

The impact of interdisciplinary Project Based Learning on young learners' speaking results

ENEKO CABANILLAS HILARIO

ORCID no: 0000-0002-9517-1691

Department of Education of the Basque Country (Spain)

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ABSTRACT: The aim of this research study is to analyse the impact of interdisciplinary Project Based Learning (PBL) for English as a Foreign Language (EFL) teaching on speaking skill results. A quasi-experimental design was selected to that effect, with a control group (24 participants) and an experimental one (22 participants) from the 5th grade of Primary Education, in the bilingual region of The Basque Country (Spain). The intervention for the control group was founded on a traditional method, whereas the experimental one was developed through interdisciplinary projects. Furthermore, the effect of the method on students' motivation was measured as well. There was no initial difference between the groups, but there was a statistically significant difference, associated with the instruction method, in the experimental groups' post-test speaking results. Moreover, data showed a significant difference in motivation in favour of the control group. Notwithstanding, the variance of the groups for the results in motivation were different. The findings revealed that the effect of the interdisciplinary PBL to EFL teaching was greater on the speaking results. Nevertheless, the difference in motivation could not be directly attributed to the training method.

Key words: Project Based Learning, oral expression, EFL, interdisciplinary, motivation.

El efecto del Aprendizaje Basado en Proyectos interdisciplinarios en la expresión oral de aprendices jóvenes

RESUMEN: El objetivo de esta investigación es analizar el efecto del Aprendizaje Basado en Proyectos (ABP) interdisciplinarios para la enseñanza del inglés como lengua extranjera en los resultados de la expresión oral. Se seleccionó un diseño cuasi-experimental, con un grupo control (24 participantes) y un experimental (22 participantes) en 5º curso de Educación Primaria en la región bilingüe del País Vasco (España). La instrucción para el grupo control se cimentó en un método tradicional, mientras que para el experimental en proyectos interdisciplinarios. Asimismo, se midió el efecto del método en la motivación de los estudiantes. No se observaron diferencias iniciales entre los grupos, pero existió diferencia estadísticamente significativa, atribuida al método de enseñanza, en los resultados del post-test de expresión oral en el grupo experimental. Además, los datos mostraron diferencia significativa en la motivación a favor del grupo control. Sin embargo, las varianzas de los grupos fueron distintas. Los resultados revelan que el efecto del ABP interdisciplinarios para la enseñanza del inglés como lengua extranjera fue mayor en los resultados de la expresión oral. Aun así, la diferencia de motivación entre grupos no se pudo atribuir a la metodología de intervención.

Palabras clave: Aprendizaje Basado en Proyectos, expresión oral, Inglés como Lengua Extranjera, interdisciplinar, motivación.

1. INTRODUCTION

Globalisation is commonly understood, nowadays, as a complex process of economic, political, social, technological and cultural interdependence between different nations (Coppelli Ortiz, 2018). In this regard, this process entails necessary communication among different nations, which, in turn, implies the use of a lingua franca, such as English, as this occupies an important place for international transactions.

Apart from that, The Basque Autonomous Community, where this research takes place, is one of the three other bilingual regions in Spain, since both Basque and Spanish are officially used in society, administration and schools, both as languages of instruction and as subjects. In this context, the current Basque educational law Heziberri 2020 (Departamento de Educación, Política Lingüística y Cultura del Gobierno Vasco [DEPLCGV], 2015), being an adaptation of the national legislation, establishes the compulsory nature of being competent in, at least, one foreign language (FL), which is English in 99% of the schools in this region (Aliaga, 2010).

Regarding the results in linguistic communication in English, the Basque Government carried out the research study, Marco de Educación Trilingüe (MET), which may be translated as Framework of Trilingual Education, (DEPLCGV, 2014). The working group estimated that for 6th grade of Primary Education (PE) the reference level of the Common European Framework of References for Languages (CEFR) should be A2. Notwithstanding, only 13% of the control group, who received the minimum weekly hours established by law, and 34% of the experimental group, who received 20% of their weekly timetable in English, achieved A2 or higher level.

Generally, in Spain, English is introduced in kindergarten, aged 3-5, in 81.9% of the schools and taught to 98.5% of the pupils in Primary Education (Ministerio de Educación y Formación Profesional, 2016). Nonetheless, the European Commission (2019) showed that only 54.3% of the Spanish population in 2016, aged 25-64, knew one or more foreign languages.

With the aim of overcoming the aforementioned results on the prevailing social need for interaction and the current educational legislation, language educators continually reflect on the best innovative method for FL teaching. In this regard, Jabeen (2014) recognises that any change in previous customs and trends generates reactions of all kinds. Hence, it is essential to learn about students' attitudes and motivation regarding any potential methodological change, in order to consider it as an actual possibility for implementation at any given school.

Regarding methodology, Condliffe (2017) points out that the latest education reforms seem to be emphasising deeper learning and other 21st century competencies for success. In fact, these may be summarised as critical thinking, communication, team building, problem solving, creativity and collaboration, which constitute the need for the development of interdisciplinary competencies (Brassler & Dettmers, 2017). This new perspective aligns with the objectives of Project Based Learning (PBL). Despite this focus, more rigorous evidence is needed to confirm the efficacy of this method, especially in literacy classes, as, thus far, it is more limited than in other subjects (Condliffe, 2017).

Consequently, the objective of this study is to analyse how interdisciplinary PBL methodology affects young students' English speaking results and their motivation.

2. STATE OF THE ART AND THEORETICAL FRAMEWORK

2.1. Previous Studies

In the review of literature, regarding the connection between the use of PBL and the EFL results in students' speaking skills, Condliffe (2017) carried out a review of studies that suggested that PBL positively affects students' outcome by providing them with more speaking time in English. Furthermore, Dewi (2016) defends that not only does PBL improve students' speaking results, but it also motivates and allows them to become more confident in speaking English. As far as the focus of this research study is concerned, Ya-Ting, Yi-Chien and Hsiu-Ting (2020) recommend the implementation of interdisciplinary projects in order to help students improve their English speaking skills and creativity. According to Sanz and Sánchez (2021), PBL contributes to an improvement in the communicative and interactive skills, specifically in the listening and speaking competences, as well as in their intrinsic motivation, creativity and autonomy.

In fact, Sanz and Sánchez (2021) consider PBL as one of the effective hands-on methods that are closely related to the Communicative Approach (CA) or Communicative Language Teaching (CLT). Furthermore, according to Armentero Reboredo (2021), a CA comprises current trends and methodologies regarding foreign language didactics, PBL being one of those. This author defends the interdisciplinary principles of PBL, as well as the presence of real contexts in the learning process. Additionally, the researcher encourages the utilisation of ICT, due to the active and motivational learning conditions it provides.

Zardini and Bernabé (2013) found that a CA is more effective, under specific conditions, in improving interactive skills and promotes student motivation towards learning. Alternatively, they indicated that the method focused on the teaching of grammar lacks real exposure to the language. In this regard, Agbatogun (2014) compared an EFL teaching method based on a CA with a method founded on traditional lectures. Based upon the conclusions, the variable that made the greatest contribution to the development of the communicative competence was oral expression. Regarding specific practices that this approach encompasses, Zhu (2012) concluded that the use of games in the learning process is effective in improving students' interaction skills, motivation and interest. The author explained that through CLT students are actively involved in the learning process, and games, evidently, promote this state.

Concerning innovative methodologies, Jabeen (2014) states that changes, such as methodological ones, provoke different reactions in human beings. Thus, while some are uncomfortable with large new changes, others adopt distinct positions: indifference, acceptance or intermediate paths.

Overall, studies show the positive effect of PBL on student motivation and their collaborative skills (Shin, 2018). Moreover, Almulla (2020) states that it enhances student engagement by facilitating knowledge and information sharing and discussion. Nevertheless, Aldabbus (2018) explains that PBL may be challenging for some students, since they lack the essential abilities for cooperative work and impose their ideas on others, which, in turn, reduces the motivation of the latter.

With regards to interdisciplinarity, Brassler and Dettmers (2017) noted that the number of empirical studies is limited, which, consequently, involves the lack of specific interdisciplinary education models. Nonetheless, they consider that Problem and Project Based Learning are both great approaches to foster pupils' interdisciplinary competences.

As stated before, Condliffe (2017) argues that more rigorous studies should be developed in order to confirm the efficacy of PBL method, since it did not have an impact on students' literacy results nor their engagement (Menzie et al., 2016). This disparity, in terms of methodological efficacy and motivation, is the key to the development of this study.

2.2. Theoretical Framework

Concerning the teaching methodologies compared in the present study, firstly, the traditional method focuses on the deductive analysis of grammatical, phonological lexical, morphological and syntactic units and their memorisation, that is, mainly on grammar instruction (Bilbatua, 2010).

Regarding PBL, Laverick (2018) highlights that, considering it integrates all language skills, it perfectly aligns with the CA. Following Littlewood (1981), the CA is a methodological approach that focuses on real, authentic, spontaneous and functional use of the language. Additionally, the active role of students is understood as one of the foundations of the method, as well as these others: the facilitating role of the teacher to promote motivating and meaningful situations, and the non-segmented nature of language teaching.

In line with this, Condliffe (2017) highlights students' ability and necessity for taking ownership of their work in PBL, which, in turn, is developed by scaffolding knowledge. This method is driven by initial motivating questions, which students feel the need to inquire into, towards the completion of a final project. It is also worth noting other relevant principles such as collaboration, engagement and student choice.

In this regard, a recent meta-analysis about PBL pinpoints the key principles of this method, whose impact is related to the improvement of results in science, reading, collaborative and reflective skills, as well as the betterment of language proficiency for English learners (Baines et al., 2021). Among the most relevant principles, these stand out: purposeful and authentic learning process, driven by interdisciplinarity and the integration of contents, meaningful relationships, and evidence-based teaching and assessment practices. Concerning an interdisciplinary learning context, students need to learn to solve distinct interdisciplinary problems by making connections, synthesising, integrating knowledge from different disciplinary perspectives and reconsidering one's thinking.

Based on the aforementioned principles, this study was developed through interdisciplinary PBL in English, as a subject, and Natural Science. The experimental unit was initiated by pupils' motivating questions, through the utilisation of one Visible Thinking Routine (Ritchhart, Church & Morrison, 2011). These routines contribute to the management of students' thinking, reflection and reasoning, as well as promoting creativity, questioning and planning. Throughout the unit, students inquired into and discussed different scientific and literary aspects of the curriculum towards the development of the final project, since Vergara (2015) advocates learning based on experimentation, inquiry and language games as tools that foster autonomy, communication and engagement. Moreover, Cassany (2006) attaches importance to working on discursive genres based on different types of texts. Likewise, Cooperative Learning bases were applied, among which positive interdependence, simultaneous interaction, individual responsibility, social skills and groups' self-evaluation stood out (Pujolàs & Lago, 2011). Furthermore, Engh (2013) defends that music helps students succeed in the acquisition of the FL. Finally, the use of rubrics for co-evaluation,

self-evaluation and hetero-evaluation meet the expectation for employing evidence-based assessment strategies and tools (Vergara, 2015).

According to Pintrich and De Groot (1990), student motivation, which lies in subjectivity (Vanslambrouck et al, 2017), consists of three components of self-regulated learning: expectancy, value and affectivity. The latter represents their emotional reactions to a given task and, for the purpose of this study, affectivity was considered for the definition of motivation.

2.3. Factors related to English language competence

Next, the following data compiles the most important and influential factors in the success of the English oral competence. This information allows for the control for the confounding variables.

Following the conclusions drawn by MET (DEPLCGV, 2014), participation in extracurricular English lessons has a high impact on the results of linguistic competence. The same study confirms that these other factors correlate with those language results as well: time of teaching and exposure to language, the sex of the participants and their attitude towards the target language. Grounded in the main concepts pointed out by the European Commission (2012), exposure to language through digital media positively correlates to better oral results. Likewise, Tugrul (2012) corroborates the existence of a high relationship between reading in the target language and speaking. Furthermore, the European Commission (2012) mentions the importance of a family's FL level and the opportunities to use it for the development of oral skills at an early age. In this way, results in understanding are improved, which, in turn, implies enhancement of the rest of the competences. Finally, Bozorgian (2012), discovered that the higher listening results are, the better speaking results will be.

3. METHODOLOGY

3.1. Research questions

The questions for this study are as follows:

RQ1: Does the intervention with an interdisciplinary PBL methodology have a greater effect on the results in the English oral expression test compared to the group with a traditional methodology?

RQ2: Does this method have a greater effect on the results in terms of the motivation scale?

3.2. Research design

This research has a quasi-experimental design, due to the manipulation of the independent variable and control for confounding variables, but it was not regulated by random formation of groups (León & Montero, 2003). Hence, these were previously established and corresponded to each of the classes: 5th grade A being the control group and 5th B the experimental one.

Thus, the latter received interdisciplinary instruction in the English language and natural science through the PBL method for FL teaching. Meanwhile, the former received training in both subjects separately and rooted in a traditional and structural method for language teaching. This intervention period lasted 6 weeks.

Founded on the aforementioned studies, these were the variables for the current research: initial oral expression (named *SpeakInitial*); final oral expression (*SpeakFinal*); difference between initial and final oral expression due to the effect of the instruction (*InstructionEffect*); students' motivation (*Motivation*); initial listening skills (*ListeningInitial*); students' sex (*Sex*); research group (*Group*), randomly assigned, 1 was control and 2 was experimental; weekly time devoted to English extracurricular lessons (*Extracurricular*); weekly time devoted to reading in English (*EnglishReading*); weekly time devoted to watching TV in English (*TV*); family's knowledge of English (*EnglishFamily*) and use of English with family members and/or friends (*UseContext*).

3.3. Research and participant context

The research was carried out at an urban school in Bilbao, specifically, in the two classes of 5th grade of Primary Education. For the sample, the criterion $N = n$ was followed, since the instruction was conducted with both whole groups. In a population of 52 pupils, the initial descriptive analysis made it possible to control the presence of errors in the data entry phase. Therefore, the sample for the research was 46 students ($n = 46$), specifically, $n_c = 24$ (control), $n_e = 22$ (experimental).

In this Spanish region, the aforementioned linguistic reality has led to a different time distribution in language teaching. As a matter of fact, at this school, English is taught as a FL and utilised as the language of instruction 26% of the teaching time in PE, while in Kindergarten 33% of it.

With regards to ethical procedures, after having obtained the consent from the school, roster numbers were used in order to respect students' anonymity. Likewise, once the intervention was completed, both groups received instruction by using the experimental methodology.

3.4. Instruments

On the one hand, an ad hoc rubric was created and employed for the measurement of oral expression. Regarding the theoretical validation of this instrument, Pomposo (2016) classifies this tool into 2 categories: holistic and analytical. The former assesses oral production globally without internal separations of linguistic aspects. The latter differentiates features of oral performance and judges them individually. Hughes (2002) proposes to employ subcategories in order to carry out a global assessment to avoid a diversion of attention from general communicative competence. Thus, a variety of items were selected so as to develop a precise and adjusted scale and, simultaneously, these were combined into broader categories. Hence, 12 items were classified into 4 dimensions. The first of the latter was fluency, which, according to the Council of Europe (2020), is part of the evaluation criteria in oral assessment scales, such as the CEFR. As a second category, syntax is considered a fundamental linguistic area for the appraisal of oral and written discourses (Granadillo, 2015). Moreover, the author states that semantic elements are valuable variables for the assessment

of oral production. Similarly, Cassany (2006) argues that one of the most characteristic features of discursive genres and textual typology is their organisation in form. Consequently, a 12-item rubric was elaborated, with a descriptive and quantitative score system from 1 to 4 points per item. Pupils were given a six-strip comic, out of which four were drawn but silent, and two were empty. After 10 minutes of developing a small outline, they had to finish, tell and orally record their stories.

Regarding the reliability of the instrument, it was concluded that, since the 12 items of the instrument do not measure the same dimension and are not highly correlated with each other, this rubric does not allow the calculation of their internal consistency, despite serving to measure the construct. In addition, the Delphi technique was used in the Expert Judgement process (Pérez Juste, 2006), in order to corroborate the validity of the instrument, for which the contributions and conclusions of 9 experts, selected according to the Expert Competence Coefficient (Zartha et al., 2014), were collected in successive stages.

Motivation, on the other hand, was measured by using an ad hoc motivation scale, Likert 5, which consisted of 12 items. Pintrich and De Groot (1990) broke down the components of motivation, out of which the affective reactions are valued for the present study. With the aim of verifying the validity of the construct, an exploratory factor analysis was carried out and the selected dimension, which is directly related to students' motivation, explains 36.74% of the variance. Its reliability, measured by Cronbach's Alpha, is 0.905.

Furthermore, data about students' initial listening skills were collected by means of an objective multiple-choice test, which consisted of 8 questions, both for the pre-test and post-test, with one correct answer from a set of 4 options. In order to take this test, each student was given a 4-strip silent comic, they listened to it twice and had to answer the 8 questions. Each item had an equal weight of 1 point.

Moreover, additional information, concerning factors related to English language competence, was collected by means of a previous questionnaire administered to the pupils: sex, English extracurricular lessons (years received were counted), amount of television watched in English (days per week were considered), reading time in English (days per week were considered), parents' knowledge of English (yes-no question), and use of English with parents and/or family (yes-no).

3.5. Data analysis procedure

In relation to data collection, the research consists of three phases: pre-test, instruction and post-test. Oral comprehension and expression were measured before and after the teaching. Information on pupils' motivation was gathered at the end and data on strange variables were collected before the intervention.

Regarding data analysis, first of all, an initial control for independent variables was developed. Despite the fact that this research was not adapted to strict conditions of randomisation of groups, variables were controlled to assure the absence of differences between these in relation to possible affecting factors, which were specified in the section called "Factors related to English language competence". Firstly, students' time of exposure to English teaching was neutralised by the fact that all pupils had attended the same school for their entire schooling time. Additionally, their attitude towards the language was controlled, based on the positive conclusions drawn from a previous survey carried out by the

Language Project Commission of the school. In order to reduce the effect of the independent variables that may have an impact on the results of the oral expression, contrasts of means between the groups were calculated. Furthermore, the Chi Squared test was also utilised to work out the association of qualitative variables, in order to corroborate their distribution in each group. Lastly, after the relational analysis, variables that did not lead to any difference between groups were discarded.

After that, a descriptive analysis was executed. Hence, basic statistics were analysed in order to determine if the collected data were valid and contributed to visualising the characteristics of the variables. Apart from that, contingency tables were studied to corroborate the difference, anticipated by the Chi Squared test, in the distribution of the categorical variables in relation to the experimental and control groups.

Next, a relational study was conducted. Spearman's rank correlation coefficient was applied, due to a predominance of a non-normal distribution of most variables. Likewise, Levene's test was run, prior to performing the one-way ANOVA, to observe the equality of means between the categorical variable, Groups, and the dependent variable, oral expression.

Finally, a multivariate analysis was performed, initially, by analysing the covariance by means of the ANCOVA test and, therefore, seeking to reduce the experimental error to benefit the precision of the experiment. As previously pointed out, the elimination of the existing variability in the dependent variable was pursued in order to be able to better estimate the effect of the independent variables. Finally, with a confirmatory nature, a multiple analysis of covariance was run, through the MANCOVA test.

4. RESULTS

To begin with, the significance level (p) was established at 0.05. By means of the initial analysis of contrast of means, through Student's T and Mann Whitney U, and of the association of variables, by using the Chi Squared test, it is concluded that there is homogeneity between the groups in all variables except in the variables ListenInitial, with statistically significant differences between the groups and non-normal distribution, $U=174.000$, $p<.05$, and EnglishReading, with statistically significant differences between the groups and non-normal distribution, $U=147.000$, $p<.05$. Therefore, the rest of the quantitative and qualitative variables did not have an effect on the results of oral expression.

4.1. Descriptive Analysis

The study of descriptive results gives us an idea of the shape of the collected data (Table 1): mean (M) and standard deviation (SD).

Table 1. *Descriptive statistics of the research variables*

	CONTROL GROUP		EXPERIMENTAL GROUP	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
SpeakInitial	29.42	7.99	25.55	4.84
SpeakFinal	30.63	7.46	30.18	5.81
English Reading	3.46	1.14	2.41	1.40
Motivation	35.08	3.94	24.55	8.05
ListenInitial	6.42	1.67	5.59	1.33
InstructionEffect	1.21	4.22	4.64	4.17

4.2. Correlational Study

Considering that the sample does not have a normal distribution for all the quantitative variables, the Spearman correlation coefficient was used to carry out the relational analysis.

Table 2. *Spearman correlation: 1.InstructionEffect, 2.Motivation, 3.EnglishReading, 4.ListenInitial, 5.SpeakInitial, 6.SpeakFinal.*

	1	2	3	4	5	6
1.InstructionEffect	1					
2.Motivation	-.247	1				
3.EnglishReading	-.036	.502**	1			
4.ListenInitial	.008	-.067	-.005	1		
5.SpeakInitial	-.396**	.215	.178	.488**	1	
6.SpeakFinal	.309*	.162	.212	.486**	.710**	1

* $p < .05$; ** $p < .01$

In Table 2. we observe that there is a significantly positive relationship between the number of days per week devoted to reading in English (EnglishReading) and the motivation of students after instruction (Motivation), $r = .502$, $p < .01$. Likewise, there is a significant

and positive relationship between initial speech (SpeakInitial) and final speech (SpeakFinal), $r = .710$, $p < .01$. On the other hand, there is a significant and positive relationship between the initial listening result (ListenInitial) and the final results in speech (SpeakFinal), $r = .486$, $p < .01$, as well as a significant and positive relationship between the initial listening result (ListenInitial) and the initial speech results (SpeakInitial), $r = .488$, $p < .01$. The variable initial speech (SpeakInitial) has a significant and negative relationship with the effect of the instruction (InstructionEffect), $r = -.396$, $p < .01$, and the final speech (SpeakFinal) significant and positive with the effect of the instruction, $r = .309$, $p < .05$.

4.3. Bivariate Inferential Analysis

With the aim of answering the first research question, groups’ difference in means was analysed in relation to the effect of instruction. For this, Student’s T test was applied, since the variable InstructionEffect was normally distributed in both groups. As for research question 1, the experimental method, interdisciplinary PBL, had a greater effect on their students’ oral expression results (M = 4.64, SD = 4.17) than on the control group (M = 1.21, SD = 4.22). This difference was statistically significant, $t = -2.767$, $p < .01$.

Moreover, taking into consideration the difference in the variance of the groups as the main measure, one-way ANOVA-test was run with the InstructionEffect variable.

Table 3. *T-test: Control and Experimental Groups on InstructionEffect variable*

		LEVENE’S TEST		T-TEST FOR EQUALITY OF MEANS			
		<i>F</i>	<i>p</i>	<i>t</i>	<i>df</i>	<i>p</i>	<i>Difference</i>
InstructionEffect	equal variance	.140	.710	-2.77	44	.008	-3.43

Table 4. *Inter-subject effects tests for the dependent variable InstructionEffect*

SOURCE	TYPE III SUM OF SQUARES	DF	MEAN SQUARE	F	P	PARTIAL ETA SQUARED
Corrected model	134.886 ^a	1	134.886	7.658	.008	.148
Intercept	392.103	1	392.103	22.260	.000	.336
Group	134.886	1	134.886	7.658	.008	.148

a. $R^2 = .148$ (Adjusted $R^2 = .129$)

In table 3, assumption for homogeneity of variance for the Levene's test was verified, $p > .05$. ANOVA shows that the difference of means in the oral expression of the groups, $F(45, 1) = 7.658$, is statistically significant, $p < .01$ (table 4). The Squared Partial Eta value, $\eta^2 = .148$, explains the proportion of variance of the response attributable to its relationship with the factor, the group. In other words, it is the measure of effect size for ANOVA.

Concerning the second research question, there is a significant difference in motivation in favour of the control group, $U = 44$, $p < .01$. The difference in means between groups in relation to motivation after instruction was analysed by Mann-Whitney's U test, due to lack of normality. Despite the absence of normality, ANOVA test was run based on the robustness of this statistical analysis. Nonetheless, Levene's test, $p < .05$, rejects the null hypothesis of equality of variances. This proves the lack of homoscedasticity, which is a condition for the performance of ANOVA. Therefore, it was not possible to continue applying ANOVA for group motivation.

4.4. Multivariate Inferential Analysis

For this analysis of covariance, ANCOVA was carried out, in order to study the relationship of a factor, the group, with a quantitative variable, the effect of the instruction, eliminating the influence of a third quantitative variable or covariate, the initial listening. Box's M-test, 5.359, determines the assumption of homogeneity of covariances, $p > .05$.

Table 5. ANCOVA-test: Contrast tests within subject

SOURCE	TYPE III SUM OF SQUARES	DF	MEAN SQUARE	F	P	PARTIAL ETA SQUARED
InstructionEffect	0.992	1	0.992	0.011	.740	.003
InstructionEffect * ListenInitial	5.933	1	5.933	0.669	.418	.015
InstructionEffect * Group	73.354	1	73.354	8.266	.006	.161

The Levene's test, $p > .05$, tests the null hypothesis that the error variance of the dependent variable is the same between groups, thus, fulfilling the homoscedasticity condition. In table 5, we observe that the effect of the Group, once the influence of the Initial Listening covariate was eliminated, is statistically significant, $F(45, 1) = 8.266$, $p < .01$, with an effect size of 16.1% of the explained variation, $\eta^2 = .161$.

The MANCOVA test was then run for the multivariate analysis of covariance with a confirmatory nature of the previously followed process (table 6).

Table 6. MANCOVA-test: Contrast tests within subject

SOURCE	DF	MEAN SQUARE	F	P	PARTIAL ETA SQUARED
InstructionEffect.	1	16.474	2.003	.166	.053
InstructionEffect. * Sex	1	1.284	0.156	.695	.004
InstructionEffect. * Extracurricular	1	8.756	1.065	.309	.029
InstructionEffect. * EnglishReading	1	3.202	0.389	.537	.011
InstructionEffect. * TV	1	2.549	0.310	.581	.009
InstructionEffect. * EnglishFamily	1	31.780	3.864	.057	.097
InstructionEffect. * UseContext	1	0.055	0.007	.935	.000
InstructionEffect. * Motivation	1	6.239	0.759	.390	.021
InstructionEffect. * ListenInitial	1	4.019	0.489	.489	.013
InstructionEffect. * Group	1	72.163	8.774	.005	.196

It is observed that the effect of the Group, once the influence of the covariates is removed, is statistically significant, $F(45, 1) = 8.774$, $p < .01$, with an effect size of 19.6% of the explained variation, $\eta^2 = .196$.

Table 7. Estimated marginal mean: Group * InstructionEffect

Group	Instruction-Effect	Mean	Std. Error	95% CONFIDENCE INTERVAL	
				Lower	Upper
Control	1	28.628 ^a	1.554	25.476	31.780
	2	28.849 ^a	1.425	25.959	31.739
Experimental	1	26.406 ^a	1.653	23.054	29.757
	2	32.119 ^a	1.515	29.046	35.192

a. Covariates appearing in the model are evaluated at the following values: Sex = 1.37, Extracurricular = 1.50, EnglishReading = 2.96, TV = 3.17, EnglishFamily = 1.83, UseContext = 1.39, Motivation = 30.04, ListenInitial = 6.0217.

Regarding research question 1, in the above estimation (table 7), once the effect of the covariates was eliminated, the experimental group would obtain a higher score in the oral expression test in the post-instructional period as a consequence of the effect of the instruction.

5. DISCUSSION

Concerning the first research question, the collected data corroborate that the experimental interdisciplinary PBL methodology, which is closely connected to a Communicative Approach for ESL teaching (Sanz & Sánchez, 2021; Armentero Reboredo, 2021), has a greater effect than a traditional method on the results of oral expression. Moreover, Agbatogun (2014), who defends the relevance of the approach and its contribution to students' oral betterment, underlines the activating nature of this methodological perspective due to rehearsal and practice opportunities offered by the speaking activities, which, in turn, facilitate the possibilities of feedback about the skill itself.

As confirmed by Zardini and Bernabé (2013) and Condliffe (2017), the experimental method produces extensive conversational patterns and development of oral skills in different situations. In agreement with Dewi (2016), under the appropriate conditions and through the experimental method of this research study, students' interactive competence improves. Thus, interdisciplinary PBL helps the population of study to a greater extent than the traditional method in the development of oral expression competency.

Cooperative Learning and Project Based Learning, both used as the axis of the methodology, contribute to the development of interaction between students (Vergara, 2015). In their active role, students have the need to interact in the language, so spontaneous conversations compliment this process with some real communicative situations through authentic materials (Littlewood, 1981). In this regard, Zhu (2012) discloses that the use of games for ESL learning is efficient in enhancing competences for interaction, due to the active role given to pupils in the face of the passivity offered by a traditional method, depriving them of opportunities for the oral use of the language. Furthermore, as stated by Baines et al. (2021), interdisciplinarity provides students with problem solving competences, by means of connection making and synthesis. These are directly associated with greater language practice, which is, in turn, connected to language improvement (Condliffe, 2017).

Regarding the second research question, it is rejected that the experimental method had a greater effect on students' motivation, understood as emotional reactions according to Pintrich and De Groot (1990), compared to a traditional method. In fact, the latter group obtained a higher score on the motivation assessment scale. The difference in the means of both groups does not match with what is defended in the studies by Zardini and Bernabé (2013) in relation to the CA and motivation, since they defend that speaking activities motivate students by their engaging qualities. Shin (2018), Armentero Reboredo (2021) and Almulla (2020) also believe that PBL improves students' intrinsic motivation.

There are different reasons why this may have occurred this way. On the one hand, the starting point and the range of motivation of each class may have been different, as it was shown by the different distribution of variances, being more homogeneous in the control group and more uneven in the experimental group. This makes it difficult to analyse the covariates that had an effect on that difference. In fact, as it was corroborated with the analysis of the first research question, motivation did not have a significant influence on the difference in the effect of instruction. The relational analysis also confirmed the lack of correlation between them.

Another reason why these results were obtained is the great methodological difference used in the experimental group with respect to what students are accustomed to. As

previously mentioned, significant changes affect all individuals. Therefore, while some are uncomfortable with new changes, others adopt a critical position. There are also attitudes of indifference, unconditional acceptance to change and those who prefer to adopt an intermediate stance (Jabeen, 2014).

Moreover, as defended by Aldabbus (2018), PBL methodology requires some cooperative abilities in order to succeed in the process, so as to avoid the imposition of one's ideas. For this reason, students' lack of those competences may be another motive for these inconclusive results about motivation.

Additionally, when motivation is appraised, taking into account that the point of view of individuals about a specific item is collected, subjectivity is assumed in their opinion (Vanslambrouck et al, 2017). The assessment of these points of view was about isolated objects that were not related to each other. In fact, students in the control group were not able to experience the experimental method and vice versa. Consequently, there was no clear criterion for comparison, which represents one of the limitations of the study. This leaves them with a partial vision of the two realities, which makes it difficult for evaluation.

6. CONCLUSIONS

From the previous analysis, it may be concluded that the experimental method, based on the implementation of interdisciplinary PBL for ESL teaching, has a greater effect on students' oral expression, specifically on the population of this study, compared to the traditional method. It facilitates training in oral language competences, by offering a greater number of qualitative opportunities to practice this skill (Zardini & Bernabé, 2013; Condliffe, 2017). Following this thread, Project-Based Learning and Cooperative Learning contribute to interaction, which enables the development of oral communication competences and promotes feedback on their actions among students and with the teacher (Vergara, 2015). The need for interaction and the actual use of language with real materials allows dialogues to be functional (Littlewood, 1981). Likewise, the playful effect of games assists students in taking an active role, this being a necessary condition to promote discussion between them (Zhu, 2012).

In any case, it was not possible to confirm that pupils' motivation improves due to the application of the experimental method. Nonetheless, it was not possible to verify that it significantly correlates with the instruction or with the results of oral expression in English, due to a different distribution of the variances.

Having considered the limitations of this study, it is worth noting that there was a lack of randomisation in the selection process and a small study population. Furthermore, there was not a clear criterion for the comparison of student motivation, since they did not receive the intervention with the other group's method. Therefore, for future inquiry, in order to achieve external validity that will allow data to be generalised to other populations, research studies should be based on experimental designs, for which randomisation of the sample is necessary. As well as this, the pursuit of external validity requires a larger study population. Moreover, the use of standardised tests or standardising the utilised ones for that purpose is highly recommended. In addition, in the future, the analysis of the other linguistic skills

should be included in the research, in order to corroborate the effectiveness of the PBL method in all language competences.

These conclusions imply a tight connection between input and output, that is, the exposure to hearing and using the language provides pupils with more opportunities for improvement. In fact, by means of interaction and decision making processes, students utilise the language in order to achieve other content goals, such as Science, work indirectly on the language and, consequently, their speaking skills may be developed throughout the project. For this reason, it is essential that educators plan and create communicative and flexible language learning situations, which may help learners develop and meet the necessary linguistic requirements for the project. Furthermore, teachers need to adopt a facilitator role and provide pupils with constant feedback and clear instructions that help them achieve the objectives.

7. REFERENCES

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