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Research Article

Assembly Simulators in Cooperative Learning in an Educational Institution in Pasco

[1]Abanto Cordova Salvador [2]Alexander Chavez Cordova

[1&2]Universidad Nacional Daniel Alcides Carrión. Pasco, Peru

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** *Related declarations are provided in the final section of this article.*

Abstract

This research study aimed to determine whether there is a connection between the use of assembly simulators and cooperative learning in the Work Education area. The study was conducted with students from the emblemática Daniel Alcides Carrión Educational Institution, located in Cerro de Pasco, during the year 2019.

The study was basic in nature, with a descriptive level and a quantitative correlational approach. A total of 188 students participated, and a questionnaire was used to gather the necessary information.

The findings showed that 79.3% of the students achieved a high level in the use of assembly simulators. Regarding cooperative learning, 77.1% also reached a high level. After statistical analysis, a significant relationship was found between both variables, with a Spearman's Rho coefficient of 0.973 and a significance level of 0.002.

Keywords: assembly simulators; strategies; collaborative learning.

INTRODUCTION

Currently, Information and Communication Technologies (ICT) in all fields of education are essential for optimizing learning activities, especially after the COVID-19 pandemic, which forced teachers and students to use distance learning. Virtualization and ICT allow easy access to information, knowledge acquisition, and the learning process (Borja et al., 2021).

In Colombia, education offers a variety of opportunities to develop individuals' capacities. From childhood to adulthood, there are different levels and types of learning. One of these is secondary education, which provides young people with the opportunity to continue their studies or prepare them to perform certain activities that allow them to enter the labor market (García et al., 2023).

As students acquire global knowledge and access diverse sources of information, access to technological tools such as computers and Internet connections increases the likelihood of improved academic performance. These tools allow students to take online tests in areas of interest (Rodríguez et al., 2021).

The use of simulators and their features makes it possible to vary the educational environment by simulating real situations, facilitating the achievement of specific educational objectives in courses where they can be applied. These tools use project-based learning and problem-solving methods, allowing students to experiment with variables and simulate possible outcomes (Chinchay, 2020).

Therefore, based on these findings, this study was designed to evaluate whether assembly simulators have a significant impact on students' cooperative learning in Work Education. Simulators allow teachers to personalize learning and adapt to students' needs by providing opportunities to experiment with different situations and variables, while enabling teachers to identify strengths and weaknesses and adjust their instruction accordingly.

The main goal of this study was to find out if there is a link between assembly simulators and cooperative learning in the Work Education area. The research focused on students from the emblemática Daniel Alcides Carrión Educational Institution in Cerro de Pasco, during the 2019 school year.

The specific goals were:

- To see how assembly simulators relate to understanding in Work Education.
- To explore the connection between assembly simulators and planning in Work Education.
- To examine the relationship between assembly simulators and execution in Work Education.
- To determine how assembly simulators connect with verification in Work Education.

Previous studies such as Quizhpi (2023) concluded that simulators positively influence the learning process. They improve understanding of abstract concepts, promote active and personalized learning, and allow students to experiment safely.

Villalobos (2022) concluded that virtual simulator guides can improve science learning among eighth-grade students.

Catalán et al. (2023) found that collaboration in virtual environments promotes cooperative learning and allows students to interact despite physical distance.

Cuenca (2023) found a weak and low correlation (Spearman's Rho = 0.059), indicating that some strategies had minimal impact on cooperative learning.

From a theoretical perspective, assembly simulators allow students to virtually assemble and disassemble computer components step-by-step in an interactive 3D environment. This helps

students develop technical skills and learn through hands-on virtual experience (Dominatupc, 2020).

Assembly simulators include modules such as:

- Exploration module: Provides information and 360° visualization of components.
- Learning module: Provides guided assembly and disassembly.
- Testing module: Allows students to practice independently.

Network simulators also allow students to create and configure virtual networks (Jiménez, 2022).

Cooperative learning helps students work in small groups to improve their own learning and that of others (Johnson & Johnson, 2014). It promotes teamwork, collaboration, and shared learning goals.

METHOD

The study was basic, theoretical, and descriptive in nature, with a quantitative correlational design (Hernández & Mendoza, 2018).

The research design was non-experimental, meaning no variables were manipulated or changed; instead, everything was observed as it naturally occurred. It was also cross-sectional, since data was collected at a single point in time rather than over an extended period. Additionally, it had a correlational scope, as the goal was to find out whether there was any connection between the variables under study.

The population consisted of 188 secondary school students.

school students from the Daniel Alcides Carrión Educational Institution.

The sample also consisted of 188 students selected through non-probability sampling.

A questionnaire was used as the instrument to collect the data. It was reviewed and validated by experts, who assessed its clarity and relevance. Its reliability was also tested using Cronbach's alpha coefficient, which confirmed that the instrument was consistent and suitable for measuring what was intended.

The data collection technique was a survey, through which the questionnaire was administered to the participating students.

RESULTS AND DISCUSSION

The data gathered from the questionnaires made it possible to examine the use of assembly simulators and explore how they connect with cooperative learning.

The instruments were applied to 188 students.

The results showed that assembly simulators significantly support cooperative learning, especially in the Work Education area.

Overall, the findings demonstrate that assembly simulators contribute positively to cooperative learning and improve students' technical and collaborative skills.

Tabla 5

Nivel de la variable simuladores de ensamblaje

	Frecuencia	Porcentaje	Porcentaje válido	Porcentaje acumulado
Medio	39	20,7	20,7	20,7
Alto	149	79,3	79,3	100,0
Total	188	100,0	100,0	

Fuente: Instrumento aplicado a los estudiantes.

Figura 2

Nivel de la variable simuladores de ensamblaje

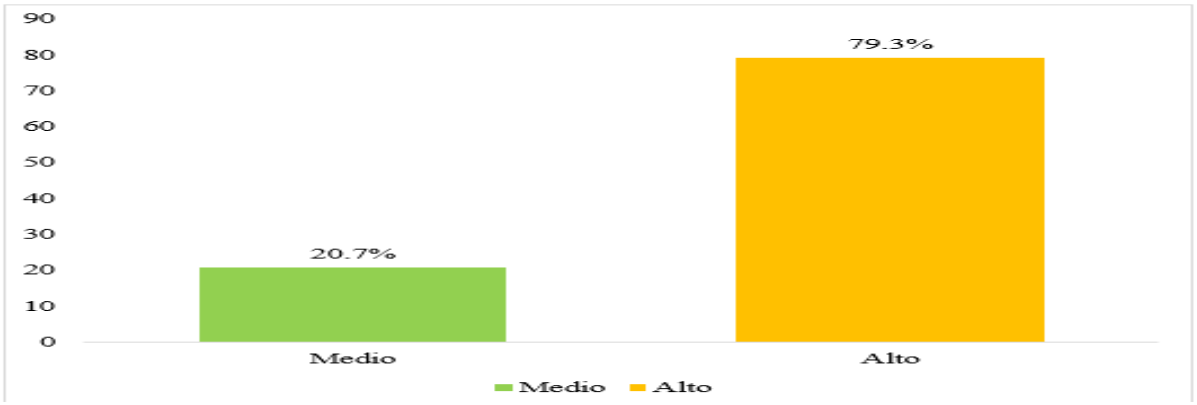


Figura 3

Niveles de las dimensiones de la variable simuladores de ensamblaje

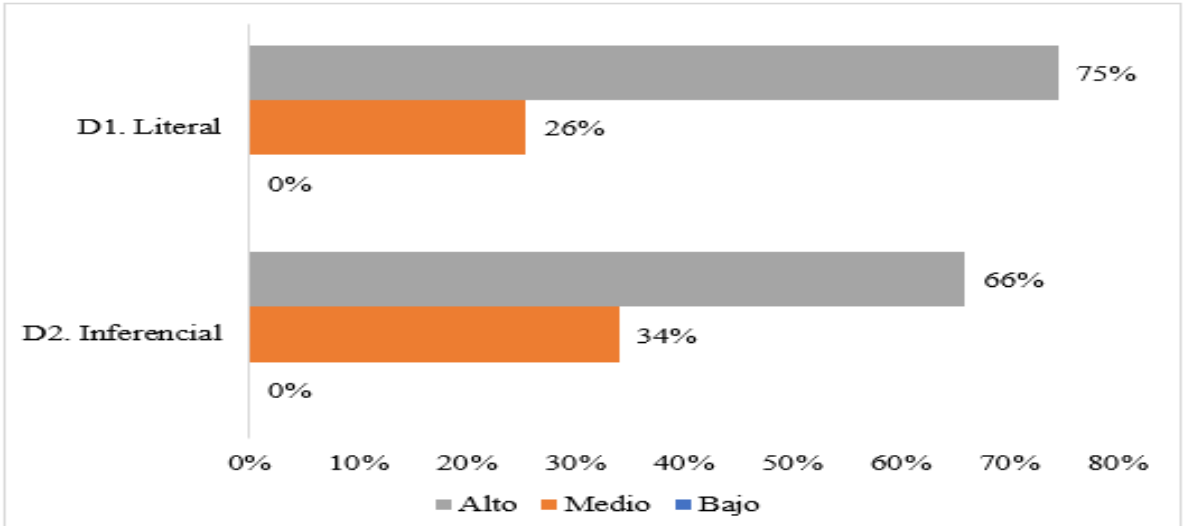


Tabla 6

Nivel de la variable aprendizaje cooperativo

	Frecuencia	Porcentaje	Porcentaje válido	Porcentaje acumulado
Medio	43	22,9	22,9	22,9
Alto	145	77,1	77,1	100,0
Total	188	100,0	100,0	

Fuente: Instrumento aplicado a los estudiantes.

Figura 4

Nivel de la variable aprendizaje cooperativo

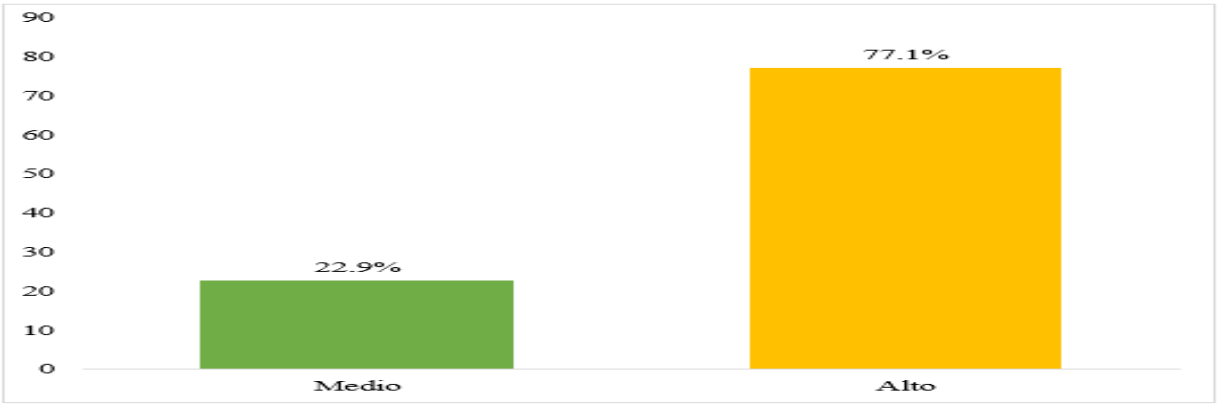
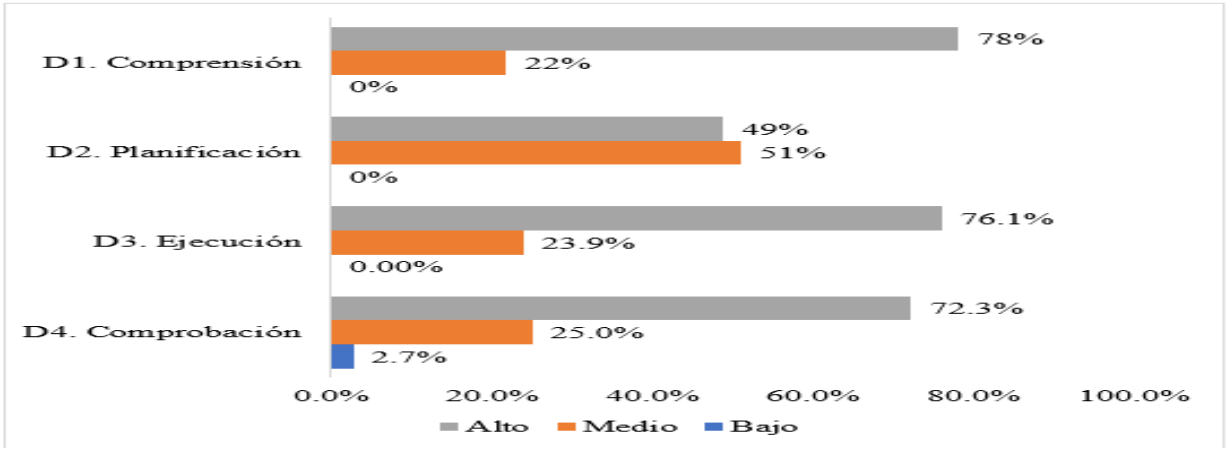


Figura 5

Niveles de las dimensiones de la variable aprendizaje cooperativo



DISCUSSION

According to the results of the general objective, assembly simulators are significantly related to cooperative learning in students, obtaining a significance value of .002 with a Spearman's Rho

of .973. In this line, the results are partially similar to the study conducted by Cuenca (2023), who concluded that the effect of strategies used by male students on cooperative learning showed a weak and low correlation. The data collection results and their analysis indicated an insignificant relationship among Ecuadorian university students. It can be observed that the Spearman's Rho value is 0.059, which means a low, weak, but positive and non-significant relationship, indicating that changes in strategies used by male students have a small effect on cooperative learning.

According to the results of the first specific objective, assembly simulators are significantly related to the comprehension dimension in students, obtaining a significance value of .001 with a Spearman's Rho of .831. In this regard, the results are similar to the study by Castilla (2023), who concluded that the use of Crocodile Simulator software was focused as a resource to optimize academic performance. With a correlation level of 0.880 using Spearman's Rho, it was concluded that the use of Crocodile Simulator contributes to improving academic performance.

According to the results of the second specific objective, assembly simulators are significantly related to the planning dimension in students, obtaining a significance value of .002 with a Spearman's Rho of .698. In this line, the results are similar to the study by Chávez (2018), who concluded that VLABQ_1_0_0_1, the use of a simulator, affects cooperative learning and student learning in fourth-grade students "A" of the Daniel Alcides Carrión Educational Institution, Cerro de Pasco – 2018.

CONCLUSIONS

Regarding the general objective, it was found that there is a very strong connection between assembly simulators and cooperative learning. This is supported by a Spearman's Rho coefficient of .973 and a significance level of .002.

Concerning the first specific objective, the results show a high relationship between assembly simulators and the comprehension dimension, with a Spearman's Rho of .831 and a p-value of .001.

As for the second specific objective, a high relationship was also found between assembly simulators and the planning dimension, yielding a coefficient of .698 and a significance level of .002.

Regarding the third specific objective, a moderate relationship was observed between assembly simulators and the execution dimension. The coefficient obtained was .485 with a p-value of .005.

Finally, for the fourth specific objective, a high relationship was identified between assembly simulators and the verification dimension, with a Spearman's Rho of .800 and a significance level of .002.

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