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Research Article

Reading comprehension and vocabulary size of CLIL and non-CLIL students: A comparative study

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Abstract

Content and Language Integrated Learning (CLIL) has a dual focus both on content and language teaching in which students learn through and about language and provides contextualized and meaningful situations. Although studies on the impact of CLIL on learners' vocabulary knowledge and reading comprehension have mostly positive results, related research is highly limited in Turkish context. Thus, this study aims to examine to what extent CLIL students differ from non-CLIL students in terms of their reading comprehension and vocabulary size (i.e. receptive and productive). Data were collected from 124 fifth-grade students by means of the reading parts of the Cambridge Key English Test, the 2,000-word frequency-band of the Vocabulary Levels Test (Schmitt, Schmitt, & Clapham, 2001), and the adapted version of the Vocabulary Knowledge Scale (Paribakht & Wesche, 1997). Results of the study showed that the CLIL students significantly outperformed their non-CLIL counterparts in reading comprehension, receptive and productive vocabulary knowledge.

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İçerik ve dil entegreli öğrenme metodunun uygulandığı ve uygulanmadığı ortamlardaki öğrencilerin okuma becerileri ve kelime dağarcıkları: Bir karşılaştırma çalışması

Öz

İçerik ve Dil Entegreli Öğrenme metodu, dilin ve içeriğin dil aracılığıyla öğrenildiği, öğrencilere kendi bağlamında anlamlı öğrenme deneyimi sunarak çift odaklı bir dil ve içerik öğrenimi sağlar. Yapılan çalışmalar her ne kadar İçerik ve Dil Entegreli Öğrenme metodunun öğrencilerin kelime bilgisi ve okuma becerileri üzerinde olumlu etkileri olduğunu gösterse de, Türkiye bağlamında bu alandaki çalışmalar yetersizdir. Bu nedenle, bu çalışma İçerik ve Dil Entegreli Öğrenme metodunun uygulandığı ortamlarda eğitim alan öğrencilerin okuma becerileri ve kelime bilgilerinin bu ortamda eğitim almayan öğrencilerden ne kadar farklılık gösterdiğini araştırmayı amaçlamaktadır. Veriler 124 tane beşinci sınıf öğrencisinden İngilizce testi (Cambridge KET), 2.000 kelime sıklık bandındaki Kelime Seviye Testi (Schmitt, Schmitt, & Clapham, 2001), ve Kelime Bilgisi Ölçeği'nin (Paribakht & Wesche, 1997) uyarlanmış versiyonu ile toplanmıştır. Sonuçlar, İçerik ve Dil Entegreli Öğrenme metodunun uygulandığı ortamlarda eğitim alan öğrencilerin bu ortamda eğitim almayan akranlarından okuma becerisi, algısal ve üretimsel kelime bilgisi açısından anlamlı bir şekilde daha iyi olduklarını göstermiştir.

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Introduction

The global role of English has increased the need for a more profound way of language teaching, and interest in Content and Language Integrated Learning (CLIL) has grown correspondingly (Cenoz, Genesee, & Gorter, 2014; Ioannou Georgiou, 2012; Moate, 2010; Wolff, 2012). Even if the importance of CLIL has been recognized, a consensus on its definition has not been reached. In some cases, it is viewed as a broader concept defining a whole educational program while in others; it implies lessons and teaching tasks with different subject areas implemented in target language. CLIL, which is defined as an approach in which content and the language itself are mingled and valued equally with joint roles in instruction to make students learn through and about language (see Coyle, 2010; Marsh, 2002; Ting, 2010), was applied to the present study.

As CLIL provides contextualized and meaningful situations for language input (Muñoz, 2007; Pérez-Vidal, 2009) and focuses on the quality of classroom discourse (Canga-Alonso, 2015a), it has become popular worldwide. There has been some research conducted in CLIL settings to evaluate its impact both on general language proficiency (e.g. Rumlich, 2013; Yang, 2015) and on specific language skills: listening (e.g. Liubinienė, 2009; Papaja, 2014); writing (Jihad, 2017; Roquet & Pérez, 2015); and speaking (e.g. Belenkova, 2014; Delliou & Zafiri, 2016). There are also CLIL studies focusing on reading skill (e.g. Gomez-Patino, 2017; Sanad & Ahmed) and vocabulary knowledge (e.g. Brown, 2013; Carloni, 2012) but they are mostly single-group studies including only CLIL contexts. To our best knowledge, research addressing reading comprehension or vocabulary knowledge of learners in CLIL and non-CLIL contexts in a comparative fashion is fewer, though. Thus, the present study fills these gaps in the literature in terms of both investigated constructs and research methodology. For the purposes of the present study, related comparative studies have been specifically viewed, after making sure that each study has the same definition of CLIL as a dual approach.

Literature review

There were studies investigating impact of CLIL instruction on learners' reading comprehension. For example, Skogen (2013) compared CLIL and traditional EFL (English as Foreign Language) instruction for tenth grade students with regards to their reading comprehension and analyzed data collected through IELTS (International English Language Testing System) test, questionnaires and interviews with teachers and students. The results indicated that students in CLIL group achieved higher scores in IELTS and the teachers found to challenge their students in CLIL group with higher level of difficulty text in classroom instruction, which may also have contributed to findings. In a similar fashion, Hamidavi, Amiz, and Gorjian (2016) worked with Iranian junior high school students in a ten week-long treatment. The results revealed that experimental CLIL group outperformed their non-CLIL peers significantly in terms of reading comprehension.

On the base of CLIL instruction in vocabulary knowledge, both receptive and productive vocabulary knowledge were taken into consideration. For example, Catalán and De Zarobe (2009) studied the receptive vocabulary size of the CLIL and non-CLIL primary students with sixth-grade students. Data were collected by means of the 1000-word receptive test (Nation, 1993), the 2000-word frequency band of the Vocabulary Levels Test (Schmitt,

Schmitt, & Clapham, 2001), and a cloze test (Corporate Author Cambridge ESOL, 2004). The results showed that the CLIL students significantly outperformed the non-CLIL group in all three tests. The finding was echoed in the study of Sylvén and Ohlander (2015), Canga-Alonso (2015b), and Castellano-Risco (2015). However, there are also studies whose findings are inconclusive. In on such study, Arribas (2016) reported the higher receptive vocabulary scores of CLIL fourth-year secondary students than their non-CLIL peers in his study, the difference between the groups was not significant, though.

There were also vocabulary studies which specifically examined the effect of CLIL instruction on productive vocabulary knowledge. For example, Canga-Alonso and Arribas (2015) collected data from tenth-grade students by means of the 2000-word frequency band version of the Productive Vocabulary Levels Test (Laufer & Nation, 1999; Laufer & Nation, 1995). The results indicated that the CLIL group significantly outperformed their non-CLIL counterparts. In the same line, Olsson (2016) took a step further and conducted a longitudinal study and concluded that CLIL students used more vocabulary items than their non-CLIL counterparts at the beginning of the study but they did not progress more and the gap between the groups did not widen over time. Unlike the previously-cited comparison studies for productive vocabulary size, Tragant, Marsol, Serrano, and Llanes (2016) benefited from a different methodological design and worked with a single group of third-year primary students who underwent one-semester-long non- CLIL instruction followed by one-semester-long CLIL instruction. The results of indicated that there were significant improvements in students' productive vocabulary gains in both contexts. In addition, the comparison of the gains between the contexts showed that students made significantly more progress in non-CLIL instruction than in CLIL instruction.

As can be seen in the related literature, CLIL instruction has become more popular and implemented at educational institutions at different levels. However, in Turkish context, CLIL studies, with different CLIL definitions, have been observed to be very limited in number and to approach the issue from the point of learner perception (e.g. Bozdoğan & Karlıdağ, 2013; Yılmaz & Şeker, 2013) and motivation (e.g. Altınkamış, 2009), only one study focusing on the effect of CLIL instruction on vocabulary knowledge has been detected, though. In his MA thesis, Nebioğlugil (2015) worked with 48 fifth-grade students to examine effect of CLIL instruction on students' vocabulary knowledge. Data were collected by means of the adapted version of the Vocabulary Knowledge Scale (Paribakht & Wesche, 1997), which was linguistically simplified and had some visually aided, administered once every two weeks for a period of three months. Each test was enlarged to include the new vocabulary items. Results indicated significant improvement in the students' vocabulary scores.

To our best knowledge, there is no comparative study examining reading comprehension and vocabulary size of CLIL and non-CLIL students in Turkish context. The present study considers CLIL as a dual approach focusing both on content and language teaching which are equally valued and aims to fill the gap in the literature through the following research questions:

1. Is there a significant difference between CLIL and non-CLIL students in terms of their reading comprehension?

2. What is the receptive vocabulary size of the students (i.e. CLIL and non-CLIL) in the sample?

3. Is there a significant difference between CLIL and non-CLIL students in terms of their:

a. receptive vocabulary size?

b. productive vocabulary knowledge?

Method

Setting

The study took place at two private secondary schools both located in İstanbul, Turkey. In both schools, fifth grade instruction involves extensive English teaching with 20 class hours weekly. The schools have similar profiles in terms of students' socio-economic background and employing non-native teachers for fifth graders. In both contexts, students have started learning English at second grade with two hours of instruction and weekly class hours increased respectively as they moved to higher grades. Until fifth grade, both groups have received traditional English language instruction (non-CLIL). The students in both contexts receive two hours of extensive reading activities each week during which they read A2 level readers and completed tasks requiring character and plot analysis, and comprehension check questions. The both groups also have in-class activities and extra worksheets to prepare for Cambridge KET exam.

In CLIL group content and the language are mingled and valued equally in instruction; the course book "Change" (Broomhead, 2017) used in this group was specifically designed for CLIL instruction and included units with subject matters: history, geography, math, science, sports, art, and technology with equal weight on language and content matter tasks. As it was officially declared in the Preface section, the book was piloted by a group of experts and changes were made according to the data collected by means of classroom observations, teacher and students interviews, and reflective surveys from both teachers and students. To ensure effective use of the book and CLIL instruction, in-service teacher trainings were provided. In these courses English teachers' conceptual understanding related to CLIL is built and concrete instructional activities were provided. The English teachers were also encouraged to collaborate with other subject teachers to compensate the lack of knowledge in related to content areas.

Non-CLIL group used Project 3 (Hutchinson, 2017) which consists of grammar, vocabulary, skills, culture and English across the Curriculum parts in each unit. Although the book uses CLIL as a synonym for English Across the Curriculum part in its official web page, it is limited to one-page long for each unit and do not include in-depth information related to the topics compared to the ones in the CLIL group. Moreover, informal interviews with the English teachers showed that the implementation of these parts did not reflect our operational definition of CLIL as only language focused instruction was available. Additionally, it was concluded from the interviews that the teachers were clueless about the concept and implementation of CLIL.

To understand the difference between the instructional designs of the CLIL and non-CLIL groups, it is better to examine the implementation of similar topics covered in the groups' coursebooks: "Our Planet" in CLIL group and "The Solar System" in non-CLIL group.

In CLIL group, "Our Planet" is the name of the whole unit and detailed information related to the topic was presented and elaborated by means of the following activities cognitively organized ranging from remember to create : Listening and labelling the layers of the Earth; reading about the characteristics of each layer of the Earth; looking at the illustration and completing the missing information related to the place of the planets in the Solar System considering their distance from the Sun; listening and organizing the planets according to the temperature, color, surface, and calendar year; interpreting statistics and graphs on different variables of the planets; demonstrating the movement of the Earth around the Sun (shading activity); diagnosing how the Sun's angle affects the temperature of the Earth (science experiment); comparing different landscapes and classifying as natural or human; and producing a travel brochure for visitors to Earth.

On the other hand, in non-CLIL group, "The Solar System" is just a part of the unit under the name of English Across the Curriculum and it was organized around a reading material including eight short paragraphs describing each planet in separate boxes with some missing information. More specifically, the activities, limited to remembering and understanding information, were as follows: listening and completing the text with missing figures, reading the text again and finding the planets described in the activity such as "the largest in our solar system" and "the nearest to Sun"; and finally answering some comprehension questions.

Participants

A total of 124 fifth-grade students (n=62 in CLIL, n=62 in non-CLIL) from two different private secondary schools participate in the study. Students are from three different classes in both schools and their English proficiency level is A2 according to Common European Framework of Reference for Languages. To be able to conduct a comparative study, the following variables are constant: (i) onset of formal exposure to English and (ii) current weekly-English class hours.

Data collection instruments

Cambridge Key English Test (KET)

To find out whether there is a significant difference between CLIL and non-CLIL students in terms of their reading comprehension, reading parts of KET were used. KET is a standardized exam that consists of different parts measuring English language skills (reading, writing, listening, and speaking) in A2 level under the Common European Framework of Reference for Languages (CEFR). The reading parts are as follows: signs and sentence matching (5 questions), sentences with multiple choice gaps (5 questions), conversation completion with multiple choice questions (5 questions), conversation completion with matching (5 questions), text with multiple choice questions (7 questions), and text with multiple choice gaps (8 questions). This test was chosen since it matched students' proficiency level and also students

in both schools were familiar with related tasks as they had previously taken tests in similar format.

Vocabulary Levels Test (VLT)

To measure students' receptive vocabulary knowledge, the 2,000-word frequency-band of the Vocabulary Levels Test (2K VLT) (Schmitt, Schmitt, & Clapham, 2001, version 2) is used. In the test, there are 10 sets each consisting six words and three definitions to be matched, which means there are three extra words in each set.

Vocabulary Knowledge Scale (VKS)

To measure students' productive vocabulary knowledge, VKS (Paribakht & Wesche, 1997) was adapted as a two-point scale instead of six-points, since the students in this study are young learners. The VKS includes 20 target words, which are randomly selected from the KET Vocabulary List developed by Cambridge ESOL. For each item, the students are required to indicate whether they know the meaning of the word or not. If so, they are expected to write down the meaning either in their native language (i.e. Turkish) or foreign language (i.e. English) and form a sentence using the word.

Data collection process

All instruments were administered to both CLIL and non-CLIL groups during class time on separate days. The participants were first given the KET exam, to be completed in 40 minutes as suggested by Cambridge ESOL. On the other day, students had 30 minutes to complete the VLT as suggested by Schmitt et. al. (2001). Lastly, they were given the VKS to complete in 45 minutes considering the productive nature of the task and the previous related studies. At the beginning of each test, clear instructions were given both orally and in written form in the students' mother tongue to clarify what they were supposed to do.

Data analysis

Statistical Package for the Social Sciences (SPSS) 20.0 was used for data obtained from the KET, VLT, and VKS. To decide on the data analysis methods to be used, the normality of distribution of scores was assessed by means of the Kolmogorov-Smirnov test. The results indicated that the data followed a normal distribution for all instruments: KET ($z=1.114; p=.167$), VLT ($z=1.482; p=.076$), and VKS ($z=.799; p=.545$).

In order to find out the differences between the groups regarding their reading comprehension (research question 1), an independent samples t-test was applied to the overall scores of the students coming from the KET, which included equally-weighted 35 questions scored out of 100 points. To identify the receptive vocabulary size of the students in both groups (research question 2), Nation's formula "Vocabulary size = N correct answers multiplied by total N words in dictionary (the relevant word list) divided by N items in test" (Nation, 1990, p.78) was applied. Finally, in order to compare the groups in terms of their receptive vocabulary size and productive vocabulary knowledge (research question 3), an independent sample samples t-test was applied respectively to the overall scores of the VLT, in which a student received maximum 30 points if s/he matched all the words with corresponding

definitions, and of the VKS, for which the scoring was done as follows: 1 point for the choice of "I do not know the meaning of the word", 2 points for incorrect translation of the word, 3 points for correct translation but no sentence, 4 points for correct translation but semantically and grammatically inappropriate sentence, 5 points for correct translation and semantically appropriate but ungrammatical sentence, and 6 points for correct translation and both semantically and grammatically appropriate sentence. The significance level was set at $p<.05$.

To measure the extent to which the proportion of variance of the dependent variables (reading comprehension and vocabulary size) explained by the independent variable (the type of instruction, CLIL and non-CLIL), effect size was calculated by means of eta squared. In order to interpret the eta squared values, the guideline by Cohen (1988) was followed: .01=small effect, .06=moderate effect, and .14=large effect.

Findings

Comparison of reading comprehension

In order to examine whether there was any significant difference between the CLIL and non- CLIL groups in terms of their L2 reading comprehension, an independent samples t-test was applied to the overall KET reading scores of students in both groups. The following table illustrates the difference values between the groups.

Table 1. Difference between the groups in terms of their reading comprehension

Test	Group	N	M	SD	t-value	DF	p	η^2
Reading	CLIL	62	63.82	22.50	-2.22	122	.028*	.042
	Non-CLIL	62	55.46	19.22				

*$p<.05$, η^2=Eta squared

The result of the t-test showed that the CLIL group significantly outperformed the control group in terms of their overall L2 reading comprehension scores ($p<.05$). As the eta squared value indicated, the magnitude of the differences in the means obtained from the KET was small.

Descriptive of receptive vocabulary size

To calculate the students' word estimates, Nation's formula "Vocabulary size = N correct answers multiplied by total N words in dictionary (the relevant word list) divided by N items in test" (Nation, 1990, p. 78) was applied.

Table 2. Vocabulary size of the groups

Group	M	Size
CLIL	15.91	1.061
Non-CLIL	12.12	808

As can be seen in the table, both groups' overall sizes were considerably lower than 2.000 words, the CLIL students (M=1.061) were better than the non-CLIL students (M=808) in terms of their overall receptive vocabulary size, though.

Comparison of receptive vocabulary size

To see whether there were any significant differences between the CLIL and non-CLIL groups in terms of their L2 receptive vocabulary size, an independent samples t-test was applied to the overall scores of students in both groups. The following table illustrates the difference values between the groups.

Table 3. Difference between the groups in terms of their receptive vocabulary size

Test	Group	N	M	SD	t-value	DF	p	ŋ²
Receptive Vocabulary	CLIL	62	15.91	7.62	-3.25	106.34	.002*	.094
	Non-CLIL	62	12.12	5.08				

*p<.05, ŋ²=Eta squared

It was concluded that L2 receptive vocabulary size of the CLIL students was significantly higher than the non-CLIL students (p<.05). The eta squared statistic indicated a moderate effect size.

Comparison of productive vocabulary knowledge

In an attempt to investigate whether there was any significant difference between the CLIL and non-CLIL groups in terms of their L2 productive vocabulary size, an independent samples t-test was applied to the overall scores of students in both groups. The following table illustrates the difference values between the groups.

Table 4. Difference between the groups in terms of their productive vocabulary size

Test	Group	N	M	SD	t-value	DF	p	ŋ²
Productive vocabulary	CLIL	62	74.43	24.20	-2.69	122	.008*	.063
	Non-CLIL	62	62.53	25.04				

*p<.05, ŋ²=Eta squared

As can be seen in Table 4, the result of the t-tests indicated significant differences between the CLIL and non-CLIL students in terms of their L2 productive vocabulary size, in favor of the CLIL group (p<.05). The eta squared statistic indicated a moderate effect size.

Discussion

The present study investigated the differences between CLIL and non-CLIL secondary school contexts with regards to students' reading comprehension level, and receptive and productive vocabulary knowledge. Data collection tools were the reading parts of the Cambridge Key English Test, the 2,000-word frequency-band of the Vocabulary Levels Test (Schmitt, Schmitt, & Clapham, 2001, version 2), and the adapted version of the Vocabulary

Knowledge Scale (Paribakht & Wesche, 1997). The results were mostly parallel to previous research, but differing at some aspects.

The results regarding reading comprehension part of this study revealed that CLIL students significantly performed better than non-CLIL students in KET test. This result was in line with previous studies (Admiraal, Westhoff & de Bot, 2006; Hamidavi, Amiz & Gorjian, 2016; Skogen, 2013) claiming that CLIL instruction enhances students reading proficiency as CLIL students are exposed to different reading texts with various subject matter in class. This finding may imply that content driven nature of CLIL instruction contributes to learners' reading comprehension.

The results concerning the receptive vocabulary size of the participants showed that although the CLIL students were better than the non-CLIL students, both groups' overall sizes were considerably lower than 2.000 words. This result contradicts with previous studies (Canga-Alonso, 2015a; Canga-Alonso, 2015b; Catalán & De Zarobe, 2009; Fernández-Fontecha, 2014) in which the participants' receptive vocabulary sizes were found to be below 1.000 words regardless of the type of instruction (i.e. CLIL and non-CLIL) even if 2.000-word frequency band of the Vocabulary Levels Test was administered. This finding might imply that all the participants in the present study may have some difficulties in certain tasks in spoken discourse in English since mastery of 2.000 words is needed to be able to understand around 90% and 94% of spoken discourse in different contexts (Adolphs & Schmitt, 2004).

With regard to the type of instruction, the findings also revealed that the CLIL students significantly outperformed their non-CLIL counterparts in terms of L2 receptive and productive vocabulary size. While this result is in line with previous studies (Canga-Alonso, 2015b ; Canga-Alonso & Arribas, 2015; Castellano-Risco, 2015; Catalán & De Zarobe, 2009; Sylvén & Ohlander, 2015), The nature of formal exposure to the foreign language might account for this difference as CLIL instruction provides more meaningful and contextual content instruction through L2 than traditional non-CLIL EFL instruction (Xanthou, 2011). However, the kind of vocabulary input to which students were exposed to in their course materials, classroom interaction (see Tragant, Marsol, Serrano, & Llanes, 2016), and extramural English activities (see Olsson, 2016) might be related to this finding since they can influence the students' performances in the administered tests.

Conclusion

The present study adds to the growing field of CLIL instruction. Furthermore, it confirms the similar studies by presenting evidence for students' higher reading comprehension and vocabulary size. Based on the findings of the study, we can make the following recommendations for different parties. With appropriate methods and materials, CLIL instruction was proved to be effective for instructional outcomes. In teacher education programs, introducing the concept of CLIL makes pre-service teachers familiar with its nature and increases the possibility of future implementations. In that point, professional support is also needed to help in-service teachers while selecting/using CLIL resources and adapt their teaching practices accordingly. Finally, instructional material designers are expected to analyze different levels of CLIL implementation in order to offer appropriate and various CLIL-aware resources.

Further research can be conducted in different contexts, meanly in primary and high school, in order to get more in-depth data for the comparison of CLIL and non-CLIL instruction. Moreover, longitudinal studies would be helpful both to determine the students' growth in the assessed areas within group and to compare this growth across settings (i.e. CLIL and non- CLIL) with the help of a pre- and post- test research design, which is not applied in the present study. Another limitation is using single, in that sense limited, instrument to measure the students' performances in each area.

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