A Look at Content and Language Integration Learning: Students' Attitudes, Teachers' Perceptions and Challenges

Attapol Khamkhien[1], Budsaba Kanoksilapatham[2]

[1]Kasetsart University, Thailand

[2]Silpakorn University, Thailand

Abstract

Content and Language Integrated Learning (CLIL) is currently getting increased attention in higher education. This article describes an interventionist study whose aim was to investigate the effectiveness of CLIL instruction, and offers information on the challenges that teachers face in providing CLIL instruction in real classroom settings. After creating relevant CLIL material, and in collaboration with both language and content teachers, data was collected using student questionnaires, and class observation forms were analysed. Six teachers and 24 students were interviewed regarding their attitudes towards, perceptions of, and experiences with CLIL lessons. Student abstracts written in English were also analysed. The results indicate that the implementation of the CLIL approach requires close collaboration between content and language teachers through training sessions so that the steps and procedures that need to be taken in the classroom can be properly understood and provided. Some of the content teachers had difficulty in delivering CLIL instruction using English as the medium of communication. Giving the students constructive feedback on their revisions was also challenging, since it required both capabilities in English and diverse content knowledge (depending on the students' scientific research topics and laboratory procedures). This study suggests that a number of factors, such as CLIL-related training, language competency, multifaceted support and instructional material, are all necessary if CLIL is to be delivered successfully.

Keywords: CLIL, abstract writing, science students, content and language, challenges

1. Introduction

English has gained the status of a lingua franca, and is used in almost every channel of communication. In fact, the demand for people who can use English effectively has been increasing worldwide. In academia, Graddol (2006) examined the issue of globalisation in higher education, and argued that students should not just become conversant in English for communication purposes, but should also study their subjects in English. Such opinions have led to English language teachers and professionals changing their views on how English should be taught. As a result, English has been used to teach content in such areas as science, mathematics, art, social studies and even engineering, in both primary and secondary education, in a number of countries.

Content and Language Integrated Learning (CLIL) is seen as an innovative educational approach in which a subject is taught in an additional language at all levels of education (Lasagabaster & Sierra, 2010). The CLIL method is considered to have contributed significantly to the European Union objective of developing multilingual citizens (European Commission, 2003, p. 8). This is because CLIL is a combination of understandin54g both the subject matter and the language required to learn and interact with the topic, in addition to the necessary learning processes and the context in which one aims to teach (Hall & Townsend, 2019). In CLIL classrooms, students are provided with the opportunity to be exposed to authentic material and learning settings, where the focus is on both the language and the content. This can help boost students' motivation levels by allowing them to be involved in the learning process. Based on the main principles of CLIL, with its balance between content and language, CLIL instruction aims to provide learning from both linguistic and content perspectives.

Since it is widely believed that students should be able to communicate in English effectively after graduation, English has become the world's predominant language of instruction in academia, especially in tertiary education. In most universities in Thailand, it is compulsory that science students conduct a scientific study and write a research report in English that details their findings. However, writing a research report, especially an abstract, in English is a daunting task because there are no academic writing courses or systematic lessons that focus on scientific research or abstract composition. Courses in academic writing are therefore extremely necessary in this context.

Since improving students' knowledge of English is vitally important, and the demand for English-language proficiency in both the academic and professional fields has been increasing in Thailand, and given the effectiveness of CLIL instruction that has been described in the literature, the present study seeks to investigate the challenges associated with providing CLIL instruction to science students in a tertiary educational setting. Specifically, the current study aims 1) to determine the effectiveness of CLIL instruction in developing English writing skills amongst Thai undergraduate students studying in the field of science; and 2) to investigate the challenges facing content teachers in delivering CLIL instruction to such students.

Therefore, this study seeks to address two research questions, namely:

1) To what extent can CLIL instruction enhance the English writing abilities of Thai undergraduate students studying in the field of science?

2) What are some of the challenges that content teachers encounter when delivering CLIL instruction to such students?

2. Literature Review

2.1 Content and Language Integrated Learning (CLIL)

Content and Language Integrated Learning (CLIL) is viewed as an educational challenge (Butler, 2005; Marsh, 2002; McDougald, 2015). Scholars have discussed the challenges associated with CLIL instruction in diverse contexts, including the material and training that is required for CLIL teachers. According to Coyle (2008), CLIL instruction basically consists of four interrelated principles that underpin effective classroom practices, and are collectively known as the '4Cs' Framework. In this framework, the first 'c' refers to content (i.e., the subject matter), and is related to the second 'c,' which is communication (language). The third 'c' is cognition (thinking), while the last one is culture (the awareness of self and of otherness). The focal point is the interaction between learning (through content and cognition) and language acquisition (through communication and culture). The '4Cs' Framework highlights the relationship between language and culture, and emphasises intercultural awareness. In this sense, teaching about culture is an intrinsic part of CLIL, since it can offer substantial support for the learning of various topics in terms of different cultural aspects, with a special attention given to the concepts of 'self' and 'otherness.'

Although CLIL is widely accepted for its effectiveness and usefulness in integrating content and language in the classroom, especially in European countries, the approach has been scrutinised and criticised for the various challenges it creates when it is applied in different contexts. For example, research by Stathopoulou (2015) highlighted the importance of a balanced combination of L1 and L2 use in CLIL instruction. She explained that in a multilingual setting, students need to realise intercultural experiences and mediate them effectively if they are to participate effectively in such contexts and communicate with each other productively. This element cannot necessarily be controlled in CLIL settings. Meanwhile, Coyle (2008) argued that there is an ongoing disagreement as to whether it is content experts or language experts who should provide CLIL instruction, and Dalton-Puffer (2008) claimed that there have been concerns regarding reduced subject outcomes.

Nonetheless, CLIL undoubtedly has a great deal of potential. The benefits of the approach are not limited to the improvement of language skills and subject knowledge. The approach also provides students with the opportunity to develop their awareness of other cultures. Moreover, the approach promotes the development of diverse learning strategies and the application of new teaching methods, and can boost student motivation (Steiert & Massler, 2011).

3. Methods

3.1 The study

This study was of an interventionist strand. The research was conducted in a medium-sized university in Thailand. Since CLIL lessons are not compulsory in higher education in Thailand, receiving the relevant permission and collaborating with the content and language teachers were imperative. Only six content-subject teachers and 24 students studying in the field of science participated in this study. The students, at the time of the study, were fourth-year students, and they were all enrolled in the 'special problem' course, which requires students to conduct a scientific study and write a research report at the end of the course. Therefore, there are no actual classes or lessons, just tutorial sessions so that laboratory progress can be reported to the teachers and comments and constructive feedback provided.

In developing the material that was used in the study, fourteen research articles (validated by the content teachers) were analysed according to their genres so that their linguistic features and lexical items found to be important in reading and writing academic articles could be identified. This aim was to confirm that the material created was authentic and met the students' needs and the objectives of the course. To that end, we found five elements that are frequently included in the abstract — Background, Purpose, Methods, Results, and Discussion, which would have to be a focus of the students. For the other sections, three elements were identified in the Introduction, three in the Methods, one in the Results, and eight in the Discussion. These findings were used to create the instructional material.

After preparing the material for the CLIL instruction, the researcher organised training sessions for the content teachers. The training focused on how to use the material and on the importance of rhetorical structure and linguistic elements found in the analysis. Discussions and negotiations regarding the CLIL methods, as well as explanations and feedback given to the students, were all taken into account. The training took place on two occasions before the CLIL instruction, and twice during the CLIL lessons.

The CLIL instruction took place over a six-week period during the second semester of the 2019 academic year. In the first half of the semester, the students had studied scientific content and conducted an experiment in a laboratory. After their mid-term exams, they were expected to start writing research progress reports and having tutorial sessions with their teachers.

3.2 Data collection and procedures

The data used in this study was collected using Likert-scale questionnaires, interviews and field notes. Before the CLIL lessons, the participants were assessed for their English proficiency (self-rating) and their opinions about CLIL. The questionnaires were completed both before and after the CLIL instruction.

During the CLIL lessons, the students were asked to write a research abstract according to the progress of their experiments and their scientific research topic of interest. In the meantime, they attended tutorial sessions during which they received feedback on how to improve the quality of their research and writing. Field notes completed by the researcher were also used during the tutorials.

Three semi-structured focus group interviews with six content teachers were conducted around one week after the completion of the project. These lasted approximately 30 minutes each, and allowed for an in-depth investigation of a number of issues covered in the CLIL project. Generally, interviews are considered a form of interaction in which rich data can be collected within a highly purposeful frame (Cohen, Manion, & Morrison, 2007). The main themes explored were the teachers' experiences and views of the CLIL process and of the lessons in general (e.g., What do you think about the CLIL lessons? What is your most important concern regarding these lessons?). Several questions were asked about personal preferences, the perceived usefulness of CLIL, and the challenges that were encountered during the project. The questions included suggestions for future projects. The interviews were analysed thematically, and this enabled the researcher to understand the teachers' individual experiences of the CLIL lessons, and what value they attached to them.

4. Results and Discussion

This section presents the results of the analysis of the students' attitudes towards CLIL instruction, the degree of improvement in the students' language skills, and the teachers' opinions regarding the CLIL lessons.

4.1 Students' level of satisfaction and the impact on motivation

The questionnaires, which were filled in by all 24 of the students participating in the CLIL lessons, required them to rate their English proficiency and their opinions about CLIL instruction both before and after the intervention. The findings revealed that overall the students were satisfied with the project and acknowledged it as beneficial, especially in terms of organising ideas and improving their skills in reading and writing abstracts. The following table shows how the students rated their English proficiency and how they perceived the CLIL lessons.

Table 1: Students' self-rating concerning English proficiency and the CLIL lessons.

Items	Before the CLIL (N = 24)	After the CLIL (N = 24)
1. English proficiency in general	3.33	3.67
2. English listening skills	3.17	3.17
3. English speaking skills	2.50	2.50
4. English reading skills	3.17	3.17
5. English writing skills	2.50	2.83
6. Ability in reading academic articles in English	2.83	3.17
7. Ability in academic vocabulary	2.33	3.00
8. Knowledge of rhetorical structure in academic articles written in English	2.33	2.67
9. Ability in reading research abstracts in English	2.83	3.17
10. Ability in writing research abstracts in English	2.17	2.83

As can be seen from Table 1, the average scores from the questionnaires were mostly higher after the CLIL instruction. Specifically, the students believed that their knowledge of English in general had improved after the CLIL lessons (from 3.33 to 3.67). Importantly, they believed that their knowledge of academic vocabulary had also improved (from 2.33 to 3.00), as had their skills in reading and writing in English (3.17 and 2.83 respectively). It is possible that most of the tasks and material used in the CLIL lessons focused on these English skills, since they followed the research and course objectives. The results from the questionnaires confirmed our initial expectations, which were drawn from many other similar research studies (e.g., Dalton-Puffer, 2011; Wenger, 2012) that had demonstrated that students' language proficiency and self-confidence increase after CLIL instruction.

The analysis of the students' abstracts also showed an improvement in terms of the number and variety of specific vocabulary units that the students used in their compositions. Figure 1 shows that the students' knowledge of rhetorical structure and how to organise ideas was substantially improved. Two abstract drafts are compared in order to highlight the development of one student's writing skills as regards generic form, the language used to express ideas, and rhetorical organisation.

Figure 1: Examples of one student's abstracts written in English.

First draft

The Pechmann condensation reaction is condensation reaction between phenol or phenol derivatives and β-ketoesters. This reaction is conducted at high temperature and used strong acidic condition. In normally, homogeneous catalyst is used in this reaction but it have major drawback such as it need to use large quantity to provide the high yield of product, toxicity and it can't reuse for the reaction according to in this study interested about heterogeneous catalyst, which must be resolve the major drawback of homogeneous catalyst. Zeolite is heterogeneous catalyst, which can resolve many problem of homogeneous catalyst. This study used the H-Beta zeolite as a catalyst for the reaction and studied about the potential of H-Bata zeolite by examined the recyclability of H-Beta zeolite. In addition, this research also determined the activation energy of the reaction and studied about the mechanism of the reaction by computational calculation.

Final draft

The Pechmann condensation reaction is the condensation reaction to produce coumarin used for medicinal industries. Due to the strong acid condition of homogeneous catalysts and environmental reason, the catalysts have been replaced with heterogeneous catalysts. In this study, the reaction between resorcinol and ethylacetoacetate at different temperature between 353-453 K was studied on the H-Beta zeolite to identify the activation energy of the reaction by using the Arrhenius equation. The experimental result reveal that the activation energy of the reaction was 5.33 kcal/mol and optimum temperature of the reaction was 413 K, which provided the highest percent yield of product around 72 % and the examined of recyclability test found that H-Beta zeolite can be reuse for the reaction more than 5 times. Additional, the reaction was calculate by using the Density Functional Theory with the M06-2X functional. The computational calculation results show that the mechanism of the reaction consisted 3 consecutive steps are Transesterification, Intramolecular hydroxyalkylation and Dehydration steps. The tansesterification was as the rate-determining step of the reaction. This research could be resolved the problem of homogeneous catalyst and develop the catalyst for environmental reason.

Figure 1 shows that both the structure and language used make greater sense when they are taught alongside the content of the subject matter. Given that during the CLIL lessons the students had the opportunity to read authentic academic texts and reflect on their ideas regarding those texts, it is natural to assume that they would have applied that newly acquired knowledge to refine the content to more closely align with their abstracts. Of course, this may not have been possible without the help of the content teachers in the tutorial sessions. Therefore, it is fair to say that the language feedback and the laboratory work also played an important role in this study.

Apart from the positive impact of CLIL on content and language learning (in terms of writing an abstract in English), there is also evidence of a positive impact on the students' level of motivation to improve their English. The findings from the interviews revealed that all the students believed that the CLIL lessons had helped in the formation of a more positive attitude towards language learning. As one of the students said: "It is good that my teacher points out what I have to revise or rewrite in my abstract draft. Her comments are really pretty much similar to the ones I have found in the lessons which I had already forgotten. I think this is good, and I want to know more how to improve the quality of my work. I need to improve my English skills, too".

However, this finding is not consistent with the results of a study by Sylvén and Thompson (2015), who found no conclusive evidence that CLIL instruction generates more positive attitudes towards learning English or that it boosts self–confidence as regards using the L2. More specifically, they stated CLIL could not be identified as the cause of students' motivation, since it was observed that the students in their study were already motivated and were keen language learners even before they participated in CLIL programmes.

4.2 Voices from the Content Teachers

4.2.1 Importance of training

English language competence and the step-by-step procedures that are a part of teaching CLIL are vital for practising CLIL in real classroom settings. All of the teachers who participated in this study believed that the training sessions were absolutely necessary, since they allowed them to understand what they had to do in addition to just focusing on the content. However, the training sessions for the content teachers were quite limited due to time constraints. Moreover, since the diverse subject matter and the laboratory work were beyond the language teachers' control, some of the content teachers perceived themselves as inadequately trained and prepared for CLIL before the actual instruction. We therefore had some discussions about the problems regarding the usage and application of academic vocabulary when writing research abstracts.

One of the content teachers highlighted certain aspects of CLIL instruction and the role of training: "I am not sure whether the words used in the abstract are right. It is very good that we have a discussion after the training because I can ask you what it means by this and that. With the training I get some sort of sense of what it is in the abstract, how it is that a lesson can actually be taught so that I can integrate that with content as well".

When asked further about the use of CLIL material, two of the content teachers admitted that creating CLIL material was really difficult because they needed a systematic plan, and had to integrate the content and language learning into the selection of texts and information,

as well as the methodological design right from the beginning. As one teacher reflected: "I have never known that we have to prepare a lot for creating the material. I normally ask my students to read and follow the way the author writes an abstract. We then discuss why is this and that and make some changes according to the topic and the results of the laboratory". This finding is in line with Steiert and Massler (2011), who concurred that making teaching material for CLIL is a challenging task for content teachers.

4.2.2 Balance between content and language

Since CLIL requires a content teacher to be language-aware and a language teacher to be content-aware, teaching quality was a major concern in this study. Some of the content teachers held a doctoral degree from an English-speaking country, and thus conducting lectures in English and providing feedback on the students' tasks was easy. However, for those who were not proficient in English, using the language probably hindered the students' understanding of the content. Through the use of English, lectures and/or discussions regarding CLIL principles should be balanced between content and language. At this juncture, this group of teachers featured the target language support mostly through L1 translation and explanation. This fact has been discussed in some studies (e.g. Coyle, 2007; Coyle, Hood & Marsh, 2010; Dalton-Puffer, 2007) which highlight the complexity of balancing content and language in instruction.

According to CLIL principles, the CLIL approach has a dual focus that places emphasis on the integration of content with language, and thus the teaching goals of a CLIL lesson should be both linguistic and content-driven. However, given the time constraints of this study, three of the content teachers mentioned that they did attain an adequate balance between content and language, and were unsure as to how these two main focal points were maintained in practice. One of the teachers reflected: "When I have a tutorial with my student, sometime I cannot think of the correct words to be used to explain her. So I switch my language into Thai, rather than English. And sometime, I think the language used in the student's work is fine, but some content should be revised and fixed. I am not sure how I can explain her and how I can control myself to balance between the revision and the English language". This teacher's response also identifies that the limits of language usage has an impact on the level of differentiation of content and challenge provided.

5. Conclusion

The present study can be seen as a small-scale study that was conducted within a half-semester. However, it indicates the potential of CLIL as an effective approach to teaching science students studying at the tertiary level the intricacies of academic writing. Learning to write research reports and abstracts (together with scientific content) through the medium of the English language and genre-based teaching was considered a strength by both the students and the content teachers. However, as pointed out by the content teachers, training sessions and close collaboration between content and language teachers are vital, since they can ensure that the right steps are taken in accordance with good CLIL practice. English proficiency, in addition to knowledge of specific content, was identified as a major issue during the discussions with the students. Therefore, the CLIL approach can contribute to the increased value placed on language skills, and boost students' motivation in terms of both language and content learning.

We acknowledge that the length of exposure to CLIL can shape positive learning outcomes. The present study, however, has some limitation. The scope and scale of this study was insufficient to examine all the factors contributing to the success of the CLIL pedagogy and to develop expertise and agency in CLIL. A longitudinal CLIL study is recommended to shed light not only one student outcomes , but it also could help to teachers to familiarise themselves in CLIL lessons and implementation. A mixed research design combining both qualitative and quantitative methods could also be beneficial in providing additional relevant findings about the effects of CLIL instructional practices.

Acknowledgment

This paper is an output of the research project supported by Thailand Research Fund (Grant No. RDH610030).

References

[1] Butler, Y.G. (2005). Content-based instruction in EFL contexts: Considerations for effective implementation. JALT Journal, vol. 27(2), pp. 227-245.

[2] Cohen, L., Manion, L., & Morrison, K. (2007). Research methods in education. London: Routledge.

[3] Coyle, D. (2007) Content and Language Integrated Learning: Towards a Connected Research Agenda for CLIL Pedagogies. International Journal of Bilingual Education and Bilingualism, vol. 10(5), pp. 543 – 562.

[4] Coyle, D. (2008). CLIL - A pedagogical approach from the European perspective. In N. Van Deusen-Scholl & N. H. Hornberger (Eds.), Encyclopedia of Language and Education, 2nd Edition, Volume 4: Second and Foreign Language Education (pp. 97– 111). New York: Springer.

[5] Coyle, D., Hood, P., & Marsh, D. (2010). CLIL: Content and language integrated learning. Cambridge: Cambirdge University Press.

[6] Dalton-Puffer, C. (2008). Outcomes and processes in Content and Language Integrated Learning (CLIL): Current research from Europe. In W. Delanoy & L. Volkmann, (Eds.), Future Perspectives for English Language Teaching (pp. 139-157). Heidelberg: Carl Winter.

[7] Dalton-Puffer, C. (2007). Discourse in content and language integrated learning (CLIL) classrooms. Amsterdam: John Benjamins.

[8] Dalton-Puffer, C. (2011). Content anad language integrated learning: From practice to principles? Annual Review of Applied Linguistics, vol. 31, pp. 182-204.

[9] European Commission. (2003). Promoting language learning and linguistic diversity: An action plan 2004-2006. Brussels: European Unit.

[10] Graddol, D. (2006). Englishnext: Why global English may mean the end of ‘English as a Foreign Language’. London: British Council.

[11] Hall, J., & Townsend, S. D. (2019). Developing a theory of practice for CLIL with pre-service teachers. Journal of the Japan CLIL Pedagogy Association, vol. 1, pp. 176-194.

[12] Lasagabaster, D. & Sierra, J. (2010). Immersion and CLIL in English: More differences than similarities. ELT Journal, vol. 64(4), pp. 367-375.

[13] Marsh, D. (2002). CLIL/EMILE the European dimension: Actions, trends and foresight potential. Jyväskylä: University of Jyväskylä.

[14] McDougald, J. (2015). Teachers´ attitudes, perceptions and experiences in CLIL: A look at content and language. Colombia Applied Linguistics Journal, vol. 17(1), pp. 25-41.

[15] Stathopoulou, M. (2015). Cross-language mediation in foreign language teaching and testing. Bristol: Multilingual Matters.

[16] Steiert, C., & Massler, U. (2011). Guidelines for evaluating and developing CLIL materials. In S. Georgious & P. Pavlou (Eds.), Guidelines for CLIL Implementation in Primary and PrePrimary Education (pp. 98-113). Madrid: Education and Culture.

[17] Sylvén, L. K., & Thompson, A. S. (2015) Language learning motivation and CLIL: Is there a connection? Journal of Immersion and Content–Based Language Education, vol. 3(1), pp. 28–50.

[18] Wegner, A. (2012). Seeing the bigger picture: What students and teachers think about CLIL. International CLIL Research Journal, vol. 1(4), pp. 29-35.