

Chatbot As An Artificial Intelligence Program In Autonomous Learning In Nursing Students At A University In Piura, 2023

Sandoval Peña, José Manuel¹, Macalupú Ipanaqué, José Víctor², Rufino Sosa, Mario³, García Paz, Elizabeth del Socorro⁴, Carmen Julia Morocho Ricalde⁵

Abstract

Objective: To determine the effects of chatbot as an artificial intelligence (AI) program on autonomous learning (ML) of nursing students at a private university in Piura, 2023. **Method:** quantitative, applied, experimental and pre-experimental approach. The population consisted of students of the Nursing Study Program and a sample of 32 students from the ninth cycle. A pretest and posttest were applied and 16 sessions were executed in the program. **Results:** according to the self-learning dimension with the pretest, 90.6% were placed in the low autonomy level, with the posttest 100% were located in the autonomous level. In self-regulation, the posttest presented 96.9%, establishing them at the medium level and low autonomy, with the posttest 100% are at the autonomous level. In metacognition, the pretest indicated that 78.1% were at the low level and at the posttest 100% were at the autonomous level. **Conclusion:** It was demonstrated that there is a significant influence of the program on the development of autonomous learning, accepting the alternative hypothesis.

Keywords: Chatbot, Artificial Intelligence, Machine learning.

1. Introduction

Education is a vital process in the formation of human beings. Globally, low academic performance is observed, according to the World Bank (2017) reports that since 2019 learning poverty has increased by 57%; The Organisation for Economic Cooperation and Development (OECD, 2016) reports that 60% of students have a low reading rate and 68.5% do not develop scientific knowledge. Pérez (2020) explains that it is necessary for the student to have the development of autonomous learning and if not, the teacher must take it step by step. Pegalajar (2020) says that a "teacher's university" was observed where a non-constructivist education prevails and less meaningful and autonomous on the part of students.

The European Commission (2018) and Fernández-Ferrer (ed.) (2023) consider that one of the main generic competences pursued by higher education is learning to learn, i.e. the ability to pursue, pursue and organise their own learning. At the university level, it is reaffirmed that in order to promote and deal with difficulties, it is of utmost importance that

¹<https://orcid.org/0000-0002-8203-0339> Universidad César Vallejo Piura-Perú.

²<https://orcid.org/0000-0003-1576-2385> Universidad César Vallejo Piura-Perú.

³<https://orcid.org/0000-0002-4539-9815> Universidad César Vallejo Piura-Perú.

⁴<https://orcid.org/0000-0001-6529-4183> Universidad César Vallejo Piura-Perú.

⁵<https://orcid.org/0000-0002-8398-8696> Universidad César Vallejo Piura-Perú.

pedagogues provide a supportive environment, provide suitable resources and strategies, this will allow the development of self-regulatory skills in learning.

According to the National Household Survey (ENAHO) provided by the National Institute of Statistics and Informatics (INEI, 2020) it publishes that 32.7% and 35.9% do not have computers and do not have access to the internet. Tinoco (2023) and Bernardo et al (2023) argue that new environments should promote spaces and autonomous learning and that teachers should work on metacognitive strategies that develop autonomous learning; In addition, Aranda (2023) states that there are "many people who lack easy access to digital tools" (p. 10) presenting difficulties.

According to the Peruvian Institute of Economics (IPE) (2018), in the city of Piura, the percentage of young university students increased from 43% to 52% in the last 10 years. On the other hand, the closure of universities by SUNEDU and the social restriction due to the pandemic uncovered shortcomings of an educational system incapable of developing autonomous learning due to a lack of teaching strategies or a lack of autonomous university competencies. According to the World Bank (2017) and Vera (2021), autonomous learning at the higher level is "immersed in deep processes of analysis and reflection" as a result of changes in the environment.

The problem of autonomous learning worldwide is a situation that involves all educational levels where institutions and organizations try to do it from a comprehensive approach, especially at the higher university level, it is crucial that young people acquire skills and competencies to learn independently. International studies show that students must possess skills to organize their own educational model, properly managing time and identifying their own shortcomings as well as accessible resources; Nowadays, artificial intelligence (AI) has gained importance in the educational field as a support in the development of these required competencies. For Chiu et al. (2023) in their experimental study carried out at the University of Hong Kong where they sought to know what is the role of the teacher supported by AI technology and the use of chatbots, the results revealed that there is intrinsic motivation and competence to learn through this technological tool is developed, leading to self-regulation of what is learned.

Taranikanti and Cameron (2023) in Oakland with Gen Z medical students. The purpose was to implement learners with student-centered strategies in interaction with the AI chatbot with metacognitive frameworks and achieve autonomous knowledge from a clinical environment, non-experimental explanatory research. These skills are important within the internal lifelong learning processes of medical students. Al-Abdullatif et al. (2023) worked at a university in Saudi Arabia with the aim of investigating the effect of the chatbot to support motivation as learning strategies. They presented a quantitative approach under a quasi-experimental design, concluding that in the experimental group there is a higher level of perception for learning, developing cognitive learning, self-regulation and metacognition strategies with the use of the chatbot system. For AI Ka'bi (2023), who conducted an inquiry at the Australian-Kuwait University, where they tried to identify the impact of artificial intelligence within higher education, seeking to promote creative thinking and criticality, for this they make a model for the improvement of cognitive capacity, where they made the comparison of already existing algorithms. Others, such as González and Vega (2023), research in Cuba, whose objective was to design the modeling and simulation courses of a career in the face-to-face modality. Within the results obtained from the analysis of the research papers, 93% of students consider the use of the chatbot for the development and orientation of self-learning to be satisfactory.

Reviewing the studies on the use of technology in learning, especially autonomous, at the national level, the Peruvians, Ortiz and Dávila (2023) who analyzed the response time of a virtual system in undergraduate students, determined that 55.13% of university students are

at an average level according to the perception they have of the virtual system, In other words, the university students adapted well, demonstrating that these tools are useful in the management of responses during autonomous learning. Luque et al. (2022) carried out their study in Apurímac, where they seek to describe skills and abilities with the application of technology in engineering university students. The results showed that 85.7% improved their academic level and 80% developed their self-learning with the use of technology. On the other hand, Romero et al. (2022) investigated in the city of Lima on the influence on the development and application of podcasts for the strengthening of autonomous learning with university students. They concluded that the use and development of podcasts does influence the strengthening of autonomous learning, it also contributes to the improvement of self-regulation, it also helps in the development of informational competencies, favoring the construction and management of knowledge. Along the same lines, Uceda et al. (2021) presented the results of a study carried out in Cajamarca where they sought to evaluate whether self-regulation of learning increases with the use of the chatbot in students of the first cycle of law; They showed that students have a high level of regularization of their learning with the use of the chatbot's digital tool.

It is clear that every student and future professional needs training which allows them to acquire, develop and strengthen cognitive skills, among others, through the application of various strategies that allow flexibility of learning and based on the theory of competencies where the achievement of learning is sought under the pillar of learning to learn according to Martínez-Sánchez et al. (2022) and Levano et al. (2019) Likewise, Pérez (2012) states that the purpose of competencies is to ensure that the student is to fix and enhance their talents or skills through tasks or actions within autonomous and active learning, all of which will allow the student to acquire learning to be applied in a specific context where it develops.

According to Corbett and Spinello (2020), the purpose is to foster autonomy in university students, understood as the ability to take responsibility for their own education. Students are encouraged to create their own routes to relevant material rather than adhering to a pre-set curriculum. Tseng et al. (2020) explain that autonomous learning refers to the ability of learners to acquire new knowledge and apply it in various situations. The autonomy of the student is increasingly relevant in the educational field, being promoted through an adequate organization and planning of the learning process. In agreement with Dumazedier and Leselbaum (1993), it is argued in this context that self-directed learning is that in which the person decides for himself how to develop his learning process, without the need for external assistance. As De León and Brown (2018) point out, the subject has the ability to self-regulate their own learning. Arellano (2018) highlights that students have a fundamental role in their learning process, reflecting on it, rethinking it and taking responsibility for their progress. Cárdenas (2018) also emphasizes that an active attitude on the part of the student is necessary to take advantage of the resources and information provided by the instructor.

In another perspective, Solórzano-Mendoza (2017) states that it is a precise intellect in which the speaker makes use of metacognition skills in order to carry out his own learning process. According to Cárcel (2016), the individual has the ability to autonomously regulate everything he learns through different techniques, including an appropriate environment, classification of information, and awareness about the process of learning to achieve a goal. When analyzing this issue, Giné Freixes (2009) highlights the importance of constant tenacity and discipline as key factors that will guide a person in the process of acquiring new information when they are able to study without supervision. The key to success in school is to have a degree in self-direction, something that students can acquire with the help and support of the university. Ferroni et al. (2005) highlight that autonomy is of great importance in education. This is because learning is an individual process where each student has the responsibility to determine the right moments, the appropriate

methodologies and the quantities necessary to reach a deeper understanding of a specific topic or task, perfectly understood by young university students who know when to learn and why they should learn.

"Self-learning is a way of learning and acquiring knowledge by oneself, either by study or experience" (Príncipe, 2018, p.43). "Self-regulation is an active process where the subject self-regulates emotions, thoughts, learning skills and is aware of their own cognitive and socio-affective learning" (Zambrano, 2016, p.54). according to Alvarado (2017) "it supports metacognition as a person's ability to learn and on what way they learn to develop their own metacognition, thus improving personal learning" (p.65).

Based on the development of the intervention of the independent variable the chatbot artificial intelligence program, it is stated that in recent years Artificial Intelligence (AI) has gained great importance in all sectors of human activity, especially in the field of education. Chatbots, chatterbots or dialogue/conversational systems/agents have a primary participation in the process of globalisation, these platforms are widely welcomed for their ability to automate the performance of multiple tasks.

Aldehy et al. (2019) state that chatbots are computer programs being part of messaging applications, which tend to emulate conversations like a human being, this can be done by text messaging, also by navigation buttons or with simulated voice to offer some service. It is understood that messages, whether by text, by navigation button or by simulated voices, are the forms that this type of AI has, where it allows the user to interact using a natural language understandable by the parties. In the same idea, we have Baker et al. (2019) who define that artificial intelligence in the educational field, they are primarily concerned with computers performing or developing cognitive tasks, that is, content learning and problem solving.

Smutny and Schreiberova (2020) define chatbots as a program that is based on artificial intelligence, i.e. it is an NLP (Natural Language Processing), its main function being to engage in a conversation between it and man by means of voice message or texts. In addition, Go and Sundar (2019) add that there is a fluid relationship of trust between man and machine due to the fact that there is a similarity between the chatbot and the human in the visual aspect. Here we can see the relationship between the two, where the importance of human language stands out. Para Wollny et al. (2021) looked at some particular ways to classify chatbots. According to Winkler and Soellner (2018), there are different perspectives to classify chatbots, they can be flow chatbots, artificial intelligence chatbots, chatbots with integrated voice recognition, or chatbots with integrated contextual data.

An important part of the research is the time-dependent design aspect of conventional agents, which are based on specific texts, in the study they are called chatbots. Feine et al. (2020) determine that they are software-based systems that are designed to interact with humans through the use of text-based natural language. When the study of the interaction between man and robot is carried out, it is recognized that temporality exists in this relationship (Baraka et al., 2020).

Baraka et al. (2020) mention that this temporal profile is characterized by the time horizon dimensions, which is the period of duration in which an interaction between the user and the robot occurs (individual interactions and frequencies or multiple interactions). Another related dimension is synchronicity, here it refers to when a robot responds immediately (synchronously) or late (asynchronously) with a much greater distance. De Keyser et al. (2019) and Khalil and Rambech (2022) consider robots as chatbots at the physical end of the "virtual reality continuum", this allows the transfer of some knowledge to the virtual chatbot. While synchronicity seems less applicable to messaging-based chatbots that are

virtually available 24 hours a day, time interval, duration, and frequency are relevant dimensions to distinguish chatbots with different temporal profiles.

The theories that support self-learning argue that the ability of oneself to take charge of one's own learning, being a non-innate ability that must be acquired either through formal education or by natural means (Holec, 1981); Arnold (2018) adds that there are three components of this autonomy within this context, on the one hand, we have the student must select the what, the how and the why to learn. Along the same lines, Coll and Martín (1999) state that it is the ability of the student to use their acquired knowledge in order to acquire new information autonomously and individually. Moreno and Martínez (2007) also add that self-learning would be one of the primary educational objectives; while Ruiz (1997) highlights that learning to learn and autonomy go hand in hand.

Mendoza and Paredes (2022) report that the ability to self-study has become essential for students. It allows them to develop management and organizational skills, thus gaining greater control over their educational process. Institutions need to provide adequate guidance and support in the current context of virtual education. Learning outside of the traditional environment is both an opportunity and a challenge for students. On the other hand, Pandero (2017) and Sáez et al. (2021) agree in defining self-regulation as a broad concept that involves a series of processes related to internal learning, involving cognitive, metacognitive, motivational, behavioral and affective processes, that is, a comprehensive and holistic system where variables that affect the learning process intervene. On the other hand, Ganda and Boruchovitch (2018) and Cunill and Curbelo (2021) contribute to the definition as a process of self-reflection and tasks carried out intentionally and consciously where the student self-evaluates, plans and controls their own process and where motivation is of utmost importance.

Within the educational framework, metacognition focuses on enhancing the competencies, skills, and abilities necessary for students to achieve their goals. In addition, it is critical to recognize how this procurement process is progressing, whether it has been completed or requires strengthening. The ultimate goal is to achieve truly valuable and self-directed learning (Arango et al., 2010). In short, to understand metacognition is to understand how we acquire our own knowledge (Guedes et al., 2013). According to Águila (2014), metacognition consists of being aware of the thought process, the use of strategies, and evaluating how efficient cognitive activity is. Despite this, the aforementioned processes are permanent according to Jaramillo and Simbaña (2014) while Vygotsky emphasizes the fundamental importance of language, underlining its need to be clear, specific and assertive. The topic related to metacognition focuses on the ability to solve academic problems in teachers and students by promoting a type of cognitive learning that includes elements such as self-control of knowledge, constructivism and knowledge development. To achieve an adequate educational act, it is necessary to consider the complex relationships that configure metacognition and generate essential epistemic configurations. University education benefits enormously in its beginnings by helping to discover the essential qualities of each individual through these aspects (Tapia, 2022).

Novel approaches in education are linked to this topic, especially from the perspective of neuroscience and how the brain acquires knowledge. Likewise, the option of using holistic learning that is connected to everyday events is proposed to make sense of theoretical elements that are acquired on campus and transmit the knowledge acquired in common environments. Achieving this goal translates into obtaining meaningful learning that fosters a close relationship between students and their environment and social situation (Tapia, 2022).

2. Objectives and hypotheses

2.1. Overall Objective

To determine the effects of chatbot as an AI program on autonomous learning of nursing students at a private university in Piura, 2023.

2.1.1. Specific objectives

Determine the influence of the chatbot as an AI program for the improvement of self-learning; to determine the improvement of self-regulation of learning, and to determine the improvement of metacognition in the learning of nursing students.

2.2. Alternate Hypothesis

The chatbot as an AI program has significant effects on the autonomous learning of nursing students at a private university in Piura, 2023.

2.2.1. Null Hypothesis

The chatbot as an AI program has no significant effects on the autonomous learning of nursing students at a private university in Piura, 2023.

3. Methodology

3.1 Type and design of research

3.1.1 The type of research

An applied rate was adopted . In this case, we sought to demonstrate the effect of the Chatbot as an artificial intelligence program to improve autonomous learning.

3.1.2 Research design

It responds to an experimental research of a pre-experimental or sub-design type.

3.3 Population, Sample and Sampling

3.3.1. Population

A population of 68 students of the Professional School of Nursing of a private University of Piura, who are enrolled in the current academic semester 2023-2, was considered, the inclusion criteria for the population selection were taken into account:

The inclusion criteria considered are: students must have been enrolled in the 2023-2 academic semester, they must be enrolled in the ninth cycle of nursing.

3.3.2. Sample

The sample for this study was 32 ninth-cycle nursing students.

3.3.3. Sampling

It was non-probabilistic for convenience where the 32 students of the ninth cycle were selected.

Data collection technique and instruments

The technique applied for the study was the survey, which allowed the collection of data, in order to know the opinion of what affects them.

The instrument that was administered for data collection was the questionnaire, as an instrument it was designed under the Likert scale.

Validity of the instrument : the approval of five specialists with a doctorate degree and registered with CONCYTEC was requested. The validity was calculated with Aiken's coefficient V, which allowed us to quantitatively estimate the result obtained is: 0.936.

Reliability was performed with Cronbach's alpha coefficient, and the level of reliability for the autonomous learning questionnaire was 0.868.

4. Results

Table 1 Descriptive statistics of pretest and posttest for self-learning

| Levels | Pretest | | | | Postest | | | |
|--------------------------|---------|-------|---------|--------------|---------|-------|---------|--------------|
| | fr. | % | % Valid | Cumulative % | fr. | % | % Valid | Cumulative % |
| Low autonomy | 29 | 90,6 | 90,6 | 90,6 | | | | |
| Moderately self-employed | 3 | 9,4 | 9,4 | 100,0 | | | | |
| Autonomous | | | | | 32 | 100,0 | 100,0 | 100,0 |
| Total | 32 | 100,0 | 100,0 | | 32 | 100,0 | 100,0 | |

Note. fr. = Frequency. %= Percentage

The results of Table 1 showed that, in the values of the pretest with respect to the self-learning dimension and according to the levels, we have 90.6% in low autonomy, which is equivalent to 29 students, and 9.4% in medium autonomous, which represent 3 students, these results tell us that there is a very significant percentage that does not have management of study strategies. She also doesn't know how to organize her time, much less plan her academic tasks. In addition, the application of the posttest for the same dimension shows that 100%, that is, the 32 students reached a level of autonomy in their self-learning.

Table 2 Descriptive Statistics of Pretest and Posttest for Self-Regulation

| Levels | Pretest | | | | Posttest | | | |
|--------------------------|---------|-------|---------|--------------|----------|-------|---------|--------------|
| | fr. | % | % Valid | Cumulative % | fr. | % | % Valid | Cumulative % |
| Low autonomy | 5 | 15,6 | 15,6 | 15,6 | | | | |
| Moderately self-employed | 26 | 81,3 | 81,3 | 96,9 | | | | |
| Autonomous | 1 | 3,1 | 3,1 | 100,0 | 32 | 100,0 | 100,0 | 100,0 |
| Total | 32 | 100,0 | 100,0 | | 32 | 100,0 | 100,0 | |

Note. fr. = Frequency. %= Percentage

The data obtained in Table 2 show that, in the values of the pretest corresponding to the self-regulation dimension and considering their assessments, they present a low autonomy of 15.6%, presenting 5 students, and in the moderately autonomous level, 81.3%, which refers to 26 students and 3.1% at the autonomous level, which represents one student, these results refer to us that there is a higher percentage of young people who are in the second level. To say that they have achieved 50% in how to apply study techniques and strategies, they also use the Internet to organize their information and take notes of the answers found. We also observed that 3.1% who are a student do apply all these activities, as opposed to 15.6%, that is, 5 students, who do not do anything. In contrast to what was found with the pretest, after applying the program and applying the posttest we found a very significant advance of 100%, which is the 32 students.

Table 3 Descriptive Statistics of Pretest and Posttest for Metacognition

| Levels | Pretest | | | | Posttest | | | |
|--------------------------|---------|-------|---------|--------------|----------|-------|---------|--------------|
| | fr. | % | % Valid | Cumulative % | fr. | % | % Valid | Cumulative % |
| Low autonomy | 5 | 15,6 | 15,6 | 15,6 | | | | |
| Moderately self-employed | 25 | 78,1 | 78,1 | 93,8 | | | | |
| Autonomous | 2 | 6,3 | 6,3 | 100,0 | 32 | 100,0 | 100,0 | 100,0 |
| Total | 32 | 100,0 | 100,0 | | 32 | 100,0 | 100,0 | |

Note. fr. = Frequency. %= Percentage

Table 3 shows, according to the results of the pretest for the metacognition dimension and taking into account the levels of assessment, that there were 78.1% of young people located in moderately autonomous, 15.6% in low autonomy, this is equivalent to 25 and 5 students respectively, as opposed to 6.3% who are 2 students who are in the autonomous level. In addition, we can observe the post-test data obtained after the program where it is shown that 100%, that is, the 32 students, reached an autonomous level for the metacognition of their learning; The program allowed all the subjects in the sample to achieve metacognition of their learning.

Table 4 Descriptive statistics of the pretest and posttest of autonomous learning

| Levels | Pretest | | | | Posttest | | | |
|--------------------------|---------|-------|---------|--------------|----------|-------|---------|--------------|
| | fr. | % | % Valid | Cumulative % | fr. | % | % Valid | Cumulative % |
| Low autonomy | 15 | 46,9 | 46,9 | 46,9 | | | | |
| Moderately self-employed | 16 | 50,0 | 50,0 | 96,9 | | | | |
| Autonomous | 1 | 3,1 | 3,1 | 100,0 | 32 | 100,0 | 100,0 | 100,0 |
| Total | 32 | 100,0 | 100,0 | | 32 | 100,0 | 100,0 | |

Note. fr. = Frequency. %= Percentage

Table 4 systematizes the results obtained with the application of the tests, before and after the execution of the program. The posttest indicates that 50% of the 32 students presented themselves as moderately autonomous in their learning, 46.9% who are 15 students are at the low autonomous level, and 3.1% who are 1 student at the autonomous level. The frequencies and percentages of the descriptive statistics show the effectiveness of the workshops carried out during the program, 100% of the students reached an autonomous level in their learning.

Table 5 Shapiro-Will Normality Test, for pretest and post-test autonomous learning

| | Shapiro-Wilk Pretest | | | Shapiro-Wilk Posttest | | |
|------------------|----------------------|----|------|-----------------------|----|------|
| | Statistical | Gl | Gis. | Statistical | Gl | Gis. |
| Self-instruction | ,770 | 32 | ,000 | ,847 | 32 | ,000 |
| Self-regulation | ,827 | 32 | ,000 | ,797 | 32 | ,000 |
| Metacognition | ,842 | 32 | ,000 | ,856 | 32 | ,001 |
| Total | ,644 | 32 | ,012 | ,951 | 32 | ,152 |

Note. Sig. = p. and $p < .005$

The results obtained from the application of the posttest with the same normality test again yielded a score below .005 in the significance of the p of the three dimensions. The results obtained before and after the test, with a pilot sample and the other the study sample, where the p does not follow a normal distribution because it is less than .005, allowed the selection of the non-parametric statistic for the study. For this particular case, and because the instrument is presented under the Likert scale with ordinal data, and because the p-value $< .005$, observing that a normal distribution is not followed for both the pretest and the posttest, the Wilcoxon test has been selected.

Table 6 Wilcoxon statistic for the identification of differences with respect to self-learning before and after applying the program

| | | N | Average Range | Sum of Ranks |
|-------------------------------|-----------------|-----|---------------|--------------|
| Self-study pretest - posttest | Negative Ranges | 0a | ,00 | ,00 |
| | Positive Ranges | 32b | 16,50 | 528,00 |
| | Draws | 0c | | |
| | Total | 32 | | |

to. Posttest self-study $<$ Pretest self-study

b. Post-test self-study $>$ Pretest self-study

c. Posttest self-learning = Pretest self-learning

Table 6 shows that of the 32 students who have zero (negative range) students who have not been harmed by the application of the AI program, the chatbot in its self-learning dimension; Unlike the 32 university students (Positive range) who have benefited from the application of the program, presenting an average range of 16.50, this means that 100% of

participants reached a level of autonomy of their learning after working on the dimension. Finally, it is observed that there are zero students (Tie) who remain constant in their level.

Table 7 Proof of acceptance or rejection of the null hypothesis according to Wilcoxon's test of the self-learning dimension

| | Null hypothesis | Test | Gis. | Decision |
|---|---|--|-------------|-------------------------------|
| 1 | The median difference between pretest and posttest self-study is zero | Wilcoxon Sign Range Test for Related Samples | .000 | Rejecting the Null Hypothesis |

- If $p < 0.005$ H_0 is rejected
- If $p > 0.05$ does not reject H_0

There is a p value of 0.000 that is less than 0.005, the null hypothesis is rejected, and the alternative hypothesis is accepted. Therefore, it can be inferred that if the chatbot is applied as an artificial intelligence program, it has significant effects on the application of self-learning strategies of nursing students from a private university in Piura, 2023

Table 8 Wilcoxon statistic for the identification of differences with respect to self-regulation before and after applying the program

| | | N | Average Range | Sum of Ranks |
|------------------------------------|-----------------|----------|----------------------|---------------------|
| Pretest - posttest self-regulation | Negative Ranges | 0a | ,00 | ,00 |
| | Positive Ranges | 32b | 16,50 | 528,00 |
| | Draws | 0c | | |
| | Total | 32 | | |

to. Posttest Self-Regulation < Pretest Self-Regulation

b. Post-test self-regulation > Pretest self-regulation

c. Posttest self-regulation = Pretest self-regulation

Table 8 shows that of the 32 students who have zero (Negative range) students who have not been harmed by the application of the AI program the chatbot in the self-regulation dimension of their learning; Unlike the 32 university students (Positive range) who have benefited from the application of the program, presenting an average range of 16.50, this means that 100% of participants reached a level of autonomy in the self-regulation of their learning after applying the program. Finally, it is observed that there are zero students (Tie) who remain constant in their level.

Table 9 Proof of acceptance or rejection of the null hypothesis according to Wilcoxon's test of the self-regulation dimension

| | Null hypothesis | Test | Gis. | Decision |
|---|--|--|-------------|-------------------------------|
| 1 | The median difference between pretest and posttest self-regulation is zero | Wilcoxon Sign Range Test for Related Samples | .000 | Rejecting the Null Hypothesis |

- If $p < 0.005$ H_0 is rejected
- If $p > 0.05$ does not reject H_0

There is a p value of 0.000 that is less than 0.005, the null hypothesis is rejected, and the alternative hypothesis is accepted. Therefore, it can be inferred that if the chatbot is applied as an artificial intelligence program, it has significant effects on the self-regulation of learning.

Table 10 Wilcoxon statistic for the identification of differences with respect to metacognition before and after applying the program

| | | N | Average Range | Sum of Ranks |
|---------------------------------------|-----------------|-----|---------------|--------------|
| Metacognition from pretest - posttest | Negative Ranges | 0a | ,00 | ,00 |
| | Positive Ranges | 32b | 16,50 | 528,00 |
| | Draws | 0c | | |
| | Total | 32 | | |

to. Posttest Self-Regulation < Pretest Self-Regulation

b. Post-test self-regulation > Pretest self-regulation

c. Posttest self-regulation = Pretest self-regulation

Table 10 shows that of the 32 students who have zero (Negative Range) students who have not been harmed by the application of the AI program the chatbot in the metacognitive process; Unlike the 32 university students (Positive range) who have benefited from the application of the program, presenting an average range of 16.50, this means that 100% of participants reached a level of autonomy of their learning after applying the program. Finally, it is observed that there are zero students (Tie) who remain constant in their level.

Table 11 Proof of acceptance or rejection of the null hypothesis according to Wilcoxon's test of the metacognition dimension

| | Null hypothesis | Test | Gis. | Decision |
|---|--|--|------|-------------------------------|
| 1 | The median difference between pretest and posttest metacognition is zero | Wilcoxon Sign Range Test for Related Samples | .000 | Rejecting the Null Hypothesis |

- If $p < 0.005$ H_0 is rejected
- If $p > 0.05$ does not reject H_0

There is a p value of 0.002 that is less than 0.005, the null hypothesis is rejected and the alternative hypothesis is accepted. So it can be inferred that if the chatbot is applied as an artificial intelligence program, it has significant effects on autonomous learning.

Table 12 Wilcoxon statistic for the identification of differences with respect to metacognition before and after applying the program

| | | N | Average Range | Sum of Ranks |
|---------------------------------------|-----------------|-----|---------------|--------------|
| Metacognition from pretest - posttest | Negative Ranges | 0a | ,00 | ,00 |
| | Positive Ranges | 32b | 16,50 | 528,00 |
| | Draws | 0c | | |
| | Total | 32 | | |

to. Posttest Metacognition < Pretest Metacognition

b. Posttest Metacognition > Pretest Self-Regulation

c. Posttest Metacognition = Pretest Metacognition

Table 12 shows that of the 32 students who have zero (negative range), students who have not been harmed by the application of the AI program to the chatbot in the metacognitive process; Unlike the 32 university students (Positive range) who have benefited from the application of the program, presenting an average range of 16.50, this means that 100% of participants reached a level of autonomy of their learning after applying the program. Finally, it is observed that there are zero students (Tie) who remain constant in their level.

Table 13 Wilcoxon statistic for the identification of differences with respect to metacognition before and after applying the program

| | N | Average Range | Sum of Ranks |
|--|---|---------------|--------------|
|--|---|---------------|--------------|

| | | | | |
|---------------------------------------|-----------------|-----|-------|--------|
| Metacognition from pretest - posttest | Negative Ranges | 0a | ,00 | ,00 |
| | Positive Ranges | 32b | 16,50 | 528,00 |
| | Draws | 0c | | |
| | Total | 32 | | |

to. Posttest Metacognition < Pretest Metacognition

b. Posttest Metacognition > Pretest Self-Regulation

c. Posttest Metacognition = Pretest Metacognition

Table 13 shows that of the 32 students who have zero (Negative Range) students who have not been harmed by the application of the AI program the chatbot in the metacognitive process; Unlike the 32 university students (Positive range) who have benefited from the application of the program, presenting an average range of 16.50, this means that 100% of participants reached a level of autonomy of their learning after applying the program. Finally, it is observed that there are zero students (Tie) who remain constant in their level.

Table 14 Proof of acceptance or rejection of the null hypothesis according to Wilcoxon's test of the metacognition dimension

| | Null hypothesis | Test | Gis. | Decision |
|---|--|--|------|-------------------------------|
| 1 | The median difference between pretest and posttest metacognition is zero | Wilcoxon Sign Range Test for Related Samples | .000 | Rejecting the Null Hypothesis |

- If $p < 0.005$ H_0 is rejected
- If $p > 0.05$ does not reject H_0

Since there is a p value of 0.002 that is less than 0.005, the null hypothesis is rejected and the alternative hypothesis is accepted. Therefore, it can be inferred that if the chatbot is applied as an artificial intelligence program in its metacognition dimension, it has significant effects on autonomous learning.

Table 15 Wilcoxon statistician for the identification of differences with respect to autonomous learning before and after the implementation of the program

| | | | | |
|---|-----------------|-----|---------------|--------------|
| | | N | Average Range | Sum of Ranks |
| Autonomous learning from pretest - posttest | Negative Ranges | 0a | ,00 | ,00 |
| | Positive Ranges | 32b | 16,50 | 528,00 |
| | Draws | 0c | | |
| | Total | 32 | | |

to. Posttest Autonomous Learning < Pretest Autonomous Learning

b. Posttest Autonomous Learning > Pretest Autonomous Learning

c. Posttest Autonomous Learning = Pretest Autonomous Learning

Table 15 shows that of the 32 students who have zero (Negative Range) students who have not been harmed by the application of the AI program the chatbot; Unlike the 32 university students (Positive range) who have benefited from the application of the program, presenting an average range of 16.50, this means that 100% of participants reached a level of autonomy of their learning after applying the program. Finally, it is observed that there are zero students (Tie) who remain constant in their level.

Table 16 Acceptance or rejection test of the null hypothesis according to Wilcoxon's test for autonomous learning

| Null hypothesis | Test | Gis. | Decision |
|-----------------|------|------|----------|
|-----------------|------|------|----------|

| | | | | |
|---|--|--|------|-------------------------------|
| 1 | The median difference between pretest and posttest autonomous learning is zero | Wilcoxon Sign Range Test for Related Samples | .000 | Rejecting the Null Hypothesis |
|---|--|--|------|-------------------------------|

- If $p < 0.005$ H_0 is rejected
- If $p > 0.05$ does not reject H_0

There is a p value of 0.000 that is less than 0.005, the null hypothesis is rejected, and the alternative hypothesis is accepted. Therefore, it can be inferred that if the chatbot is applied as an artificial intelligence program, it has significant effects on the autonomous learning of nursing students.

5. Discussion

As a first specific objective, it was considered to determine the influence of the chatbot as an AI program to improve the self-learning of future nurses. Based on this, theorists define self-learning as the ability of oneself to take charge of one's own learning, being a non-innate ability that must be acquired either through formal education or through natural means (Holec, 1981); Aoki (2000) adds that there are three components of this autonomy within this context, on the one hand, we have the student must select the what, the how and the why to learn. Along the same lines, Coll and Martín (1999) state that it is the ability of the student to use their acquired knowledge in order to acquire new information autonomously and individually. Moreno and Martínez (2007) also add that one of the central objectives of education is self-learning; while Ruiz (1997) highlights that learning to learn and autonomy go hand in hand.

The results found with the post-test administration after applying the chatbot program as a learning tool showed that 100% of the university students achieved the autonomy is their self-learning, that is, that the 32 students. The results of this research coincide with those obtained by González and Vega (2023): they showed that 93% of students consider the use of the chatbot satisfactory for the development and guidance of self-learning. On the other hand, Gouarnaluses et al. (2022), showed that 89.27% of undergraduate medical students use mobile devices to study and 95.76% make use of the virtual tool WhatsApp as a resource for their development of virtual scientific self-learning.

Another study conducted by Luque et al. (2022) showed that 85.7% of Peruvian university students improve their academic level and 80% develop self-learning with the use of ICTs. Finally, the Peruvian Bobadilla (2018) sought to determine what effects a program as a virtual tool can have on autonomous learning, leading to the conclusion that the digital portfolio as a digital tool promotes autonomous learning in university students. The background and its coincidences with the present research show that the students subjected to the chatbot program know and adequately apply the strategies for their studies, plan and organize their time and academic activities, demonstrating autonomy in their academic actions.

For the second specific objective, it was considered to determine the influence of the chatbot as an artificial intelligence program for the improvement of the self-regulation of learning of nursing students. Based on the theorists Pandero (2017) and Sáez et al. (2021), you agree in defining self-regulation as a broad concept that involves a series of processes related to internal learning, involves cognitive, metacognitive, motivational, behavioral and affective processes, that is, an integral and holistic system where variables that affect the learning process intervene. On the other hand, Ganda and Boruchovitch (2018) and Cunill and Curbelo (2021) contribute to the definition as a process of self-reflection and tasks carried out intentionally and consciously where the student self-evaluates, plans and controls their own process and where motivation is of utmost importance.

The results found in the research showed a very significant advance of the 32 students, that is, 100% of the students reached a level of autonomy in the self-regulation of their learning. The most recent research results are similar to those of Chiu et al. (2023), who showed that the use of the chatbot allows the acquisition of competence to learn, that is, to acquire self-regulated learning to improve the need for autonomy; the contributions of Al-Abdullatif et al. (2023) coincide with those found, the results demonstrate the importance of the chatbot in strengthening self-regulated learning ($t = 6.07$, $p < 0.05$) confirming a positive influence.

Studies from two years ago, such as those carried out, showed that the use of the chatbot as a digital tool increased self-regulation to a high level. Likewise, the findings found by Uceda et al. (2021) showed that students have a high level of self-regularization of their learning with the use of the chatbot's digital tool. Another of the studies that present this similarity is that of Cruzado (2020), who managed to show that the chatbot as a strategy allows to increase the self-regulation of learning in students of the first cycle of law. Finally, Velasco and Cardeñoso (2020), who seek to investigate the difference that exists in the competence of self-regulated learning in university students, concluded that there is an improvement in learning in relation to time, the environment and the review of what is learned.

The background presented coincided with the present research, where it is evident that the workshops that learned to apply the most suitable techniques and strategies in their daily study learned to organize the information found on the internet and to take notes of what their questions are solving. As Zimmerman (2000) mentions, there are factors that must be controlled in this process of self-regulation of learning, such as motivation, one's own thoughts and the different actions that are focused on the achievement of the objectives and/or goals set, where to achieve these it is necessary to go through the following phases such as planning, execution, observation, self-control and self-reflection for the achievement of self-regulation of learning.

For the third specific objective, we sought to determine the influence that the chatbot program had on the improvement of metacognition in the learning process of university students. Considering the theory of the metacognition dimension, it focuses on the development of various competencies, skills, abilities and skills in a specific and specialized way for the achievement of the desired objectives. Arango et al. (2010), Guedes et al. (2013) and Águila (2014) state that metacognition is a conscious process of the way in which the acquisition of learning is going to take place, if it has been completed or if it remains to be strengthened in order to achieve meaningful, self-regulated and autonomous learning, that is, it is the knowledge of one's own knowledge that knows how thought is produced.

The results found in the study showed that there is a high level of autonomy after applying the program to the 32 university students, the posttest showed that 100% of them achieved autonomy in the metacognitive process in the acquisition of their learning. The results of the present work, more contemporary, are similar to those found in AI, ka'bi (2023) reinforces the results with its contributions on the different ways of applying artificial intelligence (AI) in higher education in order to promote critical thinking and creativity in research. The contributions of Al-Abdullatif et al. (2023) coincide with those found in the study, demonstrating the importance of the chatbot in strengthening metacognitive learning ($t = 6.89$, $p < 0.05$). We also have the findings of Taranikanti and Cameron (2023) whose purpose was to implement learners strategies focused on interaction with the AI chatbot with metacognitive frameworks and achieve autonomous knowledge from a clinical environment, the results that the use of intelligent conversationalists allows a development of the metacognitive framework fostered critical thinking and other types of cognitive skills.

Other studies carried out years ago allow the similarity to be evidenced, such as those of Ching-Yi et al. (2022), who seek to promote the use of chatbots in nursing education in order to improve the learning provided by the chatbot, concluded that the application of the chatbot has great potential in nursing education, improving their critical thinking and satisfying their metacognitive learning. We also have Peinado (2020) who, in his non-experimental study, reaches the following conclusion where he reaffirms that university students, by making use of digital media, allow them to develop their own learning, learning, learning by themselves.

The antecedents presented are linked to those that were demonstrated in the present research work, where it is evidenced what the student has achieved according to the metacognition dimension, worked in the workshops programmed in the artificial intelligence chatbot program, where the students learned to learn being aware of their own learning process through the metacognitive strategies, this allowed the young people to learn identify and self-correct their mistakes made during their learning process, be sure of what they are learning and also know what activities they must carry out to achieve autonomous learning.

As a general objective, we sought to determine whether or not the chatbot program as artificial intelligence has effects on the autonomous learning of nursing students. The different theorists propose autonomous learning, mainly the constructivist bases (Holliday, 1979), other theories linked to cultural-historical activity, having the works of Leont'ev (1978) and those of Vygotsky (1979). Gross and Wolff (2001), Komori and Zimmerman (2000) and Kaltenböck (2001) presented papers focusing on the development of virtual tools that will benefit this type of learning. The psychological foundations that sustain Vygotsky's (1979) Cultural-Historical Theory focus on the dialectical materialism defended by the human psyche and external and cultural determinism in the social sphere. On the other hand, Leont'ev's Theory of Activity (1978) where the category Activity appears, allowing us to understand the active role of man and interaction with reality.

In the results found in the study with the application of the posttest to the 32 participants that 100% achieved a level of autonomy in the preparation and process of acquisition of their learning, with the application of the Wilcoxon test it was obtained that a negative range of zero students who have been harmed with the development of the workshops in the program, On the contrary, there is evidence of a positive range of 32 participants who have benefited from an average range of 16.50, reaching an autonomous level. The most current results found are similar to the present study, AI Ka'bi (2023) enriches the work with its contributions where the various ways of applying artificial intelligence (AI) in higher education are discussed in order to promote autonomous learning within the research course. Also the Peruvians Ortiz and Dávila (2023) seek to analyze the response time of the technological system in the university, they concluded that 55.13% who are at an average level do make use of digital tools for the management of their responses, allowing the development of autonomous learning.

Other studies located in the 2022 timeline also show similarities, such as that of Haristiani and Rifai (2022) who present the chatbot as a portable, accessible and flexible technological application, allowing it to improve basic learning in the student and promote autonomous and independent learning supported by distance learning. Also the studies of Romero et al. (2022) who study the influence of podcasts on the development of autonomous learning in university students. The results obtained from the 293 participants showed that the use and development of podcasts had a great influence on autonomous learning, strengthening it and also allowing them to improve self-regulation and develop skills for the management and construction of their own knowledge.

In the period of 2021 we present three studies that fit with the results obtained, Artiles-Rodríguez et al. (2021) who presented with the main objective to analyze the use of the chatbot in the pedagogical and didactic process in university students, showed that there is a very significant level of contribution and influence with 99.95% with the use of software in their studies. Another coincidence is found with Martínez-Sánchez et al. (2022) who investigated between the formation of research knowledge and the strengthening of autonomous learning in future doctors, demonstrating that 96.4% of them have suitable technological devices and 98.2% have access to the internet, allowing them to develop more independent learning. Finally, we have Ventosilla et al. (2021) these scholars seek to determine the influence of the flipped classroom as a tool to achieve autonomous learning, demonstrating that the 32 university students by applying the flipped classroom achieve this type of learning without neglecting the incorporation of ICT for the acquisition and transformation of new learning.

Other research works that also have similarities with the results obtained are those of Wellnhammer et al. (2020), who try to demonstrate how conversational agents (GAs) can influence learning in an individualized way, being a complement outside the classroom. Also the study by Ahmad and Ghapar (2019), who infer that artificial intelligence (AI) in education has the ability to interact, helps guide the self-exploration of learning, found that there is satisfaction on the part of students in the development of skills necessary for autonomous learning. Finally, Sandu and Gide (2019) the quantitative study showed that the chatbot helps to better understand university students by discovering that there are factors that affect the use of technology, but in a positive way it allows autonomous interactive learning.

The background and its coincidences with the present study show that the application of the ideal technology, in this case the chatbot, allows a development and strengthening of learning, considering that the autonomous in recent years presents a great constructive value, university institutions establish blended or distance modalities that force students to adopt and implement artificial intelligence "chatbot" tools that allow them to acquire Capacities, skills, abilities, and ethical behaviors without the presence of a teacher from the comfort of their home or work. Thanks to the application of the program, university students know and properly apply the strategies for their studies, plan and organize their time and academic activities, demonstrating autonomy in their academic actions.

6. Conclusions

Regarding the general objective, it was determined that there are positive significant effects of the chatbot as an artificial intelligence program on the autonomous learning of nursing students in the ninth cycle of a private university in Piura; It was shown that 50% of the students had a low level of autonomy and 46.9% were moderately autonomous, with the development of the program's workshops, 100% autonomy was achieved, leading to the rejection of the proposed null hypothesis and the acceptance of the alternative one.

According to the first specific objective, it was determined that there is a positive influence of the chatbot as an artificial intelligence program improving self-learning in nursing students, it was shown that of the 90.6% of students who were at the low autonomy level with the application of the workshops in the program, 100% of them were located at the autonomous level. With these results, the alternative hypothesis was accepted and the null hypothesis was rejected.

For the second specific objective, it was determined that there is a positive influence of the chatbot as an artificial intelligence program improving the self-regulation of learning, the results showed that before the program we located 96.9% as a product of the students are between a medium and low autonomous level, but with the application of the program the

32 students were located at an autonomous level, With these results, the alternative hypothesis is accepted.

With the last specific objective, it was determined that there is a positive influence of the chatbot as an artificial intelligence program, improving metacognition in the autonomous learning process. It is evident that before the program e, 78.1% of the university students were at the low level and with the workshops of the program, 100% developed metacognitive skills recognizing a need for the identification of errors, reflecting on what they learned.

7. Recommendations

It is recommended to apply the chatbot as an artificial intelligence program in other courses of the different cycles because it will allow students to develop autonomous learning by applying the most suitable strategies.

It is also suggested to plan strategies and incorporate them into lesson planning so that students develop self-learning and are able to manage and apply study strategies, organize their time and plan activities necessary for their academic development.

In addition, implement appropriate strategies that allow students to develop self-regulation of the process of acquiring knowledge through the application of techniques and strategies in their daily work where they learn to organize information and take notes for problem solving.

Provide training to teachers in the management of strategies for the development of self-learning, self-regulation and metacognition for the achievement of autonomous learning and where motivational or emotional management is important.

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