provided valuable qualitative data, shedding light on the implementation of the CLIL approach and its impact within the classroom environment.

With regards to data analysis, this study employed a two-fold data processing strategy. Firstly, for the quantitative data, statistical techniques including percentages and mean scores were utilized. These measures were applied to both pre- and post-test data using the Statistical Package for the Social Sciences (SPSS). This quantitative analysis enabled the study to quantitatively measure the changes in participants' performance resulting from the CLIL intervention. Furthermore, the data collected through classroom observations underwent a systematic analysis. These observations were categorized based on six key criteria: presence, interaction, concentration, homework completion, reflection, and participation. This organized dataset was then subjected to quantitative analysis using Microsoft Excel. This approach facilitated an in-depth examination of observed behaviors and practices among participants, providing valuable qualitative insights regarding CLIL implementation.

Results and Discussion

Results of the Questionnaire

This section presents the results of the questionnaire, which specifically focused on the language proficiency levels as well as the attitudes of both the experimental (EXP) and control (CTR) groups of students.

Table 1. EXP Students' English Language Proficiency Level

EXP Students' level	Beginner		Elementary		Intermediate		Pre-intermediate		Advanced		No answer	
	N	%	N	%	N	%	N	%	N	%	N	%
	8	40%	4	20%	6	30%	2	10%	0	0%	0	0%

Table 2. CTR Students' English Language Proficiency Level

CTR Students' level	Beginner		Elementary		Intermediate		Pre-intermediate		Advanced		No answer	
	N	%	N	%	N	%	N	%	N	%	N	%
	4	22.2%	6	33.3%	8	44.4%	0	0%	0	0%	0	0%

Tables 1 and 2 depict the English language proficiency levels of the experimental (EXP) and control (CTR) groups. Within the EXP group, eight students (40%) identified as beginners, four (20%) as elementary, six (30%) as intermediate, and two (10%) as pre-intermediate. Conversely, within the CTR group, four students (22.2%) were beginners, six (33.3%) at the elementary level, and eight (44.4%) demonstrated an intermediate level of English proficiency. These findings reveal the distribution of language proficiency levels among students in both groups, underscoring the heterogeneity of language skills within the study cohort.

The second section of the questionnaire aimed to assess the students' attitudes toward learning English. In response to the first question, participants were asked to indicate whether they think studying English as a module is useful. The results are presented in Tables 3 and 4.

Table 3. EXP Group Attitudes towards Learning English

	Yes	No	Not really	Undecided
N	17	1	2	0
%	85%	5%	10%	0%

Table 4. CTR Group Attitudes towards Learning English

	Yes	No	Not really	Undecided
N	15	3	0	0
%	83%	17%	0%	0%

From the data presented in tables 3 and 4, it is evident that the majority of participants (84.2%) responded positively, indicating that they think studying English is useful. In contrast, only 10% of students from both groups expressed that English was not useful to them. The second question aimed to gauge students' perceptions regarding the usefulness of acquiring PPE content knowledge in the English language. Participants were asked to rate this on a scale from "Very Useful" to "Not Useful." The results are presented in Tables 5 and 6 below.

Table 5. EXP Group Perception of Learning PPE Content in English

	Very Useful	Useful	Not Useful	Undecided
N	6	10	3	1
%	30%	50%	15%	5%

Table 6. CTR Group Perception of Learning PPE Content in English

	Very Useful	Useful	Not Useful	Undecided
N	1	2	4	11
%	5,5%	11,1%	22,2%	61,1%

Tables 5 and 6 present the responses to the second questionnaire question regarding the perceived usefulness of learning PPE content in English among students. The students' insights contribute to the broader understanding of their attitudes on language integration in their academic pursuits. The majority of participants across both groups believed that learning PPE content in English would be useful, with 50% of the EXP group and two students in the CTR group expressing this view. A notable proportion of the EXP group (15%) held a contrary opinion, considering it "Not Useful." Significantly, a considerable portion of the CTR group (61.1%) did not provide a response to this question, indicating a degree of uncertainty or lack of a clear stance on the matter. Overall, these findings reveal a divergence of opinions among students, with a significant portion recognizing the usefulness of learning PPE content in English. However, the control group's high rate of non-response

highlights the need for further investigation into their attitudes and motivation regarding learning both PPE content and English language.

Results of the Pre- and Post-Test

This section delves into the analysis of results obtained from EXP and CTR students' pre-test and post-test scores. The objective is to gauge the impact of CLIL instruction on the students' English comprehension and production levels. The analysis included both descriptive statistics, specifically calculating the mean scores, and inferential statistics employing the Paired Sample T-test. These statistical measures were employed to scrutinize any differences in students' performance before and after the implementation of CLIL instruction. Initially, the pre-test and post-test grades of a total of 30 students, 15 from each group (EXP and CTR), were tabulated within Excel spreadsheets to calculate the respective mean scores for each group. These mean scores were then transferred to SPSS for a thorough examination, utilizing the Paired Sample T-test to discern any statistically significant differences in performance between the two groups.

Calculating the Mean of the Pre-Test and Post-Test

Mean calculations were employed to elucidate the variations in scores between the pre-test and post-test as displayed in the tables below. As shown in table 7, the pre- and post-test scores reveals a noticeable increase in EXP students' scores from the pre-test to the post-test.

Table 7. EXP and CTR Group Pre- and Post-Test Performance

EXP Group			CTR Group		
N°	Pre-test/20	Posttest/20	N°	Pre-test/20	Posttest/20
1	12	11.5	1	8.5	8
2	7.25	11.25	2	1.5	5
3	4.75	10	3	6.75	7
4	7	10.5	4	13	10
5	7.5	12.25	5	10	9
6	7.75	11.5	6	10	9.5
7	8.5	8.5	7	8.75	9
8	14.5	15.25	8	6.5	7
9	10	13	9	11.25	11
10	11.5	14.5	10	7	6
11	8.5	12.5	11	9.25	10
12	8.25	10.75	12	9	10
13	10.25	14.5	13	5	8.5
14	10.75	14.5	14	10	10
15	10.25	9	15	7.75	8.5
mean	8.75	11.9	mean	8.28	8,56

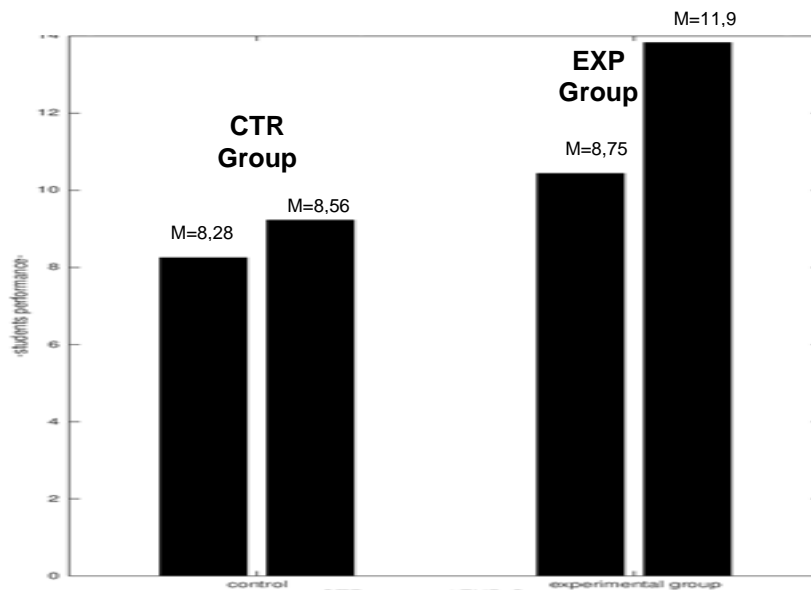


Figure 1. EXP and CTR Group Pre- and Post-Test Comprehension Performance

The pre-test mean score ($M=8.75$) of the EXP group increased to ($M=11.9$) in the post-test, indicating an increase of ($M=2.25$) in performance. In contrast, the CTR group demonstrated a more modest change, with the pre-test mean ($M=8.28$) rising marginally to ($M=8.56$) in the post-test, resulting in an increase of ($M=0.28$) in scores. To assess the significance of the difference between the post-test means of the EXP and CRT groups following CLIL instruction, it is essential to consider the ($M=3.34$) gap between the two groups' performances. This gap underscores the potential advantages of CLIL instruction in enhancing language proficiency and content comprehension, with the EXP group outperforming the CRT group.

Paired Sample T-Test Computation

While the comparison of means between the EXP and CTR groups suggests superior performance by the EXP group, the assessment of CLIL instruction's effectiveness calls for rigorous statistical analysis. To determine the statistical significance of the performance difference, the paired sample T-test conducted using SPSS was employed to strengthen the assessment of CLIL's impact on EXP students' performance.

In this study, a two-tailed hypothesis was employed consisting of the null hypothesis (H_0) and the alternative hypothesis (H_1). The null hypothesis (H_0) posits that there is no significant difference between the two means ($M_1 - M_2 = 0$), while the alternative hypothesis (H_1) suggests that a significant difference exists between the means ($M_1 - M_2 \neq 0$ or $M_1 \neq M_2$). Furthermore, the level of significance is set at 0.05, designated as the alpha level ($\alpha = 0.05$).

Tables 8. Paired-Sample T-Test for Pre-test and Post-test Means in EXP and CRT Group

		Paired-sample Test					t	DF	Sig. (2-tailed)
		Paired difference							
		Mean	S.deviation	STD. Error Mean	95% Confidence Interval of the difference				
Lower	Upper								
Pair 1	pre-test - post-test	351,800	573,936	148,190	-669,635	-33,965	2,374	14	,032
Pair 2	Pre-test - post test	278,067	424,404	109,581	44,151	514,116	2,548	14	,023

Table 8 results show that the P value (sig. 2-tailed) is 0.032 for the EXP group and 0.02 for the CRT group, both lower than the significance level $\alpha=0.05$. Thus, the null hypothesis (H0) claiming no difference between the EXP group's pre-test and post-test means is rejected in favor of the alternative hypothesis (H1). This confirms a significant difference between the pre-test and post-test means of the EXP group, reflecting notable improvement in their language proficiency and content knowledge. Conversely, the CRT group shows only a minor performance increase, indicating no significant improvement in their language skills and content knowledge.

Results of Classroom Observation

This section involves an analysis of field notes gathered through classroom observations of both EXP and CTR groups during the experiment. A total number of 10 classes were observed. The observations aimed to address this question: "To what extent can CLIL instruction change PPE students' attitudes towards learning English?". The collected data were quantified based on six aspects (presence, interaction, concentration, homework, reflection, and participation), and tabulated in Excel spreadsheets. Tables 9 and 10 present the attitudes of the EXP and CRT groups during CLIL implementation.

Table 9. EXP Students' Attitudes

NO. Class Observed		1/10	2/10	3/10	4/10	5/10	6/10	7/10	8/10	9/10	10/10	Mean
Criteria	Presence	9/15	14/15	12/15	11/15	15/15	15/15	13/15	15/15	15/15	15/15	13,4
	Interaction	6/15	5/15	6/15	8/15	8/15	8/15	8/15	11/15	11/15	11/15	8,2
	Concentration	7/15	7/15	10/15	9/15	10/15	12/15	12/15	14/15	14/15	14/15	10,9
	Homework	-	14/15	-	8/15	-	-	-	15/15	-	15/15	13
	Reflection	5/15	5/15	4/15	8/15	6/15	8/15	8/15	12/15	8/15	13/15	7,7
	participation	6/15	9/15	8/15	7/15	10/15	10/15	9/15	15/15	13/15	13/15	10

Table 10. CTR Students' Attitudes

NO. class Observed	1/10	2/10	3/10	4/10	5/10	6/10	7/10	8/10	9/10	10/10	Mean
Presence	8/15	15/15	15/15	10/15	13/15	12/15	8/15	10/15	11/15	9/15	11,1
Interaction	-	-	-	-	-	-	-	-	-	-	-
Concentration	4/15	5/15	6/15	2/15	5/15	3/15	4/15	5/15	3/15	5/15	4,2
Homework	-	10/15	-	-	-	-	-	8/15	-	-	0,9
Reflection	-	-	-	-	-	-	-	-	-	-	-
participation	3/15	5/15	6/15	1/15	7/15	3/15	2/15	5/15	6/15	1/15	3,9

The attitudes and behaviors of students in both the EXP and CRT groups were observed throughout ten sessions. The observations aimed to track changes in student engagement and participation from the first session to the tenth. Presence, assessed by attendance, indicated a gradual improvement in both groups over the ten sessions. Interaction, reflecting the level of student engagement in discussions and debates conducted in English, demonstrated a noticeable increase in the EXP group, while the CRT group showed minimal interaction throughout. Concentration levels during class sessions showed a steady rise in the EXP group but remained relatively low in the CRT group. Homework completion in the EXP group improved session by session, whereas the CRT group demonstrated a consistent but limited engagement in homework tasks. Reflections, which captured students' thoughts on each session, revealed an increase in the EXP group's reflective activities, while no reflections were observed in the CRT group. Participation, indicating students' active involvement in class activities, showed steady progress in the EXP group but remained lower in the CRT group throughout the ten sessions. These observations shed light on the evolving attitudes and behaviors of students during CLIL instruction, highlighting notable improvements in the EXP group over the CRT.

All in all, over the ten sessions, the EXP group exhibited notable growth in presence, interaction, concentration, homework completion, reflection, and participation. This suggests that CLIL instruction not only enhanced language and content learning but also increased student engagement. Conversely, the CRT group showed limited interaction and lower levels of participation, indicating a lack of progress in these areas.

Conclusions and Implications

The findings derived from the questionnaire, pre- and post-test, and classroom observations highlight that CLIL instruction had a positive and significant impact on students' language proficiency, content knowledge, and attitudes. The EXP group, which received CLIL instruction, displayed higher motivation, engagement, and language skills compared to the CRT group. The positive developments in EXP students' language skills and content knowledge were accompanied by favorable changes in their attitudes towards English. The students became more engaged, committed, and interested in learning the language. In contrast, the CRT group exhibited minimal changes in their language proficiency and attitudes throughout the study. Their performance levels remained largely stagnant, and there was no discernible shift towards more positive attitudes regarding English.

These findings underscore the effectiveness of CLIL in promoting comprehensive language learning and content understanding while fostering more positive attitudes toward learning English in higher education settings, thus serving as a valuable approach for language and content instruction. The results of this study align with the broader body of research on CLIL, reinforcing the consistency of CLIL's positive impact on language proficiency and attitudes across various educational contexts. This consistency is corroborated by previous studies conducted in different settings.

Based on the insights derived from this study, several pedagogical implications and recommendations can be discerned. The effectiveness of CLIL instruction observed during the experiment underscores the importance of curriculum development that integrates language and subject-specific content. To optimize this approach, educators should tailor curricula that adhere to the fundamental CLIL principles of communication, cognition, content, and culture. Moreover, it is imperative for CLIL classes to access and employ context-appropriate materials. This calls for collaboration between content and language educators, along with training for both groups. Such collaboration can yield well-designed materials that cater to the specific language and content demands of the course. In addition, instructors should receive professional development opportunities to become proficient in CLIL methodologies. Training programs and workshops can equip educators with the knowledge and skills required to implement CLIL effectively. By carefully considering these implications, educators and institutions can harness the potential of CLIL to improve language learning outcomes and overall student engagement.

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