

"Active Methodologies, An Important Educational Tool In Collaborative Learning In First Year Students In Their Professional Medical Career".

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Abstract

The study describes the contribution of the active methodology as an important tool in the development of collaborative learning, using different technological didactic methods that seek to provide and/or assume challenges, solve academic-professional problems in an integral and joint way seeking to assume responsibilities to achieve their professional objectives. In this context, the research aims to demonstrate how active methodologies influence the collaborative learning of students in the first year of studies of their professional medical career. This is an experimental-correlational research, with the application of different active methodologies in class, observation cards and different evaluative resources graded individually and in groups to demonstrate the improvement of collaborative learning in the studied population. The sample was formed by 2 groups (group A of 36 students, without the research variables and group B of 32 students, with the dependent and independent variable), during 5 weeks that lasts the unit 3 of the regular cycle, both groups were analyzed and studied at the same time applying the research variables in one and not in the other. From the results obtained in group A at the end of the unit: 28% of students passed and 72% of students failed. The results obtained in group B at the end of the unit 90% of students passed and 10% of students failed, which allowed to affirm that the active methodologies, both in active teaching strategies based on information and communication technologies, significantly influence the collaborative learning of medical students for their development and benefit in the professional environment.

Key words: Active methodologies, technological teaching strategies, collaborative learning.

Introduction:

In the current context, traditional methodologies are used by the vast majority of professors in the first cycles, contributing to a setback in contemporary pedagogy both in the academic and professional level of teachers and students. The main causes of a student's professional development are how he/she is instructed and oriented in his/her academic process at the university, especially in the first two cycles, since it generates in him/her an academic projection in his/her future formation.

The best students develop under a responsible and planned routine learned in their educational center or under the laws of the parents, and for them it is only to follow what is planned under the rules of the university they choose. These students are visible to teachers on a daily basis, and it should also be clarified that there are students who do not have the same academic level and adequate attitudinal profile to generate homogeneity in the classroom. For this reason, and in the face of all the known cases, good students and bad students in their daily interaction, it is proposed to learn from those who know and take advantage of all their talent for those who do not have it.

The traditional and current way that teachers use is a student-centered methodology, which is related to the objectives of each course, but the incompetent student or the student with no notion of the subject will remain. Before this difficulty and looking for the gain for both parts, the teachers use active methodologies to integrate the academic issues and technology for the motivation of the student.

These active methodologies used as part of the new standardized curriculum design in almost all universities fully assist in the academic integration of each subject thus promoting the pedagogical benefit for both the teacher and the student.

This modern methodology should be used consistently and gradually in order to generate the objectives set out in each class session, besides being a very personalized methodology to the student, its benefits

must be considered in a collective and equitable way, one way to do this is to apply the active methodology in the collaborative learning of each class section.

Collaborative work is important to use because it can generate attitudinal and aptitudinal concepts focused on a joint, group objective, among all, so the benefit both academically and professionally can be reached. Teamwork develops the critical thinking of each of the people in the group, this added to the inventiveness of the students that for excellence can generate, without doubt, beneficial results. The active methodology can be studied and practiced not only for the common and personal good, but it can also be studied and practiced for a student community for the purpose of collaboration and cooperation among all.

Our goal as teachers is not only to generate that our students learn but to help them discern what they learn for the class and for their professional help for today and tomorrow, also to provide them with a teaching with clear objectives, to work as a group and help each other to solve a case or a real problem based on their profession; everything will depend on the teachers to influence their decisions and how they learn.

The active methodology applied in collaborative learning seeks to provide challenges and solve problems in an integral and joint way, and can be achieved thanks to the technological pedagogical domain and the will of each teacher who trusts his teaching with or without resources. In this sense and with the above, the objective of the research is to demonstrate how active methodologies influence collaborative learning of students in the first year of studies of their professional medical career.

Methodology and materials

This research is based on the active methodologies and how they influence the collaborative learning of students in the first year of studies of their professional medical career. For this purpose, the study is based on a research of explanatory - correlational level, since through this type of research we can analyze and determine the causes of the educational phenomena raised in the research. In addition, the paper can explain why an educational phenomenon occurs based on the study of active methodologies on collaborative learning, under what conditions it occurs, or why two or more variables are correlated. Therefore, this type of research will help to explore, describe and establish correlations, and under such criteria we can contrast my causal hypotheses so that a causal relationship between the dependent and independent variable is involved.

The research was carried out in a private university, Lima-Peru, with a population of 308 students (5 sections of 36 students and 4 sections of 32 students), so a non-probabilistic intentional sampling by convenience was applied. A group of 36 students was used as a non-experimental sample, since the variables involved were not studied and there was no correlation between the dependent and independent variables, but it allowed to contrast results at the end and compare them with the sample under study. The other group of 32 students was used as a control sample, where the work of the implication of the dependent and independent variable were analyzed and investigated in order to obtain an objective based on an academic research problem.

The data collection instruments used were questionnaires, academic records, VARK test, data collection forms, and the results were processed in Microsoft Excel and SPSS V25.0 statistical software; descriptive statistics tests and Spearman's correlation coefficient were performed.

The section of 32 students considered for the control sample worked 5 weeks during the 2020-2 cycle (week 9, week 10, week 11, week 12, week 13), and 6 work teams were formed using the VARK test or questionnaire. In all the weeks, the instruments were designed based on information and communication technologies that relate active methodologies with the collaborative learning of the students in this

section, such as the use of web development 2.0 and gamification such as virtual forums, kahoots and socrative, using tools such as technological devices, internet and a note register. In addition to the above mentioned, active methodologies were applied for using methodological strategies such as KWL, snowball and puzzles and how they are related to collaborative learning. At the end of the research in week 13 a team evaluation was carried out (the grade taken was multiplied by a factor that was obtained through a coevolution test to all groups) to analyze and prove that active methodologies significantly influence collaborative learning of students of the medical school in the second cycle of the scientific university of the south.

Once the groups were formed, VARK test was applied, as well as gamification with the Kahoot, virtual forums and Socrative. The group evaluation was carried out weekly through a control notebook or record of notes. On week 13 the notes were averaged and the results were obtained to know which group or students passed and/or failed the gamification. Methodological strategies were also applied in each class session as KWL, snowball and puzzles, which were evaluated each week in class and in group. At the end, an average of these didactics was calculated to know how the group work was and how each working group was able to relate to each other, and taking into account the notes and resources already mentioned in the research. An evaluation was made to measure how active methodologies influence the collaborative learning of students of the medical school of the second cycle of the scientific university of the south; this evaluation corresponds to an average for the grade of the unit with respect to the cycle that is being studied.

Simultaneously, the study was performed on the section of 36 students for 5 weeks during the 2020-2 cycle (week 9, week 10, week 11, week 12, week 13), as non-experimental sample. No groups were formed there and everyone worked individually. In all the weeks, the group worked on the use of web development 2.0 and gamification such as virtual forums, kahoots and socrative, using instruments such as technological devices, internet and a record of notes. Also, at the same time in all weeks personal reading work was done, resolution and presentation of tasks, comprehensive feedback (each work had a corresponding note). in the last week, week 13, there was an evaluation of contents worked during the 5 weeks individually to verify that active methodologies significantly influence the collaborative learning of students of the faculty of medicine of the second cycle of the scientific university of the south.

3. Objectives

3.1 General Objective

- To demonstrate how active methodologies influence the collaborative learning of students of the second cycle medical school of the southern scientific university.

3.2 Specific objectives

- To demonstrate how active methodologies are related to information and communication technologies in the collaborative learning of students of the second cycle medical school of the southern scientific university.
- To demonstrate how active methodologies relate to active methodological strategies in the collaborative learning of students of the second cycle medical school of the southern scientific university.

4. Results

As a result of the first part of the research regarding information and communication technologies, the study and application of the forum was developed using kahoot and socrative as part of the strategies of a new way of teaching as the active methodology. During the 5 weeks that the unit and the research lasted, every Monday in the Blackboard collaborate platform the FORUM was enabled and each group of

students from the 6 groups developed through the VARK test had to post questions related to the theme of the week, questions that were difficult for them to understand. They had a period of 5 calendar days to do it. During this period, the teacher could answer the questions on the aforementioned platform and clarify concepts regarding the theme of the week, and the students could also answer their classmates in the FORUM. Each group that did this work would have a formative grade and that at the end of the unit could be averaged with the other grades to get the average. Figure 1 shows the results obtained from the average of the students regarding the FORUM, indicating that 66% complied with the activity and 34% had problems in doing it or did not do the activity. It was possible to note that a large part of the total took advantage of this space to integrate with the group and encourage the participation of each of the members of the group, favoring the development of collaborative learning.

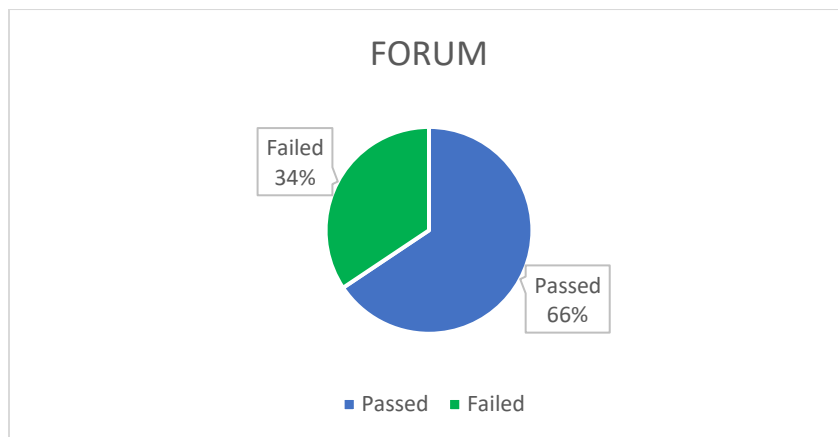


Figure 1. Results obtained from the average number of students with respect to the FORUM.
Source: Own elaboration (2021)

Cronbach's alpha was used as an indicator of the reliability of the instrument. The reliability of my FORUM instrument was analyzed in the SPSS statistical software and obtained 0.870, giving as a result a good reliability and indicating a greater consistency in obtaining results from the instrument to be applied.

Reliability statistics: FORUM		
Cronbach's alpha	Cronbach's alpha based on standardized items	N of elements
,870	,856	5

Table 1. Reliability statistics: FORUM
Source: Own elaboration (2021)

Following the same line of research, regarding information and communication technologies, the study and application of a new way of teaching was developed as the active methodology. This online academic strategy, **kahoot**, was developed at the end of theories 1 and 2. In the week, there were 3 theories and a laboratory as a practice session. In the execution of the online strategy, the students worked in groups in order to enrich collaborative learning and the way they can act when faced with an academic challenge. Like the FORUM, the kahoot was a formative grade and at the end of the unit it was also an important

grade for the unit average. Figure 2 shows the results obtained from the average of the groups with respect to theory 1, allowing to note that 66% of the students in the classroom passed the group kahoot and 34% failed the group kahoot. Regarding the results of the kahoot of theory 2, Figure 3 shows that 84% of the students in the classroom passed the group kahoot and 16% failed it. This shows a positive result in relation to the collaborative learning practiced in the two kahoot executed for this research.

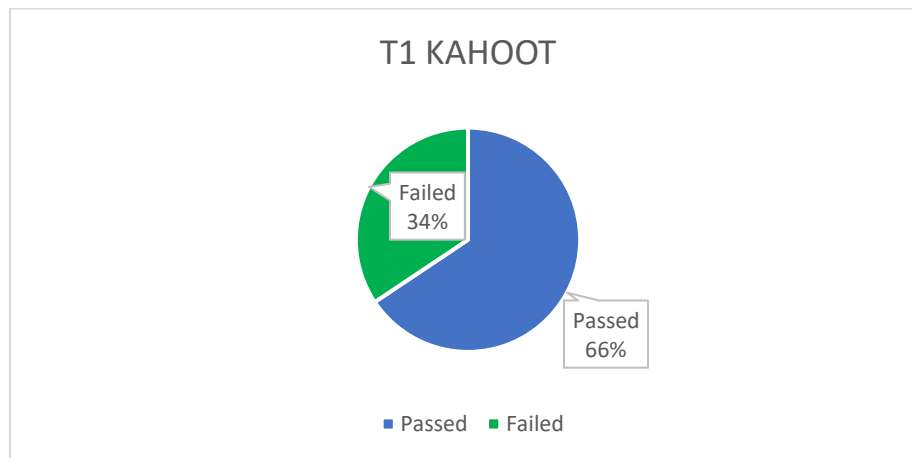


Figure 2. Results obtained from the average of the students with respect to T1 (theory 1 KAHOOT).
Source: Own elaboration (2021)

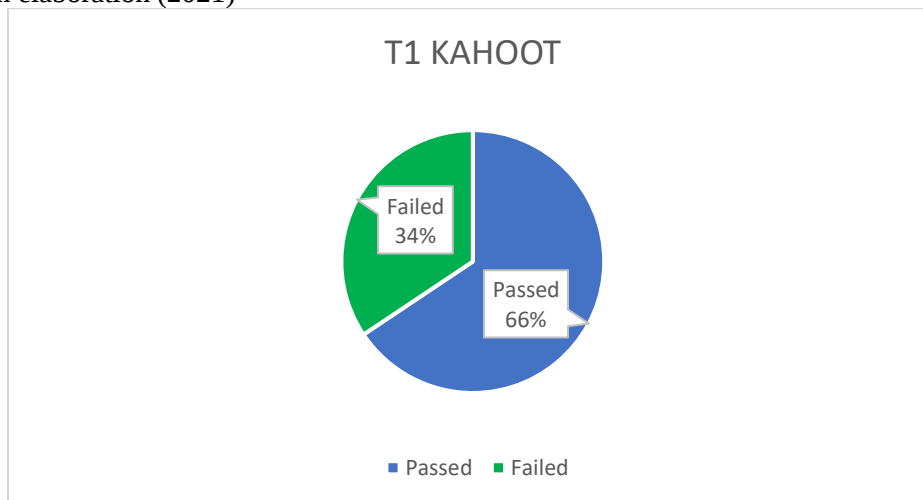


Figure 3. Results obtained from the average of the students with respect to T2 (theory 2 KAHOOT).
Source: Own elaboration (2021)

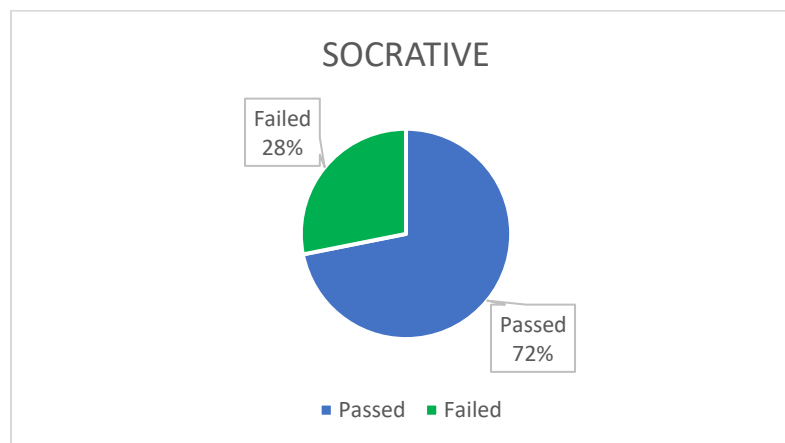
Cronbach's alpha was used as an indicator of the reliability of the instrument. The reliability of the KAHOOT instrument was analyzed in the SPSS statistical software and obtained 0.80, offering as a result a good reliability and indicating a greater consistency in obtaining results from the instrument to be applied.

Reliability statistics: KAHOOT

Cronbach's alpha	Cronbach's alpha based on standardized items	N° of elements
,800	,758	5

Table 2. Reliability statistics: KAHOOT.**Source:** Own elaboration (2021)

Continuing with the framework of the research, regarding information and communication technologies, an online didactic strategy named SOCRATIVE was developed, which was evaluated at the beginning of theory 1 of each week. During each week of class readings were enabled to help complement the learning of the sessions that were going to be taught during the week, and a way to evaluate this reading control was through the SOCRATIVE. Unlike the strategies described above, the SOCRATIVE was evaluated on an individual basis; therefore, the groups should be organized in order to integrate the concepts and share information. At the end of the unit, 5 socratives were performed and as it is a graded evaluation of each week, an average was obtained at the end of the unit. This result is shown in Figure 4 where it can be seen that 72% of students passed and obtained a good average and 28% of students failed this strategy, which allows to note that collaborative learning for many students is encouraging and outstanding.

**Figure 4.** Results obtained from the average of the students with respect to the SOCRATIVE**Source:** Own elaboration (2021)

Cronbach's alpha was used as an indicator of the reliability of the instrument. The reliability of the SOCRATIVE instrument was analyzed in the SPSS statistical software obtaining 0.788, giving as a result a good reliability and indicating a greater consistency in obtaining results from the instrument to be applied.

Reliability statistics: SOCRATIVE
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Cronbach's alpha	Cronbach's alpha based on standardized items	N° of elements
,789	,788	5

Table 3. Reliability statistics: SOCRATIVE.

Source: Own elaboration (2021)

Figure 5 shows the results of the instruments used in the research regarding information and communication technologies, indicating the number of students who passed and failed in response to the active methodology. These results allow to know that there are more students who passed using the appropriate instruments and improving the collaborative learning of the control sample already studied.

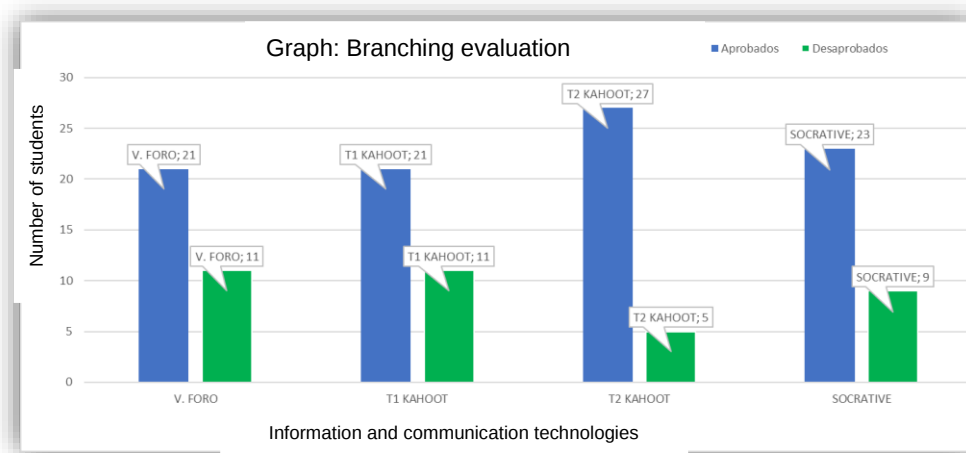


Figure 5. Results of the averages used in gamification.

Source: Own elaboration (2021)

As a result of the second part of the research in theories 2 and 3 the study used some methodological strategies as part of the active methodology trying to generate more group autonomy and thus develop collaborative learning in the students. In Figure 6, the methodological strategy used is SNOWBALL, which permitted to measure the experience in teamwork in all lines of learning, during the 5 weeks that the unit lasted the technique was developed as a formative evaluation and at the end an average was obtained obtaining as a result that 94% of students of the control sample passed and 6% failed, this induces that the group activity and its learning style generated excellent results both in the academic and attitudinal part.

Cronbach's alpha was used as an indicator of the reliability of my instrument. The reliability of the SNOWBALL instrument was analyzed in the SPSS statistical software and obtained 0.727, giving as a result a good reliability and indicating a greater consistency in obtaining results from the instrument to be applied.

Reliability Statistics: SNOWBALL

Cronbach's alpha	Cronbach's alpha based on standardized items	N° of elements
,727	,707	

Table 4. Reliability statistics: SNOWBALL.

Source: Own elaboration (2021)

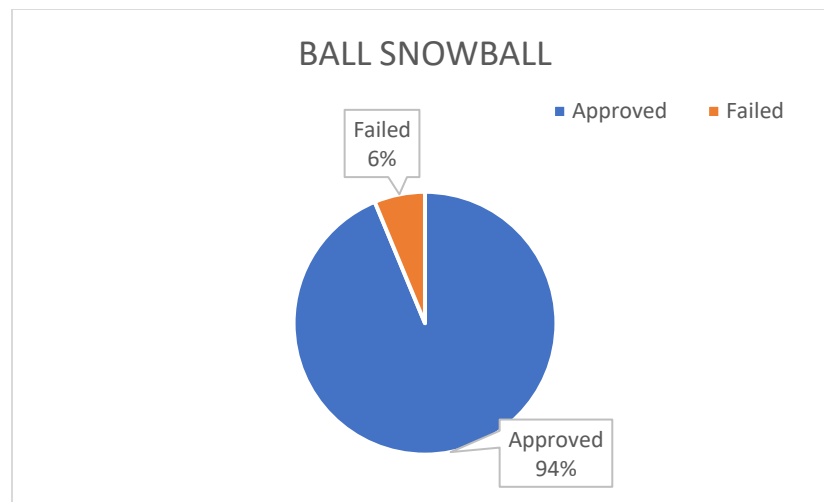


Figure 6. Results obtained from the average of the methodological strategy SNOWBALL.

Source: Own elaboration (2021)

With respect to the methodological strategy ROMPECABEZAS, group methodological strategy, used in theory 2, at the end of the 5 weeks through their averages regarding this strategy, 94% of students in the control sample passed and 6% failed, which evidenced the work done by students in groups and encouraged that collaborative learning can be developed for each group in the classroom. It is good to induce that they worked through a formative evaluation.

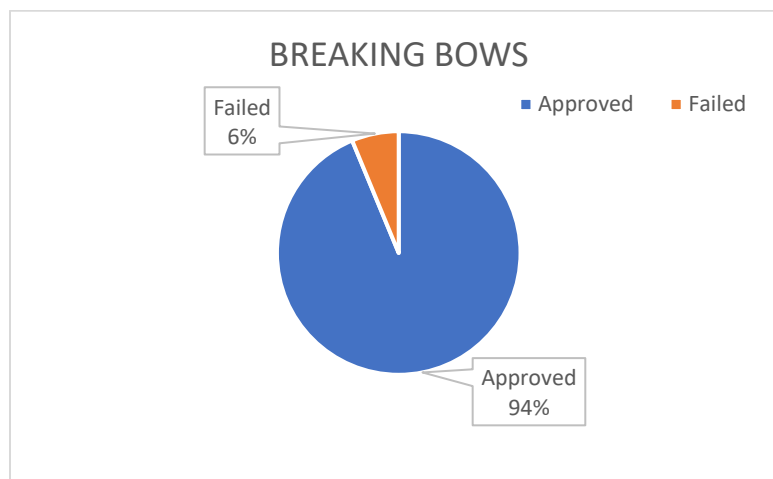


Figure 7. Results obtained from the average of the methodological strategy ROMPECABEZAS.

Source: Own elaboration (2021)

Cronbach's alpha was used as an indicator of the reliability of the instrument. The reliability of the instrument ROMPECABEZAS was analyzed in the SPSS statistical software and obtained 0.767, giving as a result a good reliability and indicating a greater consistency in obtaining the results of instrument to be applied.

Reliability statistics: BREAKING BREAKING BREAKING HEAD		
Cronbach's alpha	Cronbach's alpha based on standardized items	N° of elements
,767	,760	

Table 5. Reliability statistics: BREAKERS.

Source: Own elaboration (2021)

The discussion in small groups DPG is another group methodological strategy proposed for the research, it was only developed in theory 3, a formative evaluation was applied and continues to generate the following results during the 5 weeks of the unit and the research. A 94% of students of the control sample passed and 6% failed, deducing and affirming with respect to the methodological strategies already practiced and studied the development and progress on a large scale of collaborative learning.

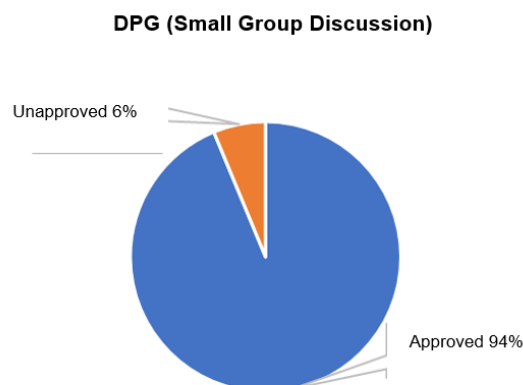


Figure 8. Results obtained from the average of the DPG methodological strategy.

Source: Own elaboration (2021)

Cronbach's alpha was used as an indicator of the reliability of the instrument. The reliability of the DPG instrument was analyzed in the SPSS statistical software and obtained 0.810, giving as a result a good reliability and indicating a greater consistency in obtaining results from my instrument to be applied.

Reliability statistics: DPG		
Cronbach's alpha	Cronbach's alpha based on standardized items	N° of elements

,810	,813	
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Table 6. Reliability statistics: BREAKERS.

Source: Own elaboration (2021)

In Figure 9 there are three methodological strategies and how they are related as part of the active methodologies and the number of students who were able to satisfactorily pass the class work. The image gives evidence that these strategies captured the concentration and participation of all students generating greater commitment in their activity as competence and academic development. In addition, it is evidenced their collaborative learning practiced in this unit.

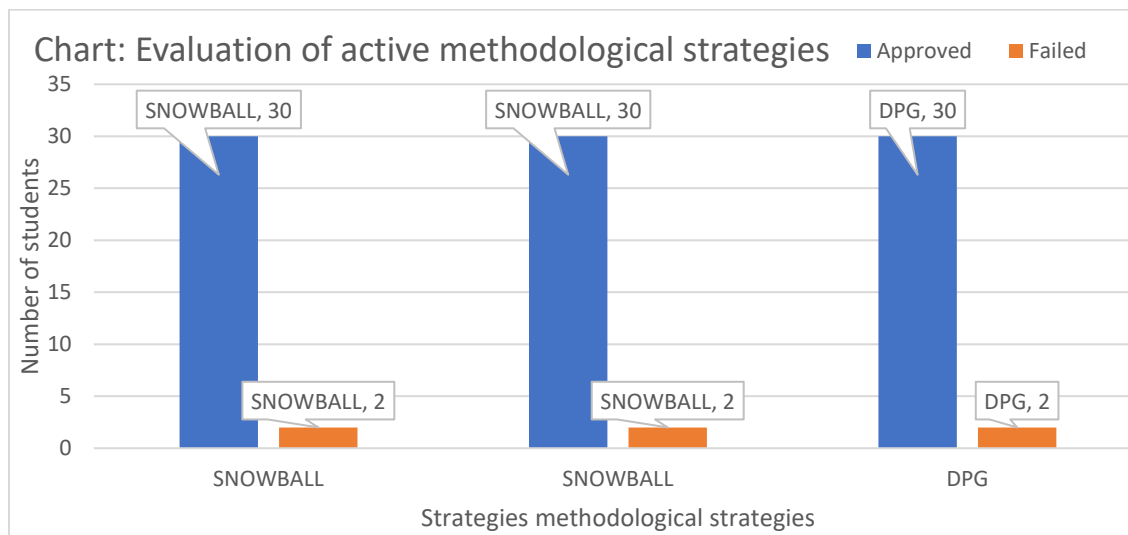


Figure 9. Results of the averages used in the active methodological strategies.

Source: Own elaboration (2021)

In week 5, the last week of the unit, the final evaluation was applied, which consisted of 20 questions and was divided by the dimensions and indicators that were developed in the research. In addition, the KR-20 (KUDER RICHARDSON) I used for the reliability test of the instrument by means of which the following result was obtained.

KR20 reliability statistics		
Cronbach's alpha	Cronbach's alpha based on standardized items	N° elements of
,842	,854	20

Table 7. Reliability statistics: BREAKERS.

Source: Own elaboration (2021)

This gives as a result a good reliability and indicates a greater consistency in obtaining results from the instrument to be applied.

In the dimension of information and communication technologies, the study worked with the indicators web 2.0 development (question 1, question 2 and question 3) and gamification (question 4, question 5, question 6, question 7, question 8, question 9 and question 10), from which the following results were obtained.

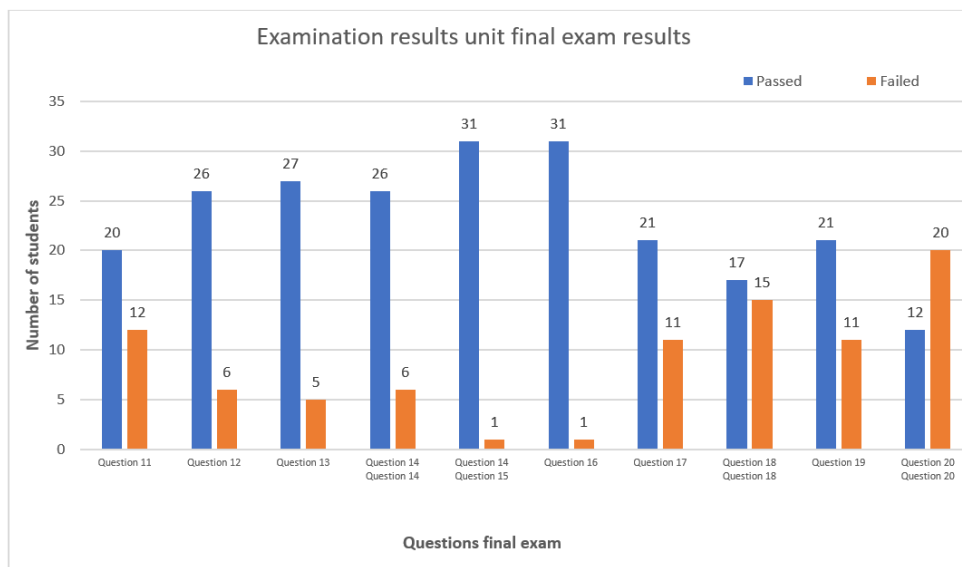


Figure 10. Results of the final unit exam.

Source: Own elaboration (2021)

The results show that for the 2 indicators the number of passes was very positive, note that for question 1 there were 17 passes and 15 failures, question 2 a total of 21 passes and 11 failures, question 3 a total of 18 passes and 12 failures, results that show commitment and development in the collaborative activity of the sample studied. Regarding gamification, it offered a result that in question 4 there were 22 passes and 10 failures, question 5 there were 22 passes and 10 failures, question 6 there were 22 passes and 10 failures, question 7 there were 21 passes and 11 failures, question 8 there were 25 passes and 7 failures, question 9 there were 21 passes and 11 failures, question 10 there were 21 passes and 11 failures, All these results show the virtue and capacity of each group in carrying out their learning in the development of the virtual platform and online activities, in addition we show how information and communication technologies are significantly related to the collaborative learning of students in the sample to be investigated.

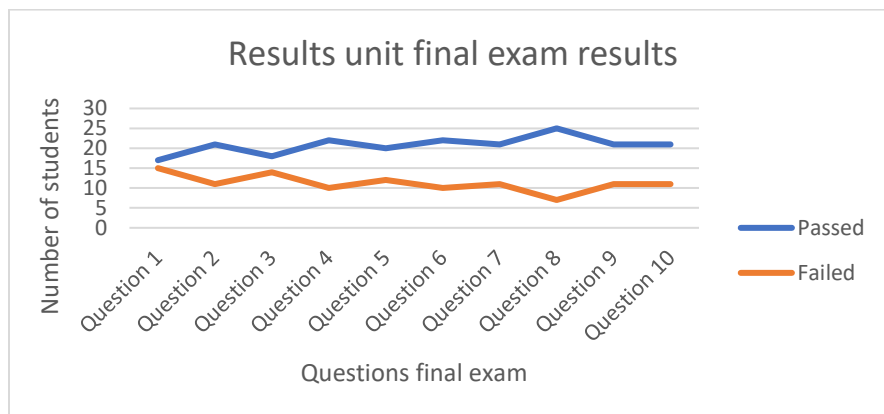


Figure 11. Results of the final unit exam.

Source: Own elaboration (2021)

Completing the evaluation, in the dimension active methodological strategies, 10 questions were developed orienting them towards the indicators to be evaluated in the research, thus question 11, question 12 and question 13 correspond to the indicator Snowball; question 14, question 15 and question 16 correspond to the indicator Puzzle; question 17, question 18, question 19 and question 20 correspond to the indicator Discussion in Small Groups (DPG), generating the following results.

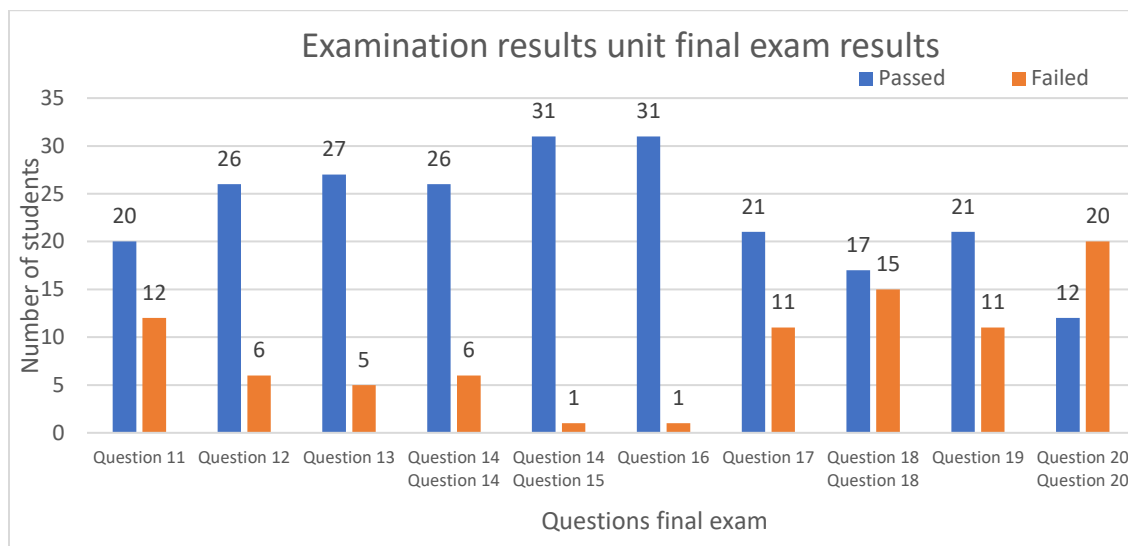


Figure 11. Results of the final unit exam.

Source: Own elaboration (2021)

The results show an important advance with respect to the way to investigated about the objective regarding the dimension. The first snowball indicator offered the following result: in question 11 there were 20 approved and 12 disapproved, in question 12 there were 26 approved and 6 disapproved, for question 13 there were 27 approved and 5 disapproved. These results make infer a great domain in the group part and how they can develop in the face of adversity of a subject trusting in the learning of each one of the members of the group. The results provided by the questions referring to the puzzle indicator indicate the following: question 14 there were 26 passed and 6 failed, in question 15 there were 31 passed and 1 failed, question 16 there were 31 passed and 1 failed. These results include the academic work in group, but demonstrating the active and academic participation of each member of the group since they are responsible for the assimilation of learning for their group. The last indicator showed the following result: question 17 there were 21 passed and 11 failed, question 18 there were 17 passed and 15 failed, question 19 there were 21 passed and 11 failed, question 20 there were 12 passed and 20 failed, these results show great development in the personal appreciations of each member in answering the questions posed, however in question 20 there was a slight complication in trying to answer the question because each member could not define the question due to various factors. It can be inferred from the results obtained that the active methodology is significantly related to the active methodological strategies in the collaborative learning of the students in the problem sample.

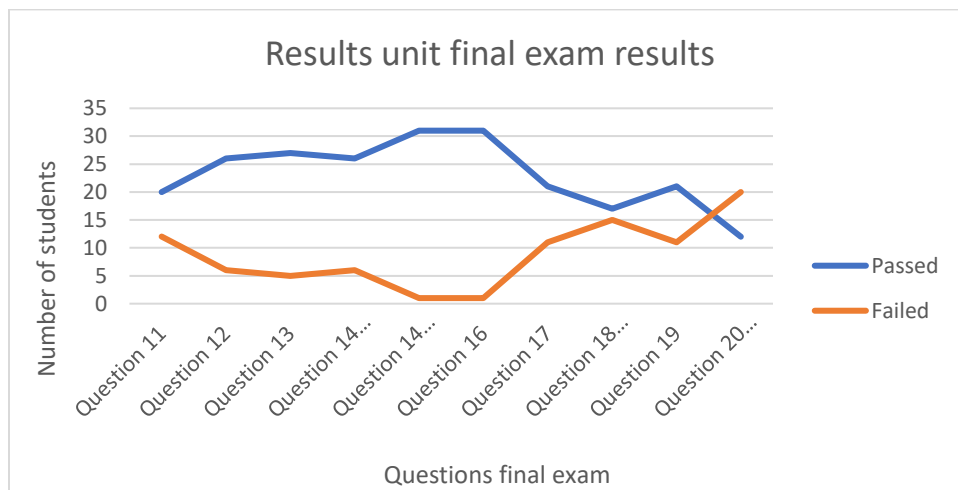


Figure 12. Results of the final exam of the unit.

Source: Own elaboration (2021)

To further verify and analyze the research, the average of the grades of the students who participated in the control sample was calculated and obtained the following result.

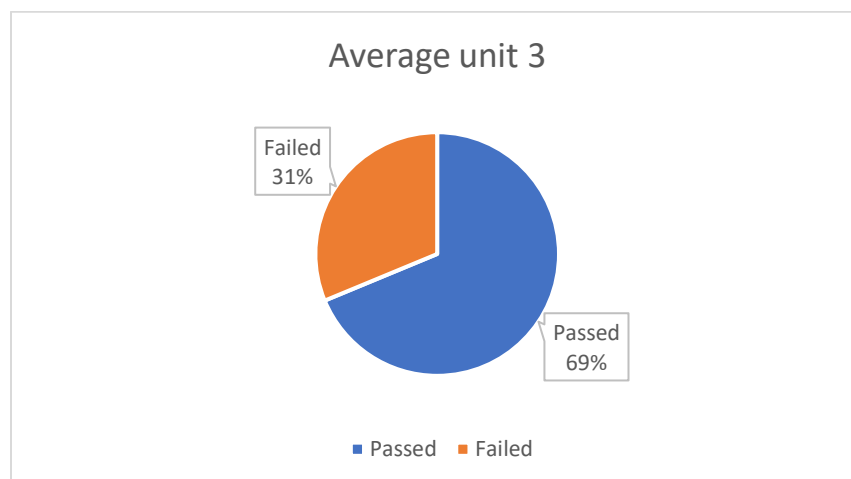


Figure 12. Average unit 3.

Source: Own elaboration (2021)

Making the corresponding calculations with respect to the record and the grades of the final exam, the final average of unit 3 is obtained, generating an encouraging result with respect to the research and in the virtual classes of my problem sample, having a 69% pass rate and 31% fail rate, we can infer that active methodologies have a significant influence on the collaborative learning of students in the first year of their medical career.

5. Discussion of results:

The research on collaborative learning is a type of teaching and learning among all members that make up a whole, however, they must delimit their learning in search that everyone can understand and take advantage of the academic wealth that everyone can reach the goal, which is to learn, a topic, a subject or a problem that arises in their profession must start from a principle, something basic, maybe one can understand it but some need a support, which is not the teacher. Someone can trust in the day to day, our

routine, classmates; they are the means and the way to strengthen the educational parameters based on collaborative help.

For Eggen and Kauchak (2012), "according to which the individual who learns in a group, by explaining, proposing, debating and elaborating their own learning, learns more than they would by listening to explanations, and these in turn learn more than those who learn alone". A statement that stipulates the importance of teamwork in terms of collaborative learning and leads to surprising and imaginable results on the academic potential of oneself plus the opinions of the group either for or against.

For Fernandez and Melero (1995), "In the collaborative approach, a more equitable distribution of knowledge is assumed between the educational agent or mediator and the participants, and authority is expected to be equally shared. That is, if instead of posing a **dichotomy** we speak of a continuum, depending on the degree of structuring of the process and the teacher's control, with the corresponding level of self-direction of the participants, it is possible to affirm that in the cooperative approach there is greater control and systematization by the teacher, while, in the collaborative approach, the students share with the teacher the authority and control of learning" a concept that has a certain logic and commitment on the part of all members of a group.

Now, relating it to the active strategies used as an aid for us teachers as is the active methodology in favor of student learning is super profitable and incalculable academic benefit that can be adapted and diversified individually or in groups makes it even more interesting as it can promote the participation of each group member, assuming a leadership role, in favor of the knowledge they are acquiring.

Now the active methodology makes understand through this research that they are all educational methodologies that put the student at the center of the educational process, mediated by the participation of the same in each learning session, generating student autonomy through the facilitating role of the teacher and the use of technological resources that help in the didactic and academic process of the student, helping them to develop practical theoretical principles at the time of the class and helping them to prepare them to face professional challenges in their specialty.

A feature that distinguishes education in this century from previous ones is the incorporation of information and communication technologies (ICT) in education. This reality goes hand in hand with the methodological requirements of the European Higher Education Area, which have encouraged the development of collaborative learning processes, as described by Baelo and Canton (2010) "the potential and functionality of ICT in the educational field has been described by different authors and its presence in current higher education is such that it can be said that ICTs provide support and support face-to-face teaching". This concept establishes that ICT is the way, the rail, that uses the active methodology to exercise its integrating principles either in a virtual platform, gamification and other online applications that can help manage the purpose of the academic objective.

The integrative active methodologies used in this research refers to the process stage, i.e., in the sequence programmed to carry out the academic activities, is the crucial stage of teaching - learning for both students and teachers, both SNOWBALL, SNOWBALL, SNOWBALL and DPG were very useful in the research because these tools were used to measure the collaborative learning of students in my problem sample generating versatility in the academic functions by students and teachers, since the purpose of applying active methodological strategies to assimilate and obtain collaborative learning was integrated, this research lasted 5 weeks and it was possible to verify how active methodologies significantly influence the collaborative learning of students.

6. Conclusion

The contribution made by the tools analyzed in this research, prove to be of a high degree of help for the academic performance of students. The samples collected in the application of the tool for data collection

in group A, reflect a high level of disapproval of the academic requirements in unit 3, since 78% of the students subjected to analysis did not pass these requirements, and only 22% were able to meet the objectives. The opposite was the case in group B where, once the academic performance of the students with whom the didactic teaching strategies were used was analyzed, 90% of the students were able to pass, while the remaining 10% did not meet the objectives. This undoubtedly reflects that the teaching methods applied in a correct and dynamic way, helps the student to effectively assimilate the information they receive through their learning process, allowing to conclude this study that the active methodologies, both in active teaching strategies based on information and communication technologies, significantly influence the collaborative learning of medical students for their development and benefit in the professional field.

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21. (14) J. Isauro Blanco R, "Conferencia los estilos de comportamiento."

22. (15) Through her educational work Maria Montessori tells us: He is disciplined who can make use of his free will correctly without his actions negatively affecting others, quoted by Lydia Rodríguez Peña in *Educere* magazine.
23. (16) See María del Carmen Merino Gamiño in *Adolescencia, juventud y plan de vida-reflexiones sobre la formación y la orientación de los estudiantes universitarios-perfiles educativos*.
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