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Implementing project-based learning to enhance communicative skills in 4th grade students with autism in Cotopaxi province

Implementación de aprendizaje basado en proyectos para mejorar las habilidades comunicativas de los estudiantes de 4to grado con autismo en la provincia de Cotopaxi

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ABSTRACT

This research was conducted in a public school in the province of Cotopaxi, Ecuador. The main objective was to explore how project-based learning could improve communication skills in autistic students in 4th grade of primary school. The participants were a group of students aged 7 to 8 years, where there were two students with autism spectrum disorder. Project-based learning was a fundamental aspect during this teaching process because it allowed the students to improve interaction with their peers and with the English teacher. The students' English level proficiency was pre-A1 according to the results of the diagnostic test carried out at the beginning of the school term. Data were collected through the observation as a qualitative instrument and pre-test, post-test, and rubric as a quantitative instrument. As a final result, the data showed that autistic participants improved their communication skills from 0.70 at the beginning of the study and after

the implementation of the project they finished with 2.69 on a scale of 1 to 5, demonstrating that project-based learning has the potential to develop the communicative skills.

Keywords: autism, project-based learning, communication skills

RESUMEN

Esta investigación se llevó a cabo en una escuela pública de la provincia de Cotopaxi, Ecuador. El objetivo principal fue explorar cómo el aprendizaje basado en proyectos podría mejorar las habilidades comunicativas de los niños autistas de 4to grado de la escuela primaria. Los participantes fueron un grupo de estudiantes de la edad de 7 y 8 años, donde había dos estudiantes con trastorno del espectro autista. El aprendizaje basado en proyectos fue un aspecto fundamental durante este proceso de enseñanza porque éste permitió a los estudiantes mejorar la interacción con los compañeros y con el profesor de Inglés. El nivel de dominio de Inglés de los estudiantes fue de un pre-A1, de acuerdo a los resultados de la prueba de diagnóstico realizada al inicio del período escolar. Los datos fueron recogidos a través de la observación como un instrumento cualitativo, el pre-test, post-test y la rúbrica como instrumentos cuantitativos. Como resultado final, los datos mostraron que los participantes autistas mejoraron sus habilidades comunicativas 0.70 al inicio del estudio y después de la implementación del proyecto terminaron con 2.69 en una escala de 1 al 5, demostrando que el aprendizaje basado en proyectos tiene el potencial para desarrollar las habilidades comunicativas,

Palabras clave: autismo, aprendizaje basado en proyectos, habilidades de comunicación

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INTRODUCTION

This research focused on implementing project-based learning to enhance communication skills of students with autism. Autism Spectrum Disorder (ASD) is not a single disorder but a cluster of closely related disorders that share common characteristics. It is considered a lifelong, neurodevelopmental disability and is characterised by the presence of persistent deficits in three core areas of functioning: social interaction; communication skills; and the presence of fixed or repetitive behaviours (Syriopoulou- Delli, 2020). Autism children often face behaviour issues due to verbal and non-verbal communication deficits (Salmihah et al., 2021). Behavioral problems among autistic children cause problems in their daily life such as bully incidents, low performance in their academics and inability to socialise (Manirajee & Rashid, 2024).

In a sense, project-based learning (PBL) is increasingly popular in the teaching learning process due to the need of education to adapt to the changing world and looking for the improvement of students' skills in a different way other than the traditional teaching. PBL gives learners opportunities to actively engage in the learning process, make preferences, and bring their interests to the learning environment, thus it has a high potential to make learners more attentive (Kemaloglu-er, 2022). PBL promotes learners' language skills improvement through deep investigation, creativity, problem solving, and the application of knowledge acquired in real-life situations. Perren et al. (2013) claimed that Project-based learning has also been billed as an excellent instructional approach for combining language and content-learning aims, improving students' literacy and research skills, and engaging students in meaningful service-learning opportunities (as cited in Stoller, 2019).

Teaching English as a foreign language faces significant challenges in contexts where educational resources are limited, either due to a lack of government support or the lesser importance given by parents to their children's education (Bempechat, 1992). These challenges are amplified when students with neurodiverse conditions, such as autism, are part of the learning program of educational institutes, therefore Busby et al. (2012) says that it requires different instructional approaches. This study explores the implementation of project-based learning (PBL) as a methodology to improve English communication skills in a group of neurotypical participants, including children with autism to increase learners' motivation and promote a harmonious atmosphere, decreasing classroom anxiety and facilitating interaction discussion (Agustina, L 2022).

The focus is on measuring how collaborative work in heterogeneous groups fosters learning. It will attract their interest and boost the students' motivation to get involved actively with the learning process (Ishak & Abdul Aziz, 2022). Despite limitations in access to digital resources and printed materials, preliminary results suggest that PBL offers an effective framework to overcome these barriers, highlighting the potential for children with autism to

develop communicative competencies comparable to those of their neurotypical peers. This work seeks to contribute to the development of inclusive educational practices that respond to the needs of all students, regardless of their abilities or socioeconomic context.

METHODOLOGY

Sample

The present action research was conducted in a public school. This school is located in the rural area of Latacunga in The Cotopaxi Province that is situated in the Highland region of Ecuador. The learners that participate in this project are in 4th grade, and they are between seven to eight years old. Their classroom is comfortable even though the school is small. In addition, the place where the student's study is big enough, and it has the necessary equipment to learn English efficiently, such as two boards, individual chairs and tables. For this exploration, it was taken in a classroom of 25 students in which 10% of them had autism.

Regarding the school's infrastructure it has water, electricity services but the internet is limited because it is available only at the principal's office. There are no technological tools in the schools, there is a lab with 10 computers, but they are out of service. Additionally, the school owns a library on the second floor where the students have access to books of different topics, but all of them are in Spanish language. Finally, there is no access for students with physical limitations, which makes it difficult to access classrooms on the second floor.

According to the report by the Student Counseling Department, two students who are in 4th grade were diagnosed with autism spectrum disorder. Regarding the schedule. The 4th graders have English classes three hours a week, and they are divided into two days. During these hours the students with autism demonstrated understanding in the target language by comprehending and acquiring new knowledge of the English in every single class. Moreover, they were always willing to participate in the sessions by being interested in working on projects, doing crafts, singing, and playing during the lessons while following the teacher's instructions and commands.

Moreover, learners seemed to enjoy the English classes because they were always smiling, and they felt comfortable when they had to interact with the teacher. They worked actively in individual activities such as; coloring and writing short sentences. When the teacher asks short questions as a way to assess the class, the participants could answer those questions in English by using vocabulary they were studying during the unit. Sometimes, when they do not know the word in English, they use their native language mixed with English. In addition, the teacher developed a strategy to motivate those students. The educator uses stickers with motivational words like: "good job", "excellent", "fantastic", among others, and the learners felt excited to continue performing their best in class. Also, they have big smiles on their faces, and they do a very good job during the class.

Those learners did not present academic difficulties, but they had problems with socialization with other classmates, they hardly ever had communication with their peers, and did not play with other kids inside or outside the classroom. The students with autism prefer to be alone or be with the teacher during their recess. Sometimes, the data participated in the collaborative activities that the instructor prepared to foster speaking and vocabulary with the purpose of integrating them to the rest of students.

Instruments

During this research, the students with autism had to take a pre-test and post-test to see their improvement and progress. The pre-test was applied at the beginning of the research, and the post-test was applied at the end, with a scale from 1 to 5 to grade each item. Therefore, at the beginning of the study the guide of observation had raised statements to recognize student's behavior patterns and the academic performance within the English subject. At the end of the study, it served to make a comparison of the results after the application of the Project Based Learning in order to know if it improved or not the communicative skills of the students with autism. Since with Project Based Learning students are given complex tasks or projects that require teamwork to complete. This situation forces students to communicate effectively, discuss ideas, and solve problems together, which in turn strengthens their verbal and non-verbal communication skills. By constantly interacting and collaborating with their peers, students learn to appreciate others' perspectives and build stronger interpersonal relationships. (Aziz & Astuti, 2023).

The project-based learning for this study was "The Game of Emotions", lasted for 6 months and consisted of the following stages: Stage 1: Students learned 10 emotions and made short sentences using each of them 2: Here students in groups had the opportunity to make pictures related to emojis. Each learner made an emoji and showed it making a sentence with the selected emoji to describe themselves and describing the partners emotions. Stage 3: Teacher divided the classroom in two groups in order for learners to make a big doll paper (a man and a girl). The big doll papers of each group were decorated by students and the most relevant characteristic of those dolls were that they did not have faces. Stage 4: Teacher located the big dolls in front of the students, the groups took turns to locate the emoji that they made previously in the doll face, the students with the major quantity of emojis said in English correctly won the game. This activity had the aim that autistic children involved with peers in the creation of a big doll paper and use the target language while they were playing with emotions.

Design, procedure, and data analysis

To obtain the results of the pre-test and post-test, it was used The SPSS program which helped to analyze the results obtained. Also, the results are based on the rubric observation. During over six months in an inclusive classroom environment. The activities were conducted during regular English lessons, ensuring that the intervention was integrated into the existing

curriculum. This approach allowed the students to engage with peers in a natural classroom setting while focusing on developing communication and teamwork skills for the autistic students as well. This study employed a qualitative and quantitative research design, specifically through the use of classroom observations and Project-Based Learning (PBL) to explore the interaction and language acquisition of autistic children in an English classroom setting. The research focused on observing behavioral patterns, social interactions, and the development of communicative skills over a six-month period.

It was conducted using a structured observation guide as the primary data collection tool. The pre-test was developed to track students' behavioral and academic performance in the English language before and after the implementation of Project-Based Learning. This comparative approach allowed for a detailed analysis of the impact of the intervention on students' communicative abilities and interpersonal interactions. The choice of Project-Based Learning as an intervention was grounded in its potential to create meaningful, collaborative learning experiences. By engaging in complex tasks and projects, students were encouraged to interact, share ideas, and solve problems collectively, which are essential skills for language acquisition and social development. Moreover, the structured yet flexible Project-Based Learning nature allows for adaptation to the unique needs of autistic students, enabling them to express emotions and improve their communicative abilities in a supportive environment.

RESULTS

The present research was conducted by qualitative and quantitative instruments. In order to analyze the obtained results, the SPSS program was used to interpret the statistical information like mean and standard deviation.

In addition, the collected data of the pre and post-test were examined by the descriptive statistics to calculate the statistical differences. Those statistical numbers were represented in tables exposing the key elements to understand how Project Based Learning contributed to enhance communicative skills in autistic children.

Table 1
Chart pre-test/ post-test/

CRITERIA	PRE-TEST MEAN	POST-TEST MEAN
Recognize English words	1.01	2.02
Identify pictures with target language	0.70	1.69
Relate pictures to communicate	1.05	2.50
Produce target language in short sentences	0.75	2.80

Author: Sanchez, M (2025)

For the pre-test and post-test instrument, it is clear that the student improved in the recognition of words in English by having a mean of 1.01 in the pre-test and a mean of 2.02 in the post test which demonstrated that they could recognize more words in English at the end of the research. Similarly, they were enhanced in the ability to identify pictures when they learned target language with a mean of 0,70 in the pre-test and a mean of 1.69 in the post-test. Equally important was their progress in the ability to relate pictures to communicate, emotions and feelings with a mean of 1.05 at the beginning of the study and with a mean of 2.50 at the end of it. Moreover, they showed willingness to participate in making short oral sentences using the new vocabulary with a mean of 0.75 in the pre-test in relation to the post-test with a mean of 2.80.

Table 2
Chart for the observation rubric

CRITERIA	PRE-RUBRIC OBSERVATION MEAN	POST-RUBRIC OBSERVATION MEAN
Recognize the teacher's instructions	1.01	2.02
Interact with the other peers in the target language.	0.70	2,69
Greet the teachers in English even when they are outside the classroom.	0.60	1.03
Demonstrate interest in participating in projects in the English class.	1.01	3.65
Feel motivated to continue learning English in class.	0.85	2.03
Understand the body language of teacher and peers	0.67	0.98
Use body language to express feelings and emotions	0.35	0.74

Author: Sanchez, M (2025)

To obtain the results of this table, the observation rubric instrument was applied, consisting of a list of different criteria to analyze learners' behavior during the application of Project-Based Learning. The facts were evaluated from 1 to 10. At the beginning the researcher evaluated the data with the direct observation, then it was used by SPSS to obtain the results. After the analysis of data collected, it is clear that the learners significantly improve their recognition of the teacher's instructions by having a mean of 1.01 in pre-observation and a mean

of 2.02 in the post-observation, the results demonstrate that learners understand teacher's vocabulary and commands in English Language. In the same way, learners were enhanced in the ability to greet the teachers in English even when they are outside the classroom with a mean of 0.60 in the pre-observation in contrast with a mean of 1.03 in the post-observation which demonstrates that students increased their interaction using the target language in real life situations in basic daily routines. In parallel, learners were observed to identify their interaction with the other peers in the target language, the outcome was a mean of 0.70 in the pre-observation in difference with a mean of 2.69 in the post-observation, it indicates that they had an improvement in their communicative skills in consequence their interaction with the peers and teacher in the target language have increased. Moreover, they showed a willingness to use body language to express feelings and emotions with a mean of 0.35 in the pre-observation in contrast with a mean of 0.74 in the post-observation, it denoted that they enhanced the use of their body language with movements and gestures to express their feelings and emotions, which have increased their communicative skill.

CONCLUSIONS

The fundamental purpose of this research was to implement Project-Based Learning (PBL) as a strategy to enhance the communicative skills of 4th-grade students with autism, through the incorporation of a designed project according to their abilities and requirements. Since autistic students in the English classroom struggled to socialize with peers. Their interaction into the schoolroom was scarce and the teamwork participation was deficient. In addition, they had difficulties expressing their emotions or feelings with classmates. Consequently, they experienced isolation most of the time.

However, the findings demonstrated that PBL could significantly improve the abilities to interact with other peers in the target language during the classroom sessions. It was evidenced that participants with autism did not manifest difficulties to acquaint themselves with instructions, representing a significant progress in the language acquisition same as the common learners. In addition, the PBL allowed all participants to enjoy a pleasant atmosphere while working and learning together. The proposed tasks at each stage of the PBL helped them to gain self-confidence and felt belonging to the group. They were more willing to participate, collaborate and strengthen the bonds of friendship.

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