العدد 10 مجلة دراسات في الإنسانيات والعلوم التربوية تموز 2025
No. 10 Journal of Studies in Humanities and Educational Sciences July 2025
Print ISSN 3006-3256 Online ISSN 3006-3264

The Influence of CLIL Instruction on Iraqi EFL Secondary School Students' Vocabulary Repertoire

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Abstract

This study aims to give new evidence that content and language integrated learning (CLIL) is an effective alternative to conventional English as a foreign language (EFL) education for increasing students' vocabulary in secondary schools. As background to the study, CLIL is used to present natural English to EFL learners and contribute a lot for gaining communicative competence in language learning. This was accomplished first by determining the current level of competence among secondary school students using the KET exam, and then utilizing an experimental vocabulary pretest and posttest as an additional measure. The results were compared of students who participated in CLIL and those who did not in their last year of high school. Students in secondary school can express themselves well in a range of real-world settings, according to the results. According to student statistics, the method used is quantitative since students who complete the posttest outperform those who do not. It was concluded that the CLIL method displays both language and subject (e.g., math, art, and technology) in English at the same time. This creates an engaging and suitable learning environment for the students as they may share information on subjects other than language. Consequently, students find such technique of language acquisition is effective and fruitful since they develop their lexical competence naturally and contextually in real-life situations.

Keywords: CLIL, effectiveness, language vocabulary, secondary education, content

تأثر التعلم التكاملي للغة والمحتوى على المخزون الدلالي المفرداتي في المدارس الثانوية لدى الطلبة العراقيين دارسي اللغة الانكليزية لغة اجنبية

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الملخص

تهدف هذه الدراسة إلى تقديم دليل جديد على أن التعلم التكاملي للغة والمحتوى هو بديل فعال لتعليم اللغة الإنجليزية التقليدية كلغة أجنبية (EFL) لزيادة مفردات الطلاب في المدارس الثانوية. كخلفية للدراسة ، يتم استخدام التعلم التكاملي للغة والمحتوى لتقديم اللغة الإنجليزية الطبيعية لمتعلمي اللغة الإنجليزية كلغة أجنبية والمساهمة كثيرا في اكتساب الكفاءة التواصلية في تعلم اللغة. تم تحقيق ذلك أولا من خلال تحديد المستوى الحالي للكفاءة بين طلاب المدارس الثانوية الذين يستخدمون اختبار KET ، ثم استخدام اختبار مسبق ومفردات تجريبية كمقياس إضافي. تمت مقارنة النتائج بين الطلاب الذين شاركوا في التعلم التكاملي للغة

والمحتوى وأولئك الذين لم يشاركوا في السنة الأخيرة من المدرسة الثانوية. يمكن للطلاب في المدرسة الثانوية التعبير عن أنفسهم بشكل جيد في مجموعة من إعدادات العالم الحقيقي ، وفقا للنتائج. وفقا لإحصاءات الطلاب ، فإن الطريقة المستخدمة كمية لأن الطلاب الذين يكملون الاختبار اللاحق يتفوقون على أولئك الذين لا يفعلون ذلك. وخلص إلى أن طريقة التعلم التكاملي للغة والمحتوى تعرض كلا من اللغة والموضوع (مثل الرياضيات والفن والتكنولوجيا) باللغة الإنجليزية في نفس الوقت. هذا يخلق بيئة تعليمية جذابة ومناسبة للطلاب حيث يمكنهم مشاركة المعلومات حول مواضيع أخرى غير اللغة. وبالتالي ، يجد الطلاب أن تقنية اكتساب اللغة هذه فعالة ومثمرة لأنهم يطورون كفاءتهم المعجمية بشكل طبيعي وسياقي في مواقف الحياة الواقعية.

الكلمات المفتاحية: التعلم التكاملي للغة والمحتوى، مفردات اللغة، الفعالية، التعليم الثانوي، أختبار كيت

1. Introduction

CLIL is an active process or system of teaching and learning that focuses on the contents and abilities of two languages simultaneously. It emphasizes the significance of cognitive engagement in effective learning. It intends to construct knowledge which is built on their interaction with the world, learners need to learn how to work well in groups, solve problems, and ask good questions (Ramirez-Verdugo, 2024). The four pillars of CLIL—cognition, content, and communication—create an engaging learning environment with diverse language and topic area goals, in addition to cultural context. In our increasingly interconnected world, English is being recognized as a "basic educational skill to be developed from primary level alongside literacy and numeracy (Dalton-Puffer, 2011: 183), a key literacy feature worldwide (Coyle, et al., 2010: 9), and a prerequisite for individual success (Dornyei and Ushioda, 2011).

Students in CLIL classes learn to use language and use language to learn (Gurney and Wedikkarage, 2024), focusing on language and communication rather than grammar and vocabulary, which is a basic benefit over traditional English language learning classes since integrated learning focuses on both meaning and form. Students are encouraged to actively participate and generate comprehensive outputs using the CLIL method, which is based on communication and provides a rich and varied input (different genres, different language functions, academic language, classroom language, etc.) (Knapp & Seidlhofer, 2009: 567). In addition, CLIL stands out because it is becoming more conscious of how students learn and think in order to overcome the dual barrier of learning new material in a foreign language (FL) (Deizmas, 2016). Despite the fact that most of these studies focus on secondary schools, "while primary settings remain unexplored," the numerous studies that have shown the benefits of CLIL argue that this multifarious approach raises students' English proficiency levels. (Faouzi, 2023).

2.The Problem of the Study

Most Iraqi secondary school students encounter a problematic obstacle in vocabulary learning due to the conventional teaching followed and the syllabus design prescribed. Most Iraqi secondary school students face a problem in communicative situations or conversations and that belongs to the reasons of lacking sufficient vocabulary because the weaknesses in the input information students receive in the class.

3. The Study Questions and Hypotheses

1. Does CLIL raise the students' performance in lexical competence?

2. Does CLIL instruction provide more opportunities that the classical teaching does not?

The following hypotheses have been adopted:

1. CLIL instruction does not differ from the conventional teaching in the acquisition of vocabulary.
2. CLIL instruction has the same chances in providing the activities in the class that promote vocabulary competence.

4.The Aim of the Study

The current study aims at finding the importance of CLIL instruction on Iraqi school secondary students in vocabulary performance.

5.The Significance of the Study

The study has an important role in language acquisition. Through CLIL instruction, both teachers and students will have a great knowledge on how to deal with language from a communicative perspective; i.e., teachers will have the ability to act linguistically and interactively in the class in providing the suitable activities and strategies that support the lesson objectives. For students, they will pave the path in that students will become aware of on how to acquire vocabulary using CLIL instruction in which they can interact effectively using language in real-life situations.

6. CLIL

Using a second language to teach and learn about topics with a focus on both language and content is what makes CLIL such an effective approach to education

(Bigelow and Ennser-Kananen, 2015) and (Karasimos and Alexiou, 2023). According to Codo's (2024) study, there has been a noticeable uptick in CLIL projects in the past time.

Several concepts that have historically had a significant influence on education have influenced CLIL, according to Reynolds (2015: 214), making it a post-method pedagogy model. A lot of the features of CLIL are similar to those of additive bilingual education programs in the United States and Canadian immersion programs, which aim to develop both languages simultaneously, as opposed to subtractive bilingual education programs, which teach students a second language at the expense of their first language. But rumor has it that CLIL is more European in flavor. The term CLIL was widely used in Europe in 1994 and has been promoted as a major educational initiative inside the EU since the 1990s.

One of the most often cited benefits of CLIL is the improvement of oral and general language competency in the target language through increased student-teacher and student-to-student communication (Dale and Tanner, 2012: 11; Abello-Contesse, 2013: 256).
An additional purported benefit of this approach is that it helps children develop their emotional intelligence. Students appear more motivated to learn FLs in a classroom that focuses less on grammatical rules and more on meaning and communication because they feel less pressure and worry in such environment. Learning with a CLIL approach helps students relax and retain more of what they study. Many people feel that implicit learning can only occur in L2 realistic situations, immersion, or CLIL programs due to the high amount of exposure to the L2. Last but not least, some believe it can help improve a language's vocabulary. The fact that the FL in CLIL is utilized to convey knowledge in real communicative contexts makes language learning more relevant and effective, and this is partially connected to everything else. (Szubko-Sitarek et al., 2014: 75).
According to Coyle (2010, cited in Heras and Lasagabaster, 2015: 72), schools should embrace efforts to increase FLL since it helps ensure that students from all backgrounds, regardless of gender or socioeconomic position, have equal opportunities. It would appear that CLIL is aware of this, as CLIL programs have been implemented, albeit to varying degrees, by the federal education authority of Spain and several provincial authorities. When it comes to CLIL, Spain is quickly becoming a European leader in both practice and research.

6.1 Benefits of CLIL methodology

According to Dale and Tanner (2012: 14) CLIL has various advantages. Using CLIL promotes whole school development and creativity; it can be a strong motivator for introspection and rejuvenation. It might also be a spur for a university considering language policies. Usually, CLIL teachers get excited when they consider and talk about curriculum development, learning, and materials.

According to research, CLIL is beneficial for acquiring the target language's vocabulary, and students who participate in CLIL programs outperform their non-CLIL peers in FL proficiency (Dalton-Puffer et al., 2010: 285). According to Zarobe and Catalan (2009: 89), students that participate in CLIL classes often outperform their non-CLIL peers by a year or more.

This improved exposure to the FL, together with the fact that CLIL "replicates the conditions to which infants are exposed when learning their first language" (Mehisto et al., 2008: 26), explains why the FL was successfully acquired. Safer learning and participation environments are created, according to this theory, since the focus on content provides a purpose for language usage and reduces anxiety (Zarobe and Catalan, 2009: 82). According to Moghadam & Fatemipour (2014: 2006), one benefit of CLIL is that it impacts conceptualization, meaning how we perceive, based on the various "thinking horizons" that come from working in another language. This means that it does more than just increase language proficiency. If we can translate our thoughts into other languages, we may be able to better understand complex concepts and use our mental mapping abilities to their full potential. As a result, the learner is able to make better connections between different concepts and progress towards a higher level of understanding.

These findings suggest that CLIL students are more successful learners due to the increased mental effort required to learn content through a FL, as "linguistic problems, [...] often prompt intensified mental construction activity, resulting in deeper semantic processing and better understanding of curricular concepts" (Dalton- Puffer, 2008: 143). The foundational elements of the CLIL approach include student-centered learning, scaffolding for students' mental growth, awareness of diversity and various intelligences, and the development of both lower- and higher-order thinking abilities. One of the four pillars of CLIL—along with communication, content, and culture—is cognition, as one would expect according to the 4c's model. (Coyle et al., 2010: 41).

6.2 The Four C's of CLIL

Typically referred to as "4Cs," CLIL consists of four core elements. Every CLIL course should provide a set of exercises grounded on each of the four following

rules.

1:Content

Art, citizenship, economics, design and technology, geography, history, ICT, literacy, mathematics, music, PE, philosophy, religious studies, politics, social science, science, and technology are all part of the CLIL curriculum. In addition to gaining information and abilities, content-based learning encourages students to construct their own knowledge and understanding while honing their unique set of talents (individualized learning). Some CLIL programs foster cross-disciplinary connections. The art, history, and geography of a certain area might be some of the topics covered. Elementary schools are common places for this to happen. We need to analyze the language requirements of the subject and convey them clearly in various CLIL settings.

2. **Communication**

Students have to write and speak in topic language. We thus have to motivate students to participate in meaningful classroom discussion. Reducing TTT (teacher talking time) and increasing STT (student talking time) is the goals of CLIL. We should also encourage self-evaluation as well as peer and group remarks. When students acquire the target language while working on the curriculum, learners displaying subject knowledge and language skills integration show development. Using language-based learning tools helps communication to get more successful.
Language is a means for communication, not a goal in and by itself, hence its meaning is significant. Learning through that language helps one to recreate the information and its connected cognitive processes, therefore relating to the learning environment. Transparency and accessibility of this language are essential since engagement in the learning environment is basic for learning. This has ramifications when the learning environment functions via a FL media.

3. Cognitive ability

CLIL encourages cognitive abilities challenging students. Learners must grow in their cognition of thinking ability so they may learn topics from the curriculum. Content addresses cognition—that is, learning and thinking. It is necessary to examine the language requirements of the materials so that the students may develop their own interpretation of them; so, thinking processes (cognition) should be examined in terms of their linguistic requirements.

4. Culture

An integral component of CLIL education is the function of culture. CLIL is mostly about culture. Sometimes students must interact in a non-native language

with recent immigrants who can have varied social and cultural backgrounds as well as home languages. CLIL offers us chances to present a broad spectrum of cultural settings. It helps students to acquire good attitudes and who also become conscious of the obligations of local and worldwide citizenship. The link between languages and cultures is multifarious. Foundation of CLIL is intercultural awareness. Its proper spot is right at CLIL's core.

6.3 CLIL and Vocabulary Learning

Vocabulary is a crucial component of language learning. Vocabulary knowledge has several faces, according to Lombardino (2012: 27). In light of this complexity, in order for students to create a sufficient amount of high-quality L2 output, classroom teachers need to adopt a more holistic approach to vocabulary learning. According to Papaja and Can (2016), expanding one's vocabulary is an essential skill for readers and should be covered in reading classes worldwide. Vocabulary acquisition has been the primary emphasis of CLIL techniques as it is a commonly discussed aspect of language development. Vocabulary is taught in a more expressive way in a CLIL setting since it is used in real-life conversational contexts, which opens up more opportunities for learning. (Heras and Lasagabaster, 2015: 75).

According to Dalto-Puffer (2011), while talking about a certain field of expertise, it's important to use general terms rather than technical ones. The usage of broad vocabulary is present in CLIL classes, however it is not taught very often. Specialized vocabulary taught in a CLIL classroom is crucial for tasks that require speaking, writing, listening, or reading. Coyle et al. (2020) notes, however, that during a CLIL course, a teacher should introduce students to subject-specific vocabularies before moving on to more advanced terminology.

6.5 Scaffolding Strategies in CLIL Contexts

Scaffolding, according to many ELT specialists, is something quite different. According to one view, scaffolding is fundamental to CLIL lessons because it provides students with cognitive and linguistic input (Agudo, 2017). Teachers need to carefully choose and organize the support they offer students in order to activate their knowledge of both the foreign language and the subject matter. Here we summarize three recent research—Walqui (2006), Meyer (2010), and Mehisto (2012)—that specifically address the topic of scaffolding approaches employed in CLIL contexts. These studies highlight the unique nature of these methods. Walqui defines scaffolding as "both structure and process, weaving together several levels

of pedagogical support" and applies it to several levels of curriculum preparation, from macro-level to micro-level, from scaffolding to the contingent modification of support responsive to interactions as they develop. (Walqui 2006: 159). Because it offers scaffolding that is uniquely applicable to CLIL contexts, the author contends that learning knowledge through a FL in CLIL courses increases cognitive burden. According to Walqui, there are six "especially salient" instructional scaffolding methods that may be used in CLIL classrooms to support students' conceptual, academic, and language development (Walqui 2006). Teachers in CLIL classrooms use scaffolding tactics like modeling, bridging, contextualizing, schema building, text re-presentation, and metacognition development to help students learn. Students are able to construct their comprehension via several class activities, each offering a unique hint or perspective, rather than depending on a single chance to fully grasp the topics. This approach improves the linguistic and extralinguistic context. According to Walqui (2006), if... Table 1 provides her brief discussion of each sort of scaffolding.

Table 1 – Methods of Providing Support for Students' Learning (revised from Walqui 2006: 170-177)

Modelling	"Teacher provides clear examples for imitation"
Bridging	""Teacher creates bridges that build on knowledge and considerations"
Contextualizing	"Teacher enhances context to academic language (films, images, realia, metaphors and analogies)"
Schema building	"Teacher delivers thinking frameworks to help illustrate ideas (charts, advanced organizers)"
Re-presenting text	"Teacher grants the same content through using a variety of genres (represented as drama, narrative, report, exposition, tautological" transformation, theory, poem, third-person historical narratives, eyewitness accounts, scientific texts, letters, cooperative posters, …)
Developing metacognition	"Teacher grows students' learning skills for planning, monitoring, and assessing"

In order to establish quality standards for successful CLIL instruction and learning, Meyer (2010) developed a methodology for constructing linguistic and cognitive scaffolds. Meyer (2010) states that scaffolding is an essential part of good CLIL instruction, hence the author incorporates it into CLIL planning and teaching

processes along with study skills and learning techniques. According to him, students in CLIL classes have an easier time dealing with the diverse language inputs since their instructors provide them enough support. The use of language and content scaffolds in CLIL classrooms has several benefits, including lowering students' cognitive and linguistic load, increasing their language production, and motivating them to finish tasks effectively. Meyer created a technique for creating CLIL-quality materials called the "CLIL¬ Pyramid," which he said allowed students to go from lower-level to higher-level thinking through the use of scaffolding. The job's design and the medium's selection (texts, images, film, etc.) should reflect scaffolding tactics for producing high-quality CLIL material. The input type and the desired output determine the quantity and sort of input and output scaffolding that is needed. The intended output might be anything from text to a presentation to a painting or even just an outline. (see Figure 2).

In order to illustrate the use of the ten criteria he proposes for the development of top-notch CLIL resources, Mehisto offers many case studies (2012). The ninth need, which is essential to our study, is as follows: "quality CLIL materials should foster cognitive fluency through scaffolding of a) content, b) language, c) learning skills development helping students to reach well beyond what they could do on their own." While still offering enough scaffolding for language, topic, and learning capacities, the author proposes exercises that teachers may do in CLIL classes to encourage students' cognitive development and boost their independence. Educators can use the following materials, compiled by Mehisto, to build CLIL classes that improve students' language, topic, and learning skills:

Language can be scaffolded by: putting an emphasis on new nouns rather than pronouns; reducing the length of phrases and paragraphs; providing brief explanations of key idioms and language; the initial step is to have students come up with pertinent language concepts; arranging words and phrases in categories based on their function (e.g., tools, processes, and individual views); presented content in two side-by-side boxes using two distinct English registers; linking difficult words to computerized pronunciation and dictionaries; Using a website like wordsmyth.com or wordchamp.com

"**Content can be scaffolded by"**: Using visual organizers like Venn diagrams, tables, and charts; providing a planner ahead of time; allowing students to draw on their implicit knowledge and make personal connections to the subject matter in an introductory paragraph or assignment; omitting complicated phrases; condensing paragraphs; emphasizing or highlighting critical points or details; via the use of several subheadings; providing examples of excellent work or sample replies;

highlighting both the boundaries and the contents of a concept; providing media files with animation connections

"**Learning skills can be scaffolded by**":Incorporating tasks for planning, monitoring, and assessment; providing students with examples of well-executed work; posing questions that require them to infer meaning from context; and providing electronic examples of recasting and mistake correcting approaches. As stated by Mehisto (2012): 24 [24]

According to Bentley (2010: 71), scaffolding may be used to apply all four of the CLIL skills.:
• Activate previous subject knowledge.
Discuss what students might hear, say, read, or write.
• Generate vocabulary for hearing, speaking, reading, or writing using visual organisers.
• Inquire of students to prevent misinterpretation.
Give students opportunity to probe the assignments with questions.
• Guide students in connecting their past work to present ones.
• Promote speaking and participatory listening; reading and writing.
• Continually provide spoken comments on students' development.
• Comment— orally or in writing—on how effectively students have completed their task.
• Let L1 be used specifically for certain tasks, such turning on past knowledge of subject matter.
• Motivational peer and self-evaluation of student performance.

7. Data Collection Procedures

7.1 Participants

The current study includes all fourth-year Al-Maymona secondary school, Directorate of Misan, Missan, Iraq, students for the 2018–2019 academic year. With 43 students in the first and 43 students in the second, the secondary school boasts two classes: A and B. The experimental group (henceforth EG) is Group A; the control group (henceforth CG) is Group B.

7.2 Tools of Measurement

Below are the resources used in this study as well as the included built-in activities among the students. EG students examined the English literature the Ministry of Education publishes and distributes. Public school students looked at the regular English books. Through these texts, they studied English versions of mathematics, science, arts, and technology. They had to do the regular KET Test to guarantee

their equality in vocabulary knowledge and measure and control the participants' degree in English ability. There are fifty multiple choice, writing, and matching tasks on this test battery. There forty minutes needed to finish the test.
Designed by the researcher, the second test had a pretest-posttest experimental design based on vocabulary. Written based on the words most often found in the books, this test was first tested using several samples with the same English knowledge level together with computing the indexes of item analysis and test reliability. Following the standardising process, the participants' test consisted of multiple choice questions was handled. Thirty-five minutes were the allotted time.

7.3 Data analysis

Building on data collection, the participants' achievement on the standard vocabulary test was measured with respect to vocabulary development of students.

7.3.1 Comparison between the Vocabulary Performance of EG and CG on the Achievement Post-test

The CLIL-students shine above the non-CLIL students. The mean scores of the EG and CG on the accomplishment post-test are compared using the t-test procedure for two independent samples. Whereas the typical score of the CG is 41.24, the mean score of the EG is 58.18. At 0.05 level of significance and 98 degrees of freedom, the computed t-value is 4.618; the tabulated value is 1.987. This shows that both groups have a statistically significant variation; that is, the EG OR CLIL students had higher vocabulary achievement than the CG or non-CLIL students. This implies that the Facebook the study used and found more efficient than the conventional methods of vocabulary education (see Table 2).

Table (2) Comparison between the Vocabulary Performance of EG and CG on the Achievement Post-test

Group	No.	M	SD	DF	t-value		Level of Significance
					Calculated	Tabulated	
EG	43	58.18	13.83	98	4.618	1.987	0.05
CG	43	41.24	11.23				

7.3.2 Comparison of the Pre-test and the Achievement Post-test of the EG Performance

While in the achievement post-test the EG's mean score is 58.18, in the pre-test it is 39.95. The mean scores are shown statistically significantly either way using the t-test procedure for paired samples or otherwise. Calculated t-value is -13.674; tabulated value is 2.012 at 0.05 level of significance and 49 degrees of freedom. This suggests a statistically significant difference; the application of CLIL helps the EG to reach a vocabulary repertoire higher than that of the CG. Consequently, the already provided null

hypothesis is disproved.

(Table 3). Comparison of the Pre-test and the Achievement Post-test Performance of the EG

Type of Test	No.	M	SD	DF	t-value		Level of Significance
					Calculated	Tabulated	
Pre-test	43	39.95	17.12	49	-13.674	2.012	0.05
Post-test	43	58.18	16.11				

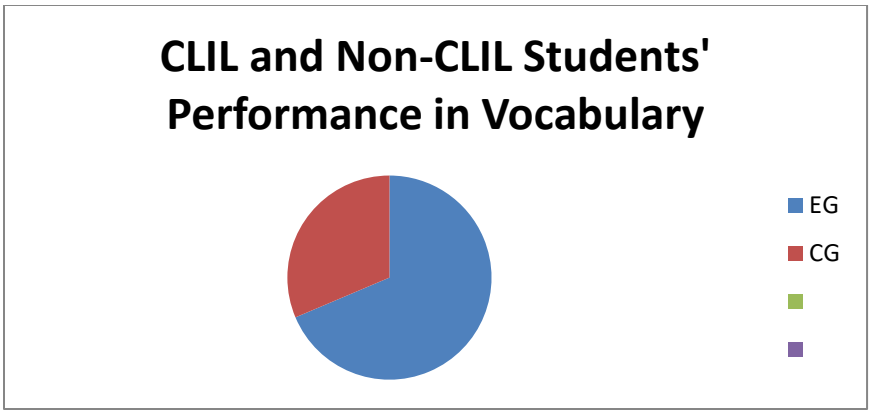

Figure (1) EG and CG Students' vocabulary repertoire in posttest

7.4 Discussion

As said before, sine EG students beat the CG. This is the result of using the CLIL approach. The aim of the project was to clarify how CLIL affects secondary school Iraqi EFL students' vocabulary growth. Public schools apply the conventional method using books supplied by the Iraqi Ministry of Education. Memorising vocabulary as word lists helps students acquire it; they should aim to utilise it in phrases and engage orally or in writing. Conversely, EG uses the CLIL approach with the English-written special books for science and maths courses. Students pick up these disciplines when English is their language of teaching. As it was evident, EG and CG students have very different accurate responses to the vocabulary test. Consequently, it may be said that vocabulary growth and CLIL have a correlation.

Furthermore, the association is positive; the CLIL helps EG students to enhance their vocabulary. This study presents a first effort to experimentally investigate how CLIL might help Iraqi EFL students retain their vocabulary and improve their performance. More research is needed for an in-depth knowledge of this topic and for validation of the conclusions expressed in this work. This is especially true considering that, although not included in this study, there could be other factors influencing intrapersonal effects depending on learning styles preferences.

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Lesson plan from (Lesca, 2012: 7)

LESSON AIMS – Content:

By the end of the lesson the students will have greater understanding of what light is, how different mediums affect the path through which light propagates (laws of refraction and reflection), what total reflection is and what total reflection can be used for.

LESSON AIMS – Language:

The students will have expanded their vocabulary in the field related to optical physics and optical fibers.

They will have practiced the use of prepositions of space and expressions to locate a path in the space.
They will have practiced the impersonal language to speculate about scientific and technological topics.

Stage	Procedure
Stage 1 (introduction)	Stage 1 (introduction) Students get information by listening to the teacher.
Stage 2 (checking previous knowledge)	Students read a list of phrases and fill in the matching words.
Stage 3 (expanding knowledge and specific language)	Students expand their knowledge about the creation of light and the law of refraction by looking at diagrams at the black board.
Stage 4 (practicing functional language and checking the knowledge)	Students use their language and special knowledge to find out the right answer for some questions. They analyse a picture and discuss their opinions.
Stage 5 (expanding knowledge)	Students get information by listening to the teacher and looking at a diagram.
Stage 6 (developing reading skills)	Students read text and do a true-false and a gap exercise. They compare answers with partner
Stage 7(Developing cognitive skills (predicting))	Students guess what might happen when the incidence angle is increased and light encounters the boundary with a lower refraction index. Work in pairs.
Stage 8 (Developing reading skills) Expanding vocabulary (specialist vocabulary for optical fibers)	Students read a text to check if their prediction was right (scanning). Students read the rest of the text to find out how total reflection is related to the functioning of optical fibers (skimming).
Stage 9 (Practicing language)	Students look at a list of verbs and a list of prepositions used in the text given at the previous stage and try to

	match verbs and prepositions according to that text.
Stage 10 (Developing cognitive skills (reasoning))	Students choose from a given list of technological applications which of them might use optical fibers and explain why optical fibers are suitable for that specific purpose. Work in pairs or groups.