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Effectiveness of Hybrid Teaching and the Flipped Classroom in the Achievement of Competencies and Satisfaction of Students of the National University of the Altiplano Puno

Yan Carlo, Quispe-Quispe[1], Estanislao Edgar Mancha Pineda[1], Diana Agueda Vargas Velásquez[1], Luz Wilfreda, Cusi Zamata[1], Sonia Sanca Escarcena[2], Judith Gladys Miranda Delgado[1]

[1]National University of the Altiplano Puno-Peru
[2]National University of Juliaca
Email: 43924029@epg.unap.edu.pe

OBJECTIVE: To determine the level of effectiveness of hybrid teaching and the Flipped classroom in the achievement of competencies and satisfaction of students at the National University of the Altiplano Puno during the 2022 academic year. METHODOLOGY: The research was of quantitative approach, applied type, explanatory level, experimental design – longitudinal, the population and sample was made up of 33 students made up of students of the Program of Studies of Science, Technology and Environment CTA of the VII semester of the Faculty of Education of the UNA – PUNO, for the collection of data the observation and survey technique was used and the instrument the written exam, for the demonstration of the hypothesis, statistics applied with Student's t-test were used for related samples, for the analysis and interpretation of results the SPSS software version 2.1 was used, and Microsoft Word and Excel programs. RESULTS: shows the results in the pre-test and post-test "achievement of research competencies and student satisfaction", the mean before the intervention was 10.91 with a standard deviation of 3.106, and then it was 16.73 with a standard deviation of 2.661. The confidence interval ranges from -6.754 to -4.882. CONCLUSION: It is argued that hybrid teaching and the Flipped classroom are highly effective in the achievement of competencies and satisfaction of the students of the National University of the Altiplano Puno during the academic year 2022, since according to the value of the calculated t, the value p = 0.000 < to the parameter of 0.005 is then the Ho is rejected and the H1 is accepted. showing a significant difference between the pre-test and post-test.

Keywords: Teaching, hybrid, Flipped, classroom, satisfaction, learning.

1. Introduction

There are studies related to the subject in the international context for Díaz (2016), has carried out a research work in Spain, for which he has dedicated time to analyze the relationships that exist between the ethical and the pedagogical, and his integration of ICT in students, it should be noted that these integrations occur when the student manages to understand the use of the computer resources that help him within his learning obtained by the cognitive strategies on how to obtain more knowledge through ICTs. He concludes that these relationships that exist between the ethical and the pedagogical are moderated according to the dimensions of study and the achievement of learning. On the other hand, Enríquez (2011) in his research work on the role of the primary education teacher in the digital era and its appropriate use, concludes that teachers present attitudes of change and acceptance of the incorporation of new methodological strategies with ICT technologies and their importance in the achievement of student learning. However, it is not necessarily shared by the principals who lead the educational management of the educational institutions in the sense that although it is true that apparently these technologies favor the improvement of learning, but these changes and improvements in performance are not necessarily reflected in the attitudes of the teachers, taking advantage of all the advantages that the world of ICT technologies can offer. At the national level, Cabrejos (2019) mentions in the thesis "The influence of information and communication technologies in relation to the learning strategies applied in the fourth grade of secondary school students of the "Ebenezer" Educational Institution located in the cercado de Arequipa – 2018" intended to demonstrate the influence of information and communication technologies (ICT) in relation to the learning strategies applied in the students of 2nd year of Secondary School of the Ebenezer Educational Institution in the region of Arequipa, province of Arequipa. The type of research is descriptive, the sample was probabilistic, made up of 33 students. The instrument used was a survey consisting of 15 questions. The results determined that the use of ICTs does influence the amount of their learning, the achievement of their competencies and the solution of problems. It is concluded that there is a high level in the use of ICT by students, however, on the part of teachers there is no greater motivation and frequent use of ICT in their learning strategies, as learners would like to experience so that each pedagogical session is dynamic and innovative and therefore productive in the teaching-learning process. On the other hand, Oyarce (2016), in his thesis "Information and communication technologies, ICT and its relationship with quality teaching performance at the Professional Academic School of Social Communication of the National University of San Marcos, 2015" whose main objective was to determine the relationship between the application of didactic strategies in the digital field and quality teaching performance in the EAP of Social Communication, quantitative-qualitative research; of explanatory descriptive level. The design is correlational, not experimental. It concludes that the greater the mastery of ICT by teachers, the better their teaching performance and the relationship with students is strengthened. Its use encourages the strengthening of their pedagogical capacities; the deployment of strategies and materials in the digital field contributes to the quality of the teaching-learning process". For Rivas and Suarez (2019) in the research "Application of Information and Communication Technologies (ICT) by teachers in the teaching-learning process of the third grade of secondary education of the Educational Institution "Faustino B. Franco, Camaná", 2017, it had as a general objective: to determine the factors that do not allow an adequate use of ICT by teachers in the teaching-learning process in students of the THIRD

grade of the IEAM "Faustino B. Franco" de Camaná, 2017. It corresponds to the qualitative approach, type of action research. He reached the following conclusions: The factors that do not allow the proper use of ICTs are: disinterest and demotivation to use technological resources; due to ignorance and lack of preparation; that is, teachers did not have guidance and/or training on how to apply ICT in learning sessions; all of the above responds to why teachers do not apply ICTs. Consequently, it is determined how to make teachers apply ICT, reaching the conclusion of executing actions (Training: Office automation, ICT and application of ICT), which lead to the application of ICT in the teaching-learning process.

According to some appreciations of the study variables regarding hybrid teaching, the hybrid model is defined as "a formal educational program in which the student carries out at least part of their learning online, where they can exercise a certain degree of control over the time, place, route or pace of the same. While another part of their learning takes place in a physical space other than their home and with some degree of supervision." (Sulmont, 2019).

We have to consider the dimensions of time (when we will do what things), space (where we will do what things), and what Sulmont (2019) calls grouping (what things we will do individually and what we will do as a group).

As for time, we talk about two modalities:

Synchronous: all participants are present, either in person or remotely, dedicated to carrying out the same activity.

Asynchronous: students and teachers do not coincide, but they dedicate themselves to working on an assigned activity in a group or individually.

When we talk about space, users can be present in a physical space (physical classroom, laboratory, etc.) or in a virtual space (remotely). And this presence can occur synchronously or asynchronously.

This is how we arrive at grouping: how we configure students to carry out activities, whether physically or remotely, synchronously or asynchronously. It can be individual or group.

According to Sulmont (2019), the implementation of hybrid models requires integrating face-to-face activities with those carried out remotely. That they are coherent. And technologies should be used as a tool to accelerate learning, rather than as a simple channel to transmit content.

The method behind hybrid models.

Implementing a hybrid model requires us to rethink our learning-teaching models to begin with. These will tell us what kind of technologies we should invest in and how to configure them in the physical spaces of the university.

We must innovate in the pedagogical model, review the way we teach and understand how the student is going to learn in that context.

Only when we know this, comes the part of asking ourselves what the hybrid classroom is going to be like. In other words, the room is in the last link.

Universities first have to think about how they manage time, space and grouping to teach

through hybrid models.

The implementation of these models and in addition of hybrid classrooms in the country has not taken into account this necessary coherence and integration, nor the curricular innovation where it should have started.

2. METHODS

According to Quispe et al. (2023), the research was of a quantitative approach of applied type, explanatory level, design - pre-experimental. The population and study sample was made up of 33 students of the VII semester of the Science, Technology and Environment CTA Study Program of the Faculty of Education of the National University of the Altiplano Puno; applied to a single experimental group, The technique used for the research is the examination and the survey; being mainly the written test (pre test and post test) that was applied to the group at different times and the satisfaction survey as additional information. To demonstrate the hypothesis, descriptive statistics were used with the T-test for related samples.

For the execution of this research work, the following procedures have been carried out:

a) Coordination with the students of the VII semester of the Science, Technology and Environment CTA study program of the Faculty of Education of the National University of the Altiplano-Puno.

b) It was implemented with the necessary materials to properly develop the learning sessions, making use of the hybrid method (cameras, cell phones, tripod, speakers, microphones).

c) The sessions to be developed in the course of Methodology of Quantitative and Qualitative Research of Education were distributed, according to the syllabus.

d) It was explained that the role of the students is to be a unique research group according to the research design (pre-experimental).

e) The entrance test or pretest was applied, depending on the research design.

f) The sessions were developed throughout the 2022-I semester, with the students of the VII semester of the CTA Science, Technology and Environment study program of the Faculty of Education of the National University of the Altiplano-Puno.

g) In each learning session, which was up to three times a week, students attended either in person or virtually at random (since attendance at face-to-face classes was not mandatory, due to the prevalence of the Covid-19 pandemic.

h) At the end of the 17th week, the exit or post-test test was applied to all students in person.

i) The results of both the entry test and the exit test have been tabulated for later comparison.

j) The results have been properly processed to prepare the report and/or article.

k) The materials used in the experiment were the following:

a) Learning sessions.

b) Slides of the topics developed.

c) Video cameras.

d) XO PC or Laptop

e) Camera tripods.

f) Cellular devices with unlimited internet.

g) Digital display.

Table 1. Sample of students of the VII semester of the Science, Technology and Environment CTA study program of the Faculty of Education of the UNA Puno.

ITEMS	N	%
Males	13	39.3
women	20	60.6
TOTAL	33	100.0%

Source: Enrollment payroll for the 2022-1 semester.

Elaboration. The researcher.

3. RESULTS AND DISCUSSION.

Table 2. Result of the data of the sociodemographic variables of the students of the VII semester of the study program of Science, Technology and Environment CTA of the Faculty of Education of the UNA Puno.

Variables	n	%
Socioeconomic level		
C	17	51,5
D	16	48,5
Computer resources		
Cellular	6	18,2
Laptop/ Cell Phone	27	81,8
Internet hours		
Less than 4 hours	23	69.7
Greater than or equal to 4 hours	10	30.3
Provenance		
Rural	19	57.6
Urban	14	42.4
Sex		
Verón	13	39.4
Woman	20	60.6

Source: Enrollment payroll for the 2022-1 semester.

Interpretation:

Table 2. About the sociodemographic variables of the students of the VII semester of the

Science, Technology and Environment CTA study program of the Faculty of Education of the UNA Puno. In the socioeconomic aspect, it is observed that of the total of 33 students who represent 100% of the experimental work group, 17 of them are located or identified in category C, and 16 of the students are located in category D. All this in the monetary poverty indicators. Likewise, with respect to computer resources, 06 of them work from the cell phone device or equipment; Regarding internet hours, 69.7% have less than 04 hours of work on the internet, while 30.0% indicate that they work on the internet is done more than 04 hours. Similarly, 57.6% of the students come from the rural sector and 42.4% from the urban sector and with regard to sex, 60.6% are women and 39.4% are men.

Table 3. Result of the data of the variable achievement of research competencies, of the students of the VII semester of the study program of Science, Technology and Environment CTA of the Faculty of Education of the UNA Puno, considering all its dimensions of study.

Paired differences								
Dimensions	Before Pre-test	After Post-test	Desv. Average error	95% difference confidence interval		T	Gl	Sig. (bilateral)
Achievement of research competencies and student satisfaction.	10.91±3.106	16.73±2.661	,459	-6,754	-4,882	-12,664	32	,000
Epistemological foundations and elements of scientific research.	3.18±0.769	4.39±0.747	,149	-1,516	-,908	-8,123	32	,000
Paradigms and approaches to scientific research.	2.42±1.001	4.42±0.663	,174	-2,355	-1,645	-11,489	32	,000
Levels of Scientific Research.	2.73±0.944	4.36±0.783	,143	-1,928	-1,345	-11,432	32	,000
Typology of Scientific Research Designs	2.55±0.938	3.55±1.092	,222	-1,452	-,548	-4,506	32	,000

Source: Pre and post-tes 2022-1. Students of the CTA study program.

Interpretation

- Regarding the dimension: Epistemological foundations and elements of scientific research, the results show that there are significant changes in the post-test with respect to the pre-test, so according to the 95% confidence interval of the difference, -1.516 is obtained in the lower range and -.908 in the upper range and according to the statistical test of the T it is -8.123, The result is .000. Therefore, it is concluded that hybrid teaching and the Flipped classroom are

- highly effective in the achievement of competencies in the dimension of epistemological foundations and elements of scientific research of the students of the National University of the Altiplano Puno during the academic year 2022.

- In the dimension Paradigms and approaches of scientific research, the results show that there are significant changes in the post-test with respect to the pre-test, so according to the 95% confidence interval of the difference, -2.355 is obtained in the lower range and -1.645 in the upper range and according to the statistical test of the T it is -11.489, The result is .000.

Therefore, it is concluded that hybrid teaching and the Flipped classroom are highly effective in the achievement of competencies in the dimension Paradigms and approaches of scientific research of the students of the National University of the Altiplano Puno during the academic year 2022.

- In the dimension Levels of Scientific Research, the results show that there are significant changes in the post-test with respect to the pre-test, so according to the 95% confidence interval of the difference, -1.928 is obtained in the lower range and -1.345 in the upper range and according to the statistical test of the T it is -11.432, The result is .000. Therefore, it is concluded that hybrid teaching and the Flipped classroom are highly effective in the achievement of competencies in the Levels dimension of Scientific research of the students of the National University of the Altiplano Puno during the academic year 2022.

- In the dimension Typology of Scientific Research Designs, the results show that there are significant changes in the post-test with respect to the pre-test, so according to the 95% confidence interval of the difference, -1.452 is obtained in the lower range and -.548 in the upper range and according to the statistical test of the T it is -4.506, The result is .000. Therefore, it is concluded that hybrid teaching and the Flipped classroom are highly effective in the achievement of competencies in the Typology dimension of the Scientific Research Designs of the students of the National University of the Altiplano Puno during the academic year 2022.

Hybrid teaching and the Flipped classroom, therefore, have shown that they are highly effective in the achievement of research competencies in the Methodology of Educational Research course, as well as in all its dimensions of study such as: Epistemological foundations and elements of scientific research, Paradigms and approaches of scientific research, Levels of Scientific research and Typology of Scientific Research Designs,

Discussion:

In the discussion of the results of the research presented, a general trend towards the recognition of the positive impact of Information and Communication Technologies (ICT) in the educational field is observed. However, this acceptance varies according to the focus of study and the actors involved in the educational process.

Relationship between the ethical, the pedagogical and the use of ICT (Díaz, 2016): Díaz (2016) stresses that the relationship between the ethical and the pedagogical is moderate, depending on the dimensions of study and the learning achievements achieved. This finding highlights the importance of a comprehensive understanding of students' use of ICT to optimize their learning. However, this relationship is not absolute, indicating that other factors, such as the cognitive strategies used to integrate ICT into learning, also play a crucial role. Teachers' attitude and acceptance of ICT (Enríquez, 2011): Enríquez (2011) shows that, although primary school teachers are open to incorporating new methodologies with ICT, there is a discrepancy between this disposition and the perception of principals. Principals, while recognizing the potential of ICT to improve learning, perceive that these changes are not adequately reflected in teachers' attitudes and practices. This suggests that, despite initial acceptance, effective ICT implementation still faces institutional and cultural barriers. Influence of ICT on learning strategies (Cabrejos, 2019): The study by Cabrejos (2019)

reinforces the idea that the use of ICT has a significant influence on learning and the development of competencies in students. However, it also highlights a gap between students' motivation to use ICT and the lack of integration of these technologies by teachers in their teaching strategies. This disconnect suggests the need for a more balanced and collaborative approach between teachers and students to maximize the benefits of ICT. Relationship between ICT mastery and teacher performance (Oyarce, 2016): Oyarce (2016) establishes a positive correlation between teachers' mastery of ICT and the quality of their performance. This finding emphasizes that training and the use of digital strategies not only improve teaching, but also strengthen the pedagogical relationship with students. This suggests that investment in teacher training in ICT is key to improving educational quality. Factors that limit the use of ICTs (Rivas & Suárez, 2019): Finally, Rivas & Suárez (2019) identify several factors that limit the appropriate use of ICTs, such as disinterest, demotivation, and lack of training among teachers. These obstacles underscore the need for targeted interventions, such as office automation and ICT training, to overcome current barriers and promote more effective use of technologies in the classroom. Overall, the studies analyzed suggest that, although ICTs have significant potential to improve the teaching-learning process, their effective implementation depends on a number of factors, including teacher training and attitudes, institutional support, and the integration of ethical and pedagogical values. To fully reap the benefits of ICT, it is crucial to address these barriers and foster an educational environment that is conducive to innovation and collaboration between all educational actors.

4. CONCLUSIONS.

Hybrid teaching and the Flipped classroom are effective in achieving research competencies and satisfaction of the students of the National University of the Altiplano Puno during the 2022 academic year, as evidenced in the results obtained in the exit test and according to the statistical test T, where -12,664 is obtained, at 32 Degrees of Freedom and , 000 Sig. (bilateral). P, and this result being minor, demonstrates the effectiveness of the applied method, in addition to the dimensions of study of the independent variable such as: Epistemological foundations and elements of scientific research, whose statistical test T, where -8.123 is obtained, at 32 Degrees of Freedom and .000 Sig. (bilateral). P, in the dimension Paradigms and approaches to scientific research according to the statistical test T, where -11.489 is obtained

, at 32 Degrees of Freedom and .000 Sig. (bilateral). P, and this result being lower, dimension Levels of Scientific research according to the statistical test T, where -11.432 is obtained, at 32 Degrees of Freedom and .000 Sig. (bilateral). P and the dimension Levels of Scientific research, according to the statistical test T, where -11.432 is obtained, at 32 Degrees of Freedom and .000 Sig. (bilateral). P, and this result being minor, demonstrates the effectiveness of the method applied. Therefore, it is very effective in the achievement of competencies.

The level of satisfaction of the students of the National University of the Altiplano Puno, is acceptable during the 2022 academic year.

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