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EFFICACY OF CONTENT AND LANGUAGE INTEGRATED LEARNING (CLIL) PEDAGOGICAL TECHNIQUES IN IMPROVING AVIATION STUDENTS' ENGAGEMENT IN ATTAINING SPECIFIC LEARNING OUTCOMES

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Abstract. *English has been selected as the language of science and technology motivating non-native researchers and scientists to learn the language to have access to different documents and references written in English. One of the most significant current views regarding English used for specific purposes in the past few decades has been the integration of language learning with subject-matter content. Research shows that, by using CLIL, language and content receive attention at the same time because such integration can significantly improve language performance in the target language without devoting extra time to teaching efforts. Students participate more in the classroom and also report a better understanding of course concepts when steps are taken to actively engage them. Therefore, the locus of this Quasi- Experimental study was to examine the impact of studying special content while using English language on aviation students' engagement to enhance learning and compare it with a traditional class. The paper described the differences between these two settings by means of a mixed method design, both quantitative and qualitative. The instruments of the study were posttest, questionnaire based on a Likert-scale, and semi-structured interview. Results of this study showed higher engagement of aviation students in CLIL class, and positive effect on improving their learning outcome.*

Key words: *CLIL, engagement, motivation*

1. INTRODUCTION

In the context of a global world, foreign language learning (FLL) is now much more important than ever before. Therefore, finding adequate methodological approaches and efficient environments for language acquisition is a social concern. More recently, the English language has become an increasingly important source in teaching situations where learners' specificity of purposes and needs play a very important role in educational contexts. English is now being looked upon as one of the most useful subjects in modern curriculum, simply because learning English is regarded as the most prevalent medium through which scientific discussions in almost all educational programs are actualized.

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Not surprisingly, English has been selected as the language of science and technology, motivating non-native researchers and scientists to learn the language to have access to different documents and references written in English.

One of the most significant current views regarding English used for specific purposes in the past few decades has been the integration of language learning with subject-matter content. This trend has evoked great interest in Europe and other parts of the world (Banegas, 2011; Coyle, Hood & Marsh, 2010; Dalton-Puffer, 2007; Lyster & Ballinger, 2011; Moate, 2010). Evidently, CLIL has gained a remarkable momentum across Europe since the 1990s, and it is considered a new pedagogical model for second language education in contexts where specificity of purpose is paramount. The main objective in this approach is to teach content by using a foreign language.

In addition, engagement plays an important role in students' learning. It is one of the most effective and useful points that has attracted the researcher to facilitate learning. Learners' engagement is their willingness to participate in and be successful in the learning process. This will happen when they are attracted to their lesson and work, and take visible delight in accomplishing their work. Windham (2005) stated that, in order to engage learners in learning, new educational curriculum, activities must include such as relevancy, multimedia and instruction, interaction, and exploration.

Some studies have indicated that, by using CLIL, language and content receive attention at the same time because such integration can significantly improve language performance in the target language without devoting extra time to teaching efforts. This creates a realistic situation, which helps students pick up the foreign language in an environment like naturalistic settings. Thus, CLIL makes a real-life situation for language development and motivates the students toward learning a language. According to Marsh (2000), CLIL success relates to both language and content learning. Naturally, when content and language are integrated, students will have an opportunity to acquire both Basic Interpersonal Communications Skills (BICS) and Cognitive Academic Language Proficiency (CALP). BICS relates to all the social language skills and CALP to language skills, coping with the academic requirements (Cummins, 2000).

It can be stated that different points in CLIL class, increase students' engagement that leads to enhancing learning, as CLIL is the right choice for the learner-centered methodologies whose aim is to improve learning by paying attention to individuals' needs in terms of activating learners' social thinking skills. These dimensions of CLIL will increase learner's engagement, in which it is very important, and it is at the heart of all education.

By looking at CLIL in the subject area of aviation and pilot education, this study, therefore set out to assess the effect of CLIL on pilot students' engagement to improve learning and compare it with traditional teaching.

1.1. Research question

This research seeks to address the following question:

RQ: Does the implementation of CLIL improve Aviation students' engagement in learning the content and language knowledge?

1.2. Hypothesis

The hypothesis that will be tested is that:

H: CLIL class increases students' engagement in content and language learning.

2. Literature Review

Marsh (2002) defined an innovative way of teaching and learning that is CLIL. CLIL refers to situations where subjects are taught through foreign language with dual-focused educational approach, in which one selected language is used for learning and teaching of the both language and content with the objective of promoting both language and content mastery to pre-defined levels. Generally, CLIL consists of teaching content and language simultaneously; students learn both at the same time. In CLIL class, the instructor uses an additional language to make teaching more useful, so changing the medium of instruction requires changing the method of instruction. In Europe, CLIL is widely accepted and commonly used for teaching the content subject through a foreign language (Wolff, 2009).

Furthermore, CLIL is like and corresponds to Krashen's (1982) Monitor Model, and input hypothesis (1988). Based on monitor model, learned language can only be used as an editor that makes changes to language production. On the other hand, the input hypothesis expresses that acquisition will happen when students are exposed to comprehensible input, which is beyond the current level of learner's ability as i+ 1.

Krashen and Terrel (1988) in the natural approach identified that ability to communicate in another language and use it directly without instruction in its grammar through practicing the language and communicating it in real situations, allow natural use of language for particular purposes. Therefore, everyone can acquire language when having the desire or need to do so, and use it in real communicative purpose. Children first language abilities are closely considered as language acquisition, that is subconscious (Krashen, 1982).

CLIL has a social constructivist view, so it can influence the way of learners' thinking and processing new knowledge. It develops learners' ability to comprehend concepts. According to social constructivist approach, learners and teachers need to interact. Therefore, this interaction supports learning which is known as scaffolding. It means guidance and support to students carried out by his/her teachers or sometimes by other classmates. It helps learners to solve problems, do activities, and encourage their production (Van de Craen, 2001). Scaffolding in the CLIL context relates to linguistic difficulties and all measures taken that facilitate the accessibility and handling of themes. In CLIL class the instructor uses educational setting to support learning processes, different kinds of media such as images, maps, diagrams, tips, glossaries, visual strategies, questionnaires, reading or writing strategies (Inglin, 2013) which have the scaffolding-function by making the matter of discussion more accessible. Scaffolding in CLIL is an essential component, which support language production (Belinchon, 2009).

By considering Vygotsky's Zone of Proximal Development (ZPD), there is a difference between what someone can learn alone and what a learner can achieve through support, guidance and scaffolding. Generally, in CLIL and its social constructivist method, teachers need to promote cognitive challenges that are within the students' ZPD (Coyle, et al., 2010). Additionally, it should be considered that teaching non-lingual subject in a foreign language could develop an intercultural understanding of international interaction. Coyle developed the 4Cs framework in order to work out a conceptual tool for CLIL setting. Based on this framework, the focus is not on the language curriculum, but rather on the content such as themes or subject matters, so it is different from other educational language methodologies. Coyle's concept focuses on the interrelation between Content, Communication (language), Culture (awareness of perspective), and Cognition (thinking).

CLIL is a more successful way of second language acquisition as it is learnt for immediate use and for real purposes. Goris (2009) informed that CLIL is one-step further than the communicative approach because it is in real situation and does not have to simulate real-life situations so CLIL language learning uses authentic settings for a real purpose, which means content. Interaction is a fundamental prerequisite for learning to take place. Through interaction and communication, learners practice their language skills, and discuss the content to which they are exposed.

CLIL promotes meaningful interaction and creativity. The world needs creativity, problem-solving, and innovation to face the challenges of the 21st century in the global economy. Students prefer dealing with questions rather than answers, sharing their opinions, participating in group projects, working with real-world issues and people, having teachers who talk to them as equals rather than as inferiors.

In research by Dalton-Puffer, Huttner, Schindelegger, and Smit (2009) in Austrian vocational colleges to investigate what CLIL students think about the approach, they reported that the students found the course useful, the teacher allowed for more equality and diversity in the teacher-student relationship in the classroom. Both the teacher and students were responsible for the learning process, as higher student activity enhances the learning. CLIL fires up the brain; it involves memory, speed, attention, problem solving and flexibility. In this type of class subject knowledge is motivation to learn a new language. Working on the subjects causes students to use their cognitive skills. During the course of this class the learners are hardworking, participating in the activities with interaction, and respectful relationships, they make a psychological investment in learning which increases their engagement. These are different factors for their understanding and learning the material. Student engagement also refers to student's need, desire and compulsion to participate in class activity that promotes higher level thinking for enduring understanding.

As Friesen mentioned in Dunleavy & Milton (2009), real intellectual engagement calls for a deeper reciprocity in the teaching-learning relationship where learners' engagement starts as they actively improve their learning in partnership with instructors, work closer to deep conceptual understanding, and use their own thoughts to building new expertise or devising new practices in activities which are "worthy of their time and attention" (Friesen, 2008, p. 8, as cited in Dunleavy & Milton, 2009, p. 14). Such teaching contains more negotiation, interaction, and exploration among learners and instructors, who explore and discuss content material together, regularly with teachers modeling learning as opposed to telling students what the answers, process, or outcomes have to be (Claxton, 2007).

3. METHODOLOGY

3.1. Design of the study

The study was based on a mixed method approach. Quantitative research tends to test hypotheses and perform statistical analyses. In this Quasi-Experimental design the researcher examined the effects of engagement on students in CLIL class.

By qualitative research the researcher will find complete understanding and description of phenomena in the area of investigation.

3.2. Setting

This study was carried out during Aviation courses in 2016 in Tehran, Iran. Pilot students begin their courses with a unique international book named *Private Pilot Manual* as their reference book; this book is based on the study concepts of learning with detailed materials in an uncomplicated way. It consists of different parts, such as 'Meteorology for Pilots', 'Interpreting Weather Data', 'Radio Navigation Systems', and so forth. All these materials are in English language with aviation special concepts and terminology.

3.3. Instruments

The necessary information (both qualitative and quantitative) in the present study was gathered by means of posttest, questionnaires, and semi-structured interview. The researcher used these instruments to find the outcome of the studied classes, such as participants view, behavior, and beliefs due to the qualitative phase of the study, and the students' development in learning due to quantitative phase.

At the end of the course for each class, there was a posttest to evaluate and compare language learning and content learning among the students in the two classes under the study. Posttest was based on ICAO standard questions booklet. By analyzing the result of the posttest, the researcher found the effect of engagement in learning enhancement.

According to Dornyei (2010), questionnaires are the most often-employed data collection devices in statistical work. After posttest, questionnaires were distributed by the researcher, the data were collected using a 20-item questionnaire including three main parts based on their level of cognitive development, collaborative learning, and personal skills. In this study the questionnaires had four-point Likert scale format of Engagement Questionnaires, based on the National Survey of Students Engagement (NSSE) range from "Very little" = 1 to "Very much" = 4, or from "Never = 1" to "Very often = 4". The Likert-scale questionnaire was analyzed using Statistical Package for the Social Sciences (SPSS).

Semi-structured interview was one of the other instruments in this study. As indicated by Long (2005), one of the most direct ways of finding out what people think is to ask them questions through different kinds of interviews and questionnaires. The advantage of it, is that by using this method, the respondents' answers can be followed up by the interviewer and provide deeper information and clarification. The main goal in interviewing the students was to find out the effect of engagement on their learning.

3.4. Procedure

Prior to the study, the training headmaster had been given a letter of consent. The letter was included a brief explanation of the intended study and the implications it would have for the department, confidentiality and personal data processing clauses. However, all the students will have to pass entrance exam, which is almost similar to a general proficiency test of English. In aviation, those who obtain a score above 75 will be considered legible for attending aviation EOP and content courses.

At the end of the course there was a final test, the researcher considered this as the post-test. All the questions for each semester were derived from ICAO Booklet. This test included 50 items in 60 minutes, and the cut off score was 70. The researcher used posttest result to calculate each student's score. She can run a regression analysis and can

determine if there was or was not a statistical relationship between the engagement and gaining knowledge in different teaching method.

After designing the Likert Scale questionnaires based on NSSE questions about students' engagement, it was piloted on a similar group to ensure that the questions were understandable for the participants, it could show validity of the questionnaire. Some experts checked the questionnaires in terms of appropriateness of the questions asked. It was also needed to estimate the reliability. Therefore, the researcher conducted the pilot test to receive feedback, then she designed final version of the questionnaires. Finally, after the posttest these questionnaires were distributed to the participants for collecting information. Therefore, the researcher investigated the participants' attitude, and the influence of engagement on their content and language learning.

In the qualitative phase of the study, the researcher gathered data by interview, in this part the researcher used semi-structured interview; some pre- determined questions like structured-interview with some participants to find precisely their perception about different parts of the questionnaire which was related to their engagement in the two classes. Then this part was analyzed qualitatively and it could be a confirmation of the outcome of the questionnaires as well.

3.5. Participants

Subjects in this study were recruited from students in Pilot Training Center in Tehran, Iran, during winter 2016. There were two forms of classes under the study, traditional class and CLIL class, consist of 16 students in each.

4. Result and Discusion

The purpose of analyzing data is to obtain useable and useful information. The analysis may describe and summarize the data, identify relationships between variables, compare variables, identify the difference between variables, and forecast outcomes. As previously stated, the data was obtained through the first and second phases of the study. The collected data and information were analyzed in relation to the overarching research question posed in this research. This analysis could ensure validity and reliability of the gathered data.

In analyzing the statistics, first the responses for every questionnaire item had been coded manually in Microsoft excel file. Posttest was used to compare variables, after which, Statistical Package for Social Science (SPSS) was used. At that point, the results were compared in the two studied classes to find out the target results among different forms of these classes by comparing variables. In view of the outcome of the posttests and collected data from other research instruments, the research hypothesis was tested and analysis was illustrated.

The present study is an attempt to explore the effect of content and language integrated learning (CLIL) on the improvement of the aviation students' engagement learning. To achieve these goals the research question and its hypothesis were under the study.

The data were analyzed using multivariate ANOVA (MANOVA) and independent-samples t-test which assume normality of the data and homogeneity of variances of the groups. Since the ratios of skewness and kurtosis over their standard errors were lower than the absolute value of 1.96 (Table 1), it can be claimed that these data enjoyed normal distribution.

Table 1 Descriptive statistics; testing normality assumption

Group		N	Skewness			Kurtosis		
		Statistic	Statistic	Std. Error	Ratio	Statistic	Std.Error	Ratio
CLIL	Learning	16	-.118	.564	-0.21	-1.415	1.091	-1.30
	Cooperative	16	.109	.564	0.19	-.688	1.091	-0.63
	Cognitive	16	-.343	.564	-0.61	-.621	1.091	-0.57
	Personal	16	-.705	.564	-1.25	-.190	1.091	-0.17
Traditional	Learning	16	.612	.564	1.09	.000	1.091	0.00
	Cooperative	16	-.060	.564	-0.11	-1.171	1.091	-1.07
	Cognitive	16	-.555	.564	-0.98	.772	1.091	0.71
	Personal	16	-.005	.564	-0.01	-1.067	1.091	-0.98

Hypothesis

CLIL class increases students' engagement in content and language knowledge.

A MANOVA was run to compare the CLIL and traditional groups' means on the three aspects of students' engagement in learning; i.e. cooperative learning, cognitive level variable and personal skills. Before discussing the results, it should be mentioned that the assumption of homogeneity of covariance matrices was met (Box' M = 11.38, p = .119) (Table 2). That is to say; the correlations between the three variables were roughly the same across groups.

Table 2 Box's test of equality of covariance matrices

Box's M	11.381
F	1.690
df1	6
df2	6520.755
Sig.	.119

According to the results displayed in Table 3, it can be claimed that the assumption of homogeneity of variances was met ($p > .05$).

Table 3 Levene's test of equality of error variances

	F	df1	df2	Sig.
Cooperative	3.479	1	30	.072
Cognitive	.147	1	30	.704
Personal	2.980	1	30	.095

Based on the results displayed in Table 4, ($F(3, 28) = 138.15$, $p = .000$, Partial $\eta^2 = .937$ representing a large effect size) it can be concluded that there were significant differences between the CLIL and traditional groups' means on the three dimensions of engagement. Thus, CLIL class significantly increased students' engagement in learning the target goals.

Table 4 Multivariate tests; dimensions of engagement by groups

Effect		Value	F	Hypothesis df	Error Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.995	2038.240	3	28	.000	.995
	Wilks' Lambda	.005	2038.240	3	28	.000	.995
	Hotelling's Trace	218.383	2038.240	3	28	.000	.995
	Roy's Largest Root	218.383	2038.240	3	28	.000	.995
Group	Pillai's Trace	.937	138.156	3	28	.000	.937
	Wilks' Lambda	.063	138.156	3	28	.000	.937
	Hotelling's Trace	14.802	138.156	3	28	.000	.937
	Roy's Largest Root	14.802	138.156	3	28	.000	.937

Based on the results displayed in Table 5 and 6 it can be claimed that;

A: The CLIL group (M = 33.75) significantly outperformed the traditional group (M = 21.79) on the cooperative learning (F (1, 30) = 105.54, p = .000, Partial η^2 = .779 representing a large effect size).

B: The CLIL group (M = 33.25) significantly outperformed the traditional group (M = 17.37) on the cognitive level variable. (F (1, 30) = 149.43, p = .000, Partial η^2 = .833 representing a large effect size).

Table 5 Tests of between-subjects effects; dimensions of engagement by groups

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Group	Cooperative	1143.018	1	1143.018	105.541	.000	.779
	Cognitive	2016.125	1	2016.125	149.435	.000	.833
	Personal	1815.031	1	1815.031	253.689	.000	.894
Error	Cooperative	324.902	30	10.830			
	Cognitive	404.750	30	13.492			
	Personal	214.636	30	7.155			
Total	Cooperative	26151.562	32				
	Cognitive	22924.000	32				
	Personal	26758.959	32				

C: The CLIL group (M = 35.33) significantly outperformed the traditional group (M = 20.26) on the personal skills (F (1, 30) = 253.68, p = .000, Partial η^2 = .894 representing a large effect size).

Table 6 Descriptive statistics; dimensions of engagement by groups

Dependent Variable	Group	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Cooperative	CLIL	33.750	.823	32.070	35.430
	traditional	21.797	.823	20.117	23.477
Cognitive	CLIL	33.250	.918	31.375	35.125
	traditional	17.375	.918	15.500	19.250
Personal	CLIL	35.330	.669	33.965	36.696
	traditional	20.268	.669	18.902	21.634

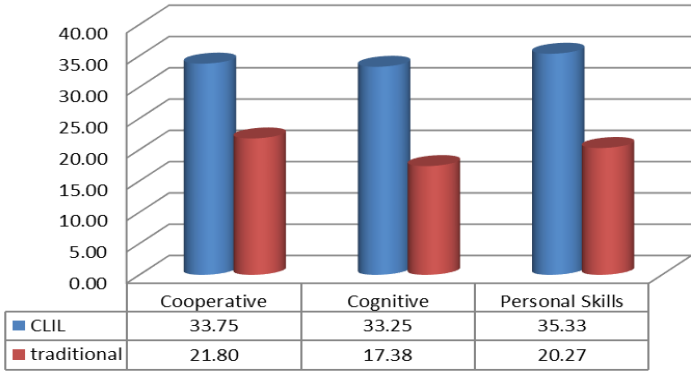

Fig. 1 Means on dimensions of engagement by groups

An independent t-test was run to compare the CLIL and traditional groups' means on the content and language learning in order to probe content and language learning based on the research question posed in this study. According to the results displayed in Table 7 it can be claimed that the CLIL group (M = 85.88, SD = 6.01) had a higher mean than the traditional group (M = 80.88, SD = 5.36) on the content and language learning.

Table 7 Descriptive statistics; content& language learning by groups

Group		N	Mean	Std. Deviation	Std. Error Mean
Vocabulary	CLIL	16	85.88	6.021	1.505
	traditional	16	80.88	5.365	1.341

The results of the independent t-test (t (30) = 2.48, p = .019, r = .412 representing a moderate to large effect size) (Table 8) indicated that there was a significant difference between the two groups' mean scores on the content and language learning. Thus, the directional hypothesis was supported.

Table 8 Independent samples t-test; content and language learning by groups

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	.904	.349	2.480	30	.019	5.000	2.016	.883	9.117
Equal variances not assumed			2.480	29.610	.019	5.000	2.016	.880	9.120

It should be noted that the assumption of homogeneity of variances was met (Levene's F = .904, p = .349). That is why the first row of Table 8, i.e. "Equal variances assumed" was reported.

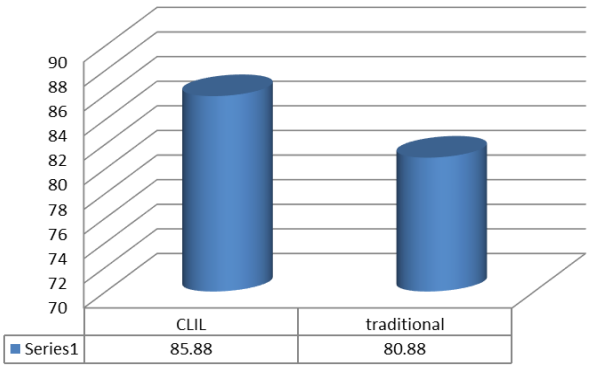

Fig. 2 Content and Language learning by Groups

KR-21 Reliability Indices

The KR-21 reliability indices for the content and language learning, cooperative, cognitive and personal skills were .64, .84, .90 and .89 respectively (Table 9).

Table 9 Descriptive statistics; KR-21 Reliability Indices

	N	Mean	Std. Deviation	Variance	KR-21
Content and language learning	32	83.38	6.158	37.919	.64
Cooperative	32	27.77	6.881	47.352	.84
Cognitive	32	25.31	8.837	78.093	.90
Personal	32	27.80	8.092	65.473	.89

5. CONCLUSION

The results of this study revealed important information about the effect of students' engagement during teaching in class activity. It showed that the real purposes in the content, interaction and communication, creativity, immediate use of language, and participating in group activity in CLIL class enhance students' attention which leads them to better learning and understanding of the content matter and English language at the same time during the course. But in non CLIL class the students do not have these authenticity of the setting and performance so there are lower engagement levels in this class, perhaps due to traditional instructional methods used to a lesser degree or no engaging at all. It was also found that the level of engagement depends on the way of teaching. This study demonstrated the pattern of higher engagement occurring in CLIL classes and stated that instructor should engage students in the class activities, therefore higher engagement causes better education, language learning, and skills development.

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