

Teaching Scientific Vocabulary to EFL Learners Using English: Content and Language Integrated Learning

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Abstract

This study investigates a method for teaching vocabulary of Biology using English to Arab learners who study English as a foreign language at a private school in Sharjah. The rationale for doing this study is that Arab students who learn all subjects in Arabic find difficulties when they learn the same subjects in English, consequently, a failure in understanding English scientific texts will happen to students. The methodology of teaching vocabulary of Biology in English is expected to enhance students' skills such as reading, writing and speaking to be able to understand scientific texts especially those related to Biology. Also, the study is adapted to suit the needs and motivations of the Arab learners whom I teach and may be suitable in schools that provide academic subjects in Arabic while English is studied as a foreign language. To achieve the purpose of the study a literature review of the main theories related to content and language integrated learning (CLIL) is conducted. Then, data samples are collected from 30 female students of grade 12 who are nearly advanced learners of English and have studied Biology for about three years but in Arabic. The qualitative instruments used to collect data include observations by school supervisors, students' works, and interviews with some of the students who are involved in the study. The results of data analysis prove the positive outcomes of the study which are represented by promoting students to understand English scientific texts, answering questions of comprehension, pronouncing words of the lesson correctly and reading aloud parts of the texts easily.

Key words: CLIL, vocabulary of Biology, English skills, Arab learners, scientific texts

Introduction

Content and Language Integrated Learning (CLIL) has been recently applied in many schools in the United Arab Emirates. These schools provide subjects like History, Math, and Science in English in addition to the English language at early stages. Students are taught by teachers specialized in the learning material and could be either native speakers or foreign language teachers with high proficiency in English. However, teaching Science through English represents a real challenge to Arab learners of English whom I teach. This is because learners study Science in Arabic, and when they have to study it in English, they face difficulties in comprehending the scientific terminology in English, and consequently fail to achieve understanding of most of the scientific texts. The purpose of this study is to investigate a method to teach scientific vocabulary especially those related to Biology in English. The investigated method is expected to develop learners' strategies in learning scientific vocabulary in the future, as well as to reinforce their reading, writing and speaking skills when dealing with scientific texts. The review of literature will focus on the theories associated with CLIL, in addition to one of the early CLIL experiments. Moreover, factors affecting teaching vocabulary to EFL Arab learners and practical suggestions for teachers to integrate reading and writing skills in CLIL lesson will be discussed.

Literature review

The review of literature will include a reference to theories discussing the aspects of language learning from which CLIL has derived the basics of its programmes. The theories are the second language acquisition theory of Krashen (1982), the sociocultural theory of Vygotsky (1978), the constructive theory and finally immersion. In addition, a reference will be made to one of the early experiments of CLIL which has taken place in the Netherland. In this study which is about teaching vocabulary of Biology to promote other skills, the concepts conducted by the theories included in the literature review will be used to provide a CLIL lesson that adapts to students' needs and levels.

The second language acquisition theory

Since content and language integrated learning is based on using language to learn other materials, the focus will be on meaning while language knowledge and skills will be learned implicitly. This idea relates to Krashen's (1982) theory of second language acquisition where he states that adults have two ways to develop competence in a second language. The first way is language acquisition which is a subconscious process or implicit learning and is similar to the way children acquire their first language. In this way, Krashen (1981) indicates that learners use language for communication:

Language acquisition is very similar to the process children use in acquiring first and second languages. It requires meaningful interaction in the target language --natural communication—in which speakers are concerned not with the form of their utterances but with the messages they are conveying and understanding. (p.1)

The second way to develop competence according to Krashen (1982) is by language learning which he calls a conscious process or explicit learning where learners become aware of the rules of language. CLIL lessons make use of the language acquisition theory by providing learners with comprehensible, meaningful and interactive environment similar to the one they used to have while acquiring their first language. CLIL widens learners' exposure to the target language

through teaching subjects like Biology, History, Science, Art and Math using English, and giving learners the chance to paraphrase, recycle information and communicate in classroom. By teaching other subjects using English, learners are provided with meaning while formal instructions develop language ability, and consequently, conscious knowledge or learning takes place. In this study, the vocabulary of Biology will be presented through meaningful context to facilitate learning and using these words in other skills.

The sociocultural theory

In CLIL lessons, interaction between students in classroom is an important factor in the process of learning. The concept of interaction is stated by Vygotsky's (1978) theory of the Social Development, where he focuses on the importance of culture, community and interaction in learning. In other words, people learn by interacting with the sociocultural context around them. Vygotsky (1978) argues that people communicate by using mediators created by human culture (Lantolf, 2006). Moreover, he introduces the concept of the Zone of Proximal Development as the place where learning happens, and the learner becomes able to produce language but with the help given by the other knowledgeable person (Mitchell and Myles, 2004). The CLIL lesson prepared for this study will present the learning material which is vocabulary of Biology through creating interaction between learners and relating the topic of the lesson to their culture. English language will be used as a mediation to get to the zone of proximal development, and later reach the mental function required to achieve learning of vocabulary.

The constructivist theory

A third theory that CLIL has used as one of its basics is the constructivist theory which Resnick's (1989) observations about it state that during the process of learning learners always try to relate the new material to what they already know about it. Resnick (1989) explains that:

The general sense of constructivism is that it is a theory of learning or meaning making, that individuals create their own new understandings on the basis of an interaction between what they already know and believe and ideas and knowledge with which they come into contact. (as cited in Richardson 2003, p.1623)

Also Piaget (1963) as cited in (Zanthou, 2011) indicates that the process of learning depends on building new information upon prior knowledge. In CLIL lessons, (Casal, 2008) teachers present the material in an interactive and cooperative environment that allows learners to negotiate meaning, ask questions to clarify vocabulary meaning or grammar structures, and have the chance to relate new information to what they already know about the topic. In this study which is about teaching vocabulary of Biology, students build up the new information about DNA structure upon old material of the same topic studied in previous years, and this happens in classroom through brainstorming learners and giving tasks that involve all students and reinforce the relation between new and old information.

Immersion versus CLIL

Immersion is a programme that focuses on learning subjects like Math, Science, History and others using a second language. Learners enrolled in the immersion programme begin in kindergarten or first grade and continue through the immersion years (Chamot and El-Dinary, 1999). For immersion programmes, learning the target language (Coyle, 2010) takes place during

the development of first language skills, and presents the learning material in social contexts similar to the ones native speakers have. However, this is not the case in CLIL, because students study content using a foreign language in a foreign language context.

A study conducted by Lasagabaster and Sierra (2012) shows that there are five main points of similarity between CLIL and immersion. These similarities are indicated by their final objective which is to help students become proficient in both first and target language, and to achieve that, Stein (1999) claims that students should be taught in a completely new language to resemble first language acquisition:

An important characteristic of immersion education is that the second language is introduced as a holistic system with the purpose of communicating meaning at all times. Immersion students are typically exposed to a range of academic vocabulary and linguistic structures from the very early grades without having to go through the process of learning them piece by piece. (p.2)

In addition, Somers and Sumont (2012) indicate that immersion and CLIL are rated as the best programmes for target language learning. This is because learners are taught by teachers who should be bilingual to implement the school activities using the target language, and create the communicative environment required to achieve effective learning. In this study, the final objective is to help students become proficient in English as a foreign language, since they are already proficient in their first language which is Arabic. The environment where this CLIL study is taking place is in a foreign language learning classroom directed by foreign language teachers. But to what extent the new language used in classroom could resemble first language acquisition is an issue that is determined only by the ability of teachers to provide learners with instructions and wider exposure of English as the target language.

The same study by Lasagabaster and Sierra (2012) states that there are differences between CLIL and immersion. The differences are related to the language used in classroom, teachers, starting age of learners, teaching material and the learning objectives. Immersion uses language in students' context like home or society, which means students use local language in formal and informal situations. Besides, teachers, who should be native speakers and whose objective is to achieve excellent command of the language of instruction, use teaching materials aimed at native speakers. Furthermore, immersion starts at early age to provide wider amount of exposure to the target language, and consequently achieves target language proficiency similar to native speakers. However, in Arab countries aiming at native speaker context and language may take learners away of the environment where they live. Teachers who are native speakers might not be aware of the cultural differences between Arabs and other nationalities. Arab learners have their own background knowledge and may face difficulties in adapting to different cultures.

CLIL language, on the other hand, is not local but a foreign language used in a formal instructional context, which is similar to the context and language in this study, since English is a foreign language and is used only in a formal context in classroom while other subjects are taught in Arabic. Somers and Sumont (2012) state that in CLIL lessons, teachers can be trained foreigners who teach other subjects using English to learners who have experienced traditional foreign language teaching, and start learning other subjects using English at a later stage. CLIL programmes use abridged materials that require a pedagogical adaptation, but they could help learners use language for communication and act effectively. In this study, foreign language

teachers of English are teaching foreign language learners who have experienced traditional teaching of English and are going to learn other subjects using English at a later stage in the university. In addition, teachers use material from learners' books and try to look for equivalent material in English to help learners improve their skills and use English language in communication.

Early CLIL experiment

A variety of CLIL programmes are conducted in Europe and other countries, where subjects are taught in two or more different languages. The application of CLIL programme in the Netherland is made by researchers on different levels of learners with different motivations and objectives. De Graaff, Koopman, Anikina and Westhoff (2007) invest CLIL with students who aim at a better command of language to prepare to study abroad, live in an international society or involve in courses taught in English, and the language of instruction in addition to Dutch is English. Dutch learners start at the beginning of secondary education with subjects like History, Geography, Biology and are taught by Dutch staff selected and trained well by English teachers. The results of this programme indicate that CLIL neither minimizes language proficiency in the Dutch language nor demands extra time in the curriculum, on the contrary, learners achieve higher levels of proficiency in English.

On the other hand, Thijssen and Ubaghs (2011) use 28 female and 26 male Learners of grade 9 who study English as a compulsory course from grade 7 and Chemistry from grade 9 and who none of them are born in an English speaking country. Whereas teachers are CLIL Chemistry teachers with some of them have extensive teaching experience. When difficult chemical concepts are explained for the first time, only specific Chemistry words are translated into Dutch. Chemistry is exclusively taught in English which allows students to be exposed to a high amount of English input. The study shows the positive correlation between students' proficiency and students' confidence as well as between teachers' confidence, teachers' didactics and teachers' corrective feedback.

Although the above experiment is performed in a foreign language context and uses different levels of learners with different aims, still Dutch and English are European languages who may have the same letters and some similar words or expressions. In addition to that, they are left to right languages and teachers are specialists in the learning material. The questions that may arise are: what if the experiment is applied on students whose mother tongue is Arabic which is completely different in origin from English. Will there be other problems related to the interference between mother tongue and target language that students may face while studying other subjects in English?

Methodology

The methodology adopted in teaching vocabulary of Biology using English to Arab learners depends on collecting data that consists of 30 females who study English as a foreign language. In addition, instruments like some characteristics of effective CLIL programme and the importance of using communicative competence in classroom will be considered.

Participants

The samples collected for the data are 30 Arab females between 16 and 17 years old of grade 12 who study English as a foreign language in a private school in Sharjah, and are going to be taught by me as an English foreign language teacher. These are my students and the data collected is a normal one that I always collect as part of my work. At the moment of gathering the data, learners have been studying English as a foreign language for about twelve years and Biology nearly three academic years but in Arabic. Learners have some background information about the material of the research, which is DNA structure, since they have studied it in grade 10.

Instruments

The study uses qualitative instruments in collecting data which consist of students' answers in the handouts given during the lesson, observations made by two supervisors and interviews conducted with students. In planning the lesson, we use the CLIL planning tools which focus on content, communication, cognition and culture (the 4Cs) suggested by Do Coyle (2005). The reason behind choosing these tools is that they cover most of the aspects that the teacher should be aware of and are required to achieve an effective CLIL lesson, especially that teaching vocabulary of biology in English is happening for the first time in this school. In addition, the 4Cs adopted in planning the lesson make use of the theories discussed earlier in the literature review, like creating communicative environment and sociocultural context to achieve learning. As for observing the teaching of the CLIL lesson, we use a list of tools investigated by De Graaff (2007). The advantage of using these observation tools is that they consider points that help observe the implementation of the lesson plan prepared for a CLIL lesson. These tools give the chance to focus on students' interaction in classroom, the effectiveness of the learning material and the core activity of teaching like classroom environment and instruction. They also concentrate on the teaching techniques, the teacher's performance and achievement of the objectives of the lesson. The lesson has been observed by two Arab supervisors who work at the same school and are responsible for English language. The observation will concentrate on learners' interaction, their responding to teacher's instructions, performing the task, discussion during group work, and the effectiveness of the lesson. The two observers may be bias positively since they observe my lessons regularly and write reports to the administration of the school.

In designing an effective CLIL lesson for English foreign language learners, the characteristics of a successful CLIL programme suggested by Zarobe and Catalan (2009) will be used. In this study some of the ten points of these characteristics are applied while others are modified to adapt to the context where the study will be implemented. The points support learners' first language and culture which is Arabic since the material used resembles what they have in their original books. Teachers are Arabs, highly proficient in English and use a variety of teaching techniques and devices to achieve communicative and interactive environment in classroom between teachers and learners on one side and between learners on the other side. The study does not depend on optional courses but it extends over the whole academic year and includes different aspects of Biology in order to help learners improve their skills in understanding Biology texts in the target language. The idea of the study is supported by parents and the administration of the school.

Another application to be used in designing an effective CLIL lesson is related to the communicative competence and cooperative learning in classroom. Coyle (2010) has discussed different aspects of communicative competence like linguistic, sociolinguistic, discourse and

strategic competence. In this study, linguistic competence is achieved since learners have knowledge of most of English grammar and a lot of them are advanced learners of English. The sociolinguistic competence is limited and needs to be developed since learners use English only for academic purposes and sometimes for interacting with some people in society. The discourse competence is acceptable as learners know how to write different types of articles, organize ideas and produce well unified texts. The same applies to spoken discourse because learners' speaking skill is acceptable to some extent. The strategic competence needs to be improved by keeping learners aware of the different situations and events in life.

The analysis

In this section, an explanation of the procedures followed during teaching the lesson and how the lesson plan is implemented will be provided. Then, the analysis of the data includes analyzing learners' interaction, students' answers in the handouts, observers' notes and students' evaluation of the lesson.

Procedures

The lesson is taught in learners' classroom and is observed by the two Arab supervisors mentioned earlier. Also the lesson is videoed to be used later in analyzing students' interaction. The teacher uses teaching aids like the computer, the data show, videos and handouts. According to the lesson plan, the teacher asks students to watch a short video to guide them to identify the topic of the lesson. Then she asks them questions like what do you know about DNA structure? What information have you studied about it? The teacher gives students a handout that includes a definition matching activity for vocabulary. She divides them into five groups each group consists of six students. The reason behind getting students to work in groups is that teaching vocabulary of Biology in English is a new idea and students may face difficulties if they work individually or as pairs. Despite that most students of the data are advanced learners, there are still individual differences in levels and abilities. So each group contains students of different abilities so that they help each other and respond effectively. The teacher asks them to discuss in English only and gives them time to do the task. Students try to relate the words and the meanings to the terminology they have studied before although it is in Arabic. After eliciting the answers and correcting them, the teacher reads the words and asks students to drill chorally, individually and in groups. Questions to check the meaning of words are asked and students are given another handout of the words and the meanings. (See Appendix 2 for vocabulary list) To reinforce learners' understanding of the words and their meanings, they are given a gap fill activity, where they have to put the pictures that contain the words they have studied in their suitable places in the text. The reason behind choosing pictures with words instead of words only is that learners are not yet familiar with the uses of the words in actual texts. After eliciting answers and correcting mistakes students watch another short video about the components of DNA. Since the purpose of the study is to teach learners words of Biology to use them in understanding academic texts in English, learners are given a productive activity which is to read a text about the history of DNA and answer questions of comprehension. Finally, the teacher elicits answers and corrects mistakes, then gives students a survey about the evaluation of the lesson to answer. (See appendix 1 for more details about lesson plan).

Data analysis

Analyzing learners' interaction and responding to teacher's instructions

Since the teacher has been teaching the learners for about six months, they are familiar with the instructions and they respond highly, especially that learners are accustomed to group work, matching definition and gap fill activities. Students show interest in the topic especially while watching the videos, and try to remember some information about DNA. Learners work hard, however, some difficulties in performing the tasks have appeared, since it is the first time they learn Biology in English. Some pauses, hesitations and misunderstanding of the requirements of the task are noticed. In the matching definition and gap fill activities, learners' correct answers are less than those in the reading comprehension task. In addition, when learners are forced to discuss in English only and never use Arabic, there have been some disturbances among some groups because of the individual differences between learners. During eliciting answers, learners feel embarrassed to give wrong answers but some of them try to participate.

Analyzing learners' answers in the handouts

The tasks used during the lesson are three: matching words with their meanings, gap fill activity and reading comprehension. In all tasks the percentage of correct answers varies not only according to the task but also between the groups. The higher result is in the reading comprehension task. In matching words with meanings, group 1 achieves 67 %, group 2 45 %, group 3 80 %, group 4 33%, while group 5 has 80 % correct answers. On the other hand, in gap fill picture task group 1 gets 50 % of the answers correct, group 2, 3 and 5 64 %, while group 4 80 % correct answers. However, the reading comprehension results are as follows: group 1 achieves 50 % correct answers whereas group 2 and 4 answer all questions correctly, group 3 got 90 % and group 5 80 %.

Analyzing notes of the supervisors

The two supervisors agree that the lesson is performed in an effective way in general. As stated earlier in the methodology, they use tools to observe CLIL lesson investigated by De Graaff (2007). They rate points like selecting authentic materials, adapting texts to learners' level, promoting learners' interaction, suggesting communicative tasks, encouraging learners to speak only in English, giving examples and overcoming problems in language comprehension as highly effective. While other tools such as stimulating feedback and reflecting on use of comprehension strategies are rated as effective. However, in private meetings with the two supervisors, they talk about the problem that the class is small in comparison to the large number of students which is 30. Such a problem does not enable the teacher as well as the supervisors to move comfortably between students. They appreciate the way the teacher teaches the spelling of difficult words through dividing the word into syllables. For more details see appendix 3 for tools to observe CLIL lesson.

Analyzing learners' evaluation of the lesson

Learners are given six questions to answer about their evaluation of the lesson. Nearly 90 % of students answer yes to questions like enjoying the lesson and the videos used, like to know more about the lesson and search for DNA Structure on the internet. About 70 % of students understand the words and the lesson, while nearly 40 % answer no to the question of explaining the lesson to anyone, and in explaining why they say that they still find difficulties in speaking

about Biology in English. (See appendix 4 for a survey to evaluate the lesson by learners). Also, in the interview conducted with few students they explain their feelings while doing the tasks and their opinions about the topic.

Excerpt 1:

S1: I liked the lesson but the words were difficult and their meanings were difficult as well to understand.

Excerpt 2:

S2: This is the first time I study Biology in English but it could be more interesting if the lesson was about the brain or the human body in general.

Discussion

The analysis of data shows that learners appreciate the thought of studying vocabulary of Biology in English although the words are new and strange. By the end of the lesson, learners become able to read the sentences and parts of the texts while answering to the questions in the task, which means that by repeating the words more than one time and using them in meaningful contexts students are not only able to read them but to read parts of the texts. The idea of building new information on prior knowledge takes place through encouraging learners to refer to what they already know about DNA. Also, the learning material is introduced in a meaningful context such as videos and reading texts which enable learners to achieve social interactions. This interaction promotes their mental operations through performing tasks that indicate the notions of the acquisition of second language investigated by Krashen (1982), the sociocultural theory of Vygotsky (1978) and the constructivist theory referred to earlier in this study.

Furthermore, the findings of the study support the importance of cooperative learning in CLIL contexts discussed by Johnson, Maruyama, Nelson and Skon (1981) (as cited in Casal 2008, p.3) and indicate that "Cooperative learning has also proved favourable to social cohesion and collaboration within the group, allowing students to overcome fear in front of other students or teachers". Also students' ability to communicate during the tasks is associated with the effect of group work which is indicated by Casal (2008) as an important factor to increase opportunities for practicing the target language, improve the quality of conversation among students, and promote learners' motivations towards participating in the lesson. Students find difficulties in using the new words in useful sentences of their own words, which supports the notion mentioned by Xanthou (2011, p.124) about the difficulties learners may encounter in CLIL lesson "CLIL students may encounter difficulties in conveying and constructing content related meaning in the way CLIL is delivered, that is, task-based learning on its own."

Implications for teaching and learning

The results of data analysis seem to support the idea that teaching vocabulary of other subjects especially Biology is necessary not only to increase students' linguistic knowledge but also to encourage learners to use these words in their future studies. Teachers in planning for vocabulary lesson should be aware of the factors affecting teaching vocabulary in classroom especially in a foreign language context. Yongqi Gu (2003) states that these factors are related to learners' motivations, levels, age, individual differences, the purpose of the task, classroom environment,

and strategies followed by learners to learn vocabulary. Asgari (2011) identifies different strategies that learners use in learning vocabulary such as discovery strategies, consolidation strategies, social strategies like learning new words through interaction with others, memory strategies by linking background knowledge to new one, cognitive strategies like mechanical ones and metacognitive strategies that involve monitoring, decision making and evaluation. The teacher could work on learners' strategies and improve them to achieve better understanding of the vocabulary. In considering the above mentioned factors, teachers could be aware of the anticipated problems that may arise while teaching vocabulary.

In addition to that, teachers are advised to choose the suitable teaching aids like videos, PowerPoint presentations, handouts, discussion board, brainstorming activities and other ways to promote learning, practice vocabulary in classroom and increase students' linguistic accuracy. There are different techniques teachers could follow to improve teaching vocabulary in classroom in addition to the ones used in this study. Choudhury (2010) refers to these techniques as either incidental learning like learning vocabulary through context or explicit learning which uses activities focusing basically on vocabulary learning like defining activities, matching words with their definitions, synonyms or antonyms, true or false, cross words, games and creative use of words in useful sentences. Also, teachers need to relate new information to prior knowledge by encouraging learners to tell what they have studied about a particular topic. This can be done by getting students to identify the topic of the lesson through presenting some information of what they have studied before and could elaborate on. Furthermore, teachers should choose the suitable material of Biology that adapts to students' needs and relates to topics found in their original books. Presenting the material in a meaningful context is important to facilitate learners' understanding.

To achieve the previous suggestions, Casal (2008) suggests that teachers should apply certain strategies in classroom like the cooperative learning which can be implemented through structured group work. When students, especially in the secondary level, work in groups and exchange ideas, the effect of the individual differences between learners will be less, students will practice self-esteem through face –to-face interaction with their peers, understanding of the tasks will be better, and the learning outcomes will be more since the level of participation is expected to be high.

Moreover, it is clear from the analysis of students' answers in the reading comprehension task that there is a solid relation between learning vocabulary and other skills like reading, writing, listening and speaking. The wider the vocabulary of Biology learners have and know the correct pronunciation of the words, the less the difficulties students face in understanding English texts of Biology, write notes and speak about the topic.

The advantages of integrated reading and writing activities in reference to content learning are as follows: reading texts from a given discipline provides information that can be later used in written production, and therefore contributes to revision and consolidation of content material. Furthermore, the necessity of selecting information in the writing process helps students develop critical thinking skills. (Loranc-Paszylk, 2009, p.2)

Nunan (1999) provides strategies and classroom techniques that help develop reading skills which can be used by teachers even in lessons where other subjects like Biology are taught using English. Some of these strategies encourage students to make inferences about the main ideas of the text, teach them the three types of reading skim, scan and read for details, avoid reading word

by word, inferring unknown vocabulary from the context and using their background knowledge to understand ideas in the text. To apply the previous strategies teachers could use classroom techniques like ordering a sequence of pictures, matching pictures with texts, completing a document, mapping, jigsaw reading, comparing several texts and summarizing.

Writing skills can also be integrated in a CLIL lesson. Lorance-Paszyk (2009) talks about some practical suggestions to integrate writing in a CLIL lesson which is through cooperating with other skills. After teaching vocabulary teachers give students texts to read and answer questions of comprehension. Then students write notes of what they understand from the text and start constructing essays about the topic which they have studied. In this case writing skills could be as a help to revise material and also demonstrate understanding of the source text. Connecting vocabulary learning with reading and writing skills could be useful for students who are going to study subjects like History, Science and Math using English. Another practical suggestion is through giving students two reading texts and asking them to compare and contrast the two texts. Students take notes about similarities and differences and later construct essays. Furthermore, when learners understand a text and write about it they will be able to discuss it orally without fear of failure since the ideas are processed semantically and syntactically.

A further implication of CLIL lesson in classroom is related to cultural awareness. Sudholf (2010) states that since CLIL programmes foster the usage of the foreign language as a tool to communicate and work on content matter, students utilize the foreign language in a functional as well as authentic way and deal with the tasks and problems the subject raises. A real world connection can be observed by engaging topics that contribute to the formation of the cultural identity of people.

Conclusion and further research

The advantages of CLIL resulted from previous experiments are represented by introducing cultural context which prepares students for internationalization. Integrating content and language is not new in Emirates, however, it is the idea of teaching other subjects like Biology in English to students who study English which is a foreign language is the new one. The purpose of the study is to investigate a methodology for teaching vocabulary of Biology using English performed by English language teachers, and to identify the role vocabulary recognition plays in practicing other skills like reading, writing and speaking in classroom. To achieve this purpose, the data samples are collected from a group of female learners and the context of the experiment is a private school where English is taught as a foreign language while other subjects are taught in Arabic. The findings have proved increasing in students' abilities to understand texts of Biology, which could help them in their future studies. In addition, the theories reviewed especially the second language acquisition, the sociocultural theory and the constructivist theory are applied in planning for CLIL lesson, through presenting the learning material in a meaningful context, using cooperative and communicative strategies in classroom activities and relating new information to prior knowledge by promoting students to tell what they have studied about the topic. Moreover, strategies to apply reading, writing and speaking skills in teaching CLIL lesson in classroom are suggested.

However, since the lesson in this study is taught once, further research should be implemented on teaching vocabulary of Biology. The study needs to be conducted on other Biology topics

with larger samples of male and female learners of the same school or even other schools. On the other hand, other subjects like History, Geography and Economy may be used in CLIL lesson to give a wider insight of a methodology for teaching vocabulary of other subjects to foreign language learners of English.

Limitations and difficulties of the research

This research is conducted on a group of Arab learners studying English as a foreign language while other subjects are taught in Arabic, and who are considered nearly advanced learners of English. So, the same results may not be applicable if the experiment is conducted in another school that teaches academic subjects in English or if the learners' level is different. Some of the difficulties that the researcher faced while doing this research were finding the suitable topic in Biology to be taught for the first time in English which should match the information students had in their books in Arabic, time of the lesson which was only 45 minutes, and preparing the teaching aids like data show to be used in teaching the lesson.

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Appendix 1: Lesson Plan

Teaching Vocabulary of Biology in English

Lesson Planning

Level: Grade 12 students Number of students: 30 Timing: 45 minutes

1. CLIL Model:

The CLIL model to be adopted in this lesson is 'subject topic' adapted for teaching in English to explore the subject which is vocabulary of Biology from a different perspective through the medium of English whilst improving foreign language skills.

2. Content:

The main aim
The aim of this lesson is to learn and use vocabulary of Biology, especially those related to DNA structure and building through the medium of English.
Teaching objectives
<ol style="list-style-type: none"> 1. To identify the topic of the lesson. 2. To teach vocabulary: modeling & drilling. 3. To check concept: answer questions to check the correct meaning of words. 4. To practice using vocabulary in a matching task (productive activity). 5. To practice using the vocabulary taught in a reading comprehension task.
Content to be taught
<ol style="list-style-type: none"> 1. Introduction of the topic: video about the structure of DNA. 2. Vocabulary: Cells, Deoxyribonucleic acid (DNA), Enzyme, Gene, Genome, Protein, Recombinant DNA, Synthesis..... 3. PowerPoint presentation about DNA structure.

3. Communication:

Language of learning
Vocabulary derived from the text, the video and the PowerPoint presentation.
Language for learning
<ol style="list-style-type: none"> 1. Definition of DNA and its structure. 2. Explain the process of building DNA. 3. Add information they already know about DNA. 4. Asking each other questions like: what do you know about DNA? Can you tell me something about its structure? How do you spell a word? What does this word mean? 5. Classifying: the different elements and components of DNA.
Language through learning
<ol style="list-style-type: none"> 1. Decide language needed to carry out activities. 2. Record, predict and learn new words which arise from activities.

4. Cognition:

1. Provide learners with opportunities to understand the new words and use them in different contexts.
2. Enable learners to identify the structure of DNA and the process of building it.

3. Encourage logical argument about predictions that may happen during the process of building DNA using English language as a medium of discussion.
4. Problem solving: (how can DNA help in identifying the person?)
5. Culture: Understand that they can learn, no matter which language they are using. Look for Arab scientists who studied DNA.
6. Learning outcomes:

By the end of this lesson learners will be able to use the vocabulary taught to reinforce reading, writing and speaking skills in their future studies and researches.

7. Procedures:

1. Lead in: T tries to elicit from SS the topic of the lesson by using a video about the history of DNA, then ask them what is the topic of the lesson.
2. Elicit: T elicits the new words. In groups SS are given papers for definition match and try to match each word with its suitable definition.
3. Feedback: SS exchange answers. T provides the correct definitions.
4. Drill : SS repeat the spelling of words chorally, group and individually.
5. Check the concept: to focus on meaning, form and pronunciation: T asks questions about the meaning of some words and parts of speech.
6. Provide a written record: T gives a written record of the meaning of words.
7. Productive activity: SS are given a text to read. T gives time to do the task then SS put pictures in their suitable places.
8. Freer activity: SS are given a text to read and answer questions of comprehension. T monitors and gives feedback.

Appendix 2: Vocabulary used in the lesson

Cells		The smallest living units of the body which together form tissues.
Deoxyribonucleic acid (DNA)		The genetic material in a cell.
Enzyme		Biological molecule, usually a protein, which promotes a biochemical reaction but is not consumed by the reaction.
Gene		A separate unit of inheritance, represented by a portion of DNA located on a chromosome. The gene is a code for the production of a specific kind of protein or RNA molecule, and therefore for a specific inherited characteristic.
Genome		The complete set of genes an organism carries.
recombinant DNA		DNA that is cut using specific enzymes so that a gene or DNA sequence can be inserted.
Synthesis		Combination
Backbones		supports, sides
Helix		Curl, twist
Rungs		steps, stairs or stages

DNA polymerase		An Enzyme that catalyzes the formation of new DNA and RNA from an existing strand of DNA or RNA
Catalyze		Undergo a transformation or a change of position or action
Nucleotide		Any of several compounds that consist of a ribose or deoxyribose sugar joined to a purine or pyrimidine base and to a phosphate group and that are the basic structural units of nucleic acids (as RNA and DNA)
Ribose		Pentose sugar important as a component of ribonucleic acid
Nitrogenous		Relating to or containing nitrogenous

Appendix 3: Tools to observe CLIL lesson

Please check if the following tools are being activated efficiently in classroom according to the following levels

Points to observe	Average	effective	Highly effective	Not effective
1. Teacher facilitates exposure to input at a minimally challenging level				
a. Selecting attractive authentic materials				
b. Adapting texts up to the level of the learners				
c. Scaffolding on the content and language level by active use of body language and visual aids.				
2. Teacher facilitates meaning-focused processing				
a. Stimulating the learners to request new vocabulary items				
b. Check the meaning of new vocabulary				
c. Use explicit and implicit types of feedback				
3. Teacher facilitates form-focused processing				
a. Giving examples				
b. Using recasts and confirmation checks				
c. Clarification requests				
d. Giving feedback				
4. Teacher facilitates output production				
a. encouraging learners' reaction				

b. Working in different interactive formats				
c. Practicing creative forms of oral and written output production				
d. Suggesting communicatively tasks				
e. Giving learners enough time for task completion				

Points to observe	Average	Effective	Highly effective	Not effective
f. Encourage learners to speak only in English				
g. Providing feedback on students' incorrect language use				
h. Stimulating peer feedback				
5. Teacher facilitates the use of strategies:				
a. Stimulating students to overcome problems in language comprehension and language production.				
b. Reflecting on use of comprehension strategies				
c. Scaffolding on the spot strategy use.				

Supervisor's name:

Signature:

Appendix 4: Students' Evaluation of the Lesson

Evaluation of the Lesson

Thank you for participating in the lesson. Please read the following questions about evaluating the lesson. Put a tick in the column that suits your opinion. If your answer is no explain why.

The questions	Yes	No	Why
Have you enjoyed the lesson?			

Did you enjoy the videos in the lesson?			
Did you understand the words of the lesson?			
Can you explain the lesson to any one?			
Would you like to know more about the lesson?			
Would you like to search for DNA Structure on the internet?			