



ISSN: 2617-6548

URL: [www.ijirss.com](http://www.ijirss.com)



## Analysis of collaborative work among university students in the province of Cusco, Peru

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### Abstract

This study aims to analyze and describe the various forms of collaborative work that teachers and university students in the province of Cusco accomplish together using the descriptive methodology. All professionals must know their area of work as well as lead in all work environments. The participation was anonymous and voluntary. The participating students are from the first cycle to the third cycle of the different professional careers between males and females from the rural and urban areas of the province of Cusco, Peru. The findings indicate that university teachers play an effective and significant pedagogical role in designing the collaborative work model that assigns group work in their respective classrooms with the various careers they supervise. Additionally, the findings show that the teacher fulfils the social role of motivating students by performing as a tutor in the classroom. Therefore, it has a positive and significant effect among university students. This has implied that the formation of working groups in university students generates student leaders and demonstrates broad knowledge in communication and information technologies which will generate many expectations in their professional training.

**Keywords:** Collaborative work, College students, Education, Group tasks, Homework, Leadership.

**DOI:** 10.53894/ijirss.v8i1.3637

**Funding:** This study received no specific financial support.

**History:** Received: 2 April 2024/Revised: 9 September 2024/Accepted: 4 October 2024/Published: 1 January 2025

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**Competing Interests:** The authors declare that they have no competing interests.

**Authors' Contributions:** All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

**Transparency:** The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

**Institutional Review Board Statement:** The Ethical Committee of the Research Institute of the National Amazonian University of Madre de Dios, Peru has granted approval for this study on 8 May 2023 (Ref. No. 072-2023-UNAMAD-VRI).

**Publisher:** Innovative Research Publishing

## **1. Introduction**

Today's society presents various challenges due to the progress in education which require people with different types of knowledge and skills to carry out collaborative work to propose and implement solutions in the various sectors and even more so in education [1] since cooperation and collaborative work are activities that make positive contributions in all contexts and all sectors, including works, education, sports and others [2]. Similarly, correct collaborative work is essential for the achievement of joint activities, although to be effective, the members of the team must adapt to the context and work collaboratively with a single objective of achieving and completing the entrusted activity [3] to get rid of the tensions generated by the interaction between the members and thus achieve the desired results jointly and successfully [4].

For effective collaborative work, some skills must be developed such as coordination, communication and cooperation between participants [5]. Simultaneously, team participants must have skills to collaborate effectively since this effectiveness directly influences the results obtained for the common good of the group [6] although understanding in depth the complexity of working collaboratively requires time and more research [7].

Collaborative work is a useful tool to formulate improvement strategies but at the same time it is a great challenge when making common agreements [8] since it is often difficult to implement them [9]. On the other hand, the literature indicates that collaborative work together with leadership is an important agent for organizational success. Leaders play a fundamental role because they facilitate collaborative work, promoting cooperation and helping to solve conflicts [10]. Even in sports, it happens that collaborative work needs leadership to obtain good results [11]. Therefore, an attempt is made to introduce collaborative work skills through exercises based on communication and other skills at the university level among students [12].

In recent years, the growing need to develop interpersonal skills in university students has been addressed through the promotion of collaborative work thanks to the pandemic situation [13]. Similarly, numerous institutions promoted the execution of projects through team collaboration with the aim of reaching agreements and mitigating risks in the decision-making process [14]. Consequently, some institutions tried to introduce collaborative work through methods such as the flipped classroom, helping students to develop certain interactive skills that are fundamental for their personal, professional and academic development [15].

Collaborative work has been widely used in teaching where pedagogues worked together to achieve a good construction of knowledge and develop academic communication skills [16]. It has also been used to stimulate oral language in the classroom [17] but in general, as a strategy to share knowledge [18]. In some professional schools at the university level, work teams have been created to facilitate the understanding of various specific topics in the academic field [19] because it is known that collaborative work is an effective tactic to achieve effective learning [20]. However, knowing how to collaborate effectively in diverse teams is a valuable skill with applicability in different environments. Therefore, it is crucial to cultivate it through intentional and meaningful learning activities [21].

The ability to form teams and collaborate effectively in various types of teams is considered an essential resource and should be incorporated from the beginning of education in all disciplines [22]. In turn, these are transferable skills of great importance for the learning and development of university students both academically and professionally [23]. Undoubtedly, collaborative work is also a desired competence for higher education teachers but its development can be complicated by various difficulties encountered in university students [24].

### *1.1. Literature Review*

On the other hand, in the professional field, collaborative work and other soft skills are also very important [25]. Since collaborative work in the work environment guarantees that good work is done although this will depend a lot on the participants [26]. For this reason, collaborative work systems are often tried to be implemented. These have a positive impact on workers' performance [27]. Employers in various industries are looking for staff with the ability to work collaboratively and the best way for students to develop through group assignments [28]. Therefore, to be effective in the workforce, graduates of higher education need to possess abilities like teamwork, communication, and problem-solving in addition to their specialized knowledge [29]. Collaboration and the joint performance of each employee are important aspects to achieve the objectives set [30].

The influence of the collaborative work culture is reflected in the attitudes of workers who feel well-informed and prepared to face all kinds of changes [31]. At the same time, although approaches to improve quality, job safety and training in collaborative work have been researched, they are often underestimated due to a lack of knowledge [32]. Scientific research on strategies to implement collaborative work in work environments is scarce [33] while collaborative work among university students is increasing. The demand for collaborative work has increased in many disciplines, including the health sector [34]. In this area, team collaboration is considered essential to ensure patient safety and it is recognized that a healthy work environment is based on good team performance [35]. In the medical field, collaborative work is a tool that offers opportunities to improve in various aspects of relevance [36] including the fact that good patient care is ensured [37]. Surgery is a specific type of collaborative work since this is crucial considering the various traditional approaches used to assess the level of collaboration which often include the use of assessing scales applied at the individual or team level [38]. Currently, managers in the health sector show a growing interest in carrying out collaborative work [39] which leads to significant improvements in medical care and ultimately translates into healthy patients who are satisfied with the care received [40].

Collaborative work is a useful technique in all environments. It is also crucial in the work of firefighters since they face difficult and dangerous working conditions where team members must work in permanent coordination [41]. Similarly, collaborative work has been evidenced in many sports of great popularity including football although these have been little

studied [42]. On the other hand, Industry 4.0 has changed the lives of a large part of the world's population and will require new skills in the future especially collaborative work which is key in all sectors [43]. Subsequently cooperative work between artificial intelligence and human beings is becoming evident which leads us to reflect and understand how important collaborative work is in our society [44].

### *1.2. Justification and Objectives of the Research*

Nobody expected to know the good side of COVID-19, since it would only be remembered for all the deaths caused, but nobody mentions "the good" that COVID-19 brought and even more in the educational sector, since the majority of the population worldwide had as the only and first need in education the internet and with it the digitalization, as was also present the information and communication technologies (ICT), together with the various virtual platforms and online education that at the beginning nobody accepted and now is requested by the use of its various and multiple forms of application. Even at the beginning of the pandemic, little or no one could handle meetings or work groups well through virtual platforms or classrooms, but nowadays there are few who do not handle ICT. After participating in a marathon training of teachers and students, it was possible to improve digital skills and thus better manage ICT [45]. Teachers and students enjoy having a work meeting from home or from wherever they are because they know and manage technologies better. Student group meetings in libraries have evolved with time. Today, meetings are carried out through apps like Google Meet, Zoom, Team, and others for different kinds of group work. These types of meetings facilitate, economize and even reduce the stress of getting together in a room just to see each other [46]. The meetings through the applications are more dynamic because one is looking for information on a topic and another is looking for special cases, another has already found a similar work, and so collaborative work meetings are more dynamic.

Collaborative work is very important because it is a work in which students support each other effectively and it is more effective than looking for information in a library book but have university students ever wondered if the teachers who teach at the university levels got together to agree on what kind of tasks should be left to the university student or how the group tasks should be to be supported with a theoretical basis, an academic foundation and a collaborative critique. If the teachers know the different types of tasks that are left to their university students or simply the teachers leave the tasks with the only purpose of keeping them busy in academic activity to achieve a good professional that can solve some problem in their personal and working life. Therefore, the general objective of this research is to analyze the different types of tasks that teachers use for collaborative work with university students in the province of Cusco.

## **2. Methodology**

Descriptive, predictive and correlational methods are used in this research. The quantitative approach was also used.

### *2.1. Sample*

The population of this study is university students from the province of Cusco. These students had an experience of classes and academic work during six academic semesters (2022 - 2024) where they developed and participated in various collaborative work groups with different professors who designated various projects to be carried out in groups. Likewise, students had to join these groups and perform the assigned tasks in order to obtain a passing grade and save the academic semester.

For this research, the assignments were delivered over two academic semesters and in each course in which they were enrolled. In other words, these students were selected as a random sample and participated voluntarily and anonymously. The students belonged to six courses enrolled from the I cycle to the III academic cycle.

The total sample is composed of 974 students from three universities: The Technological University of Peru in Cusco, the Andean University of Cusco (these two universities are private) and students from the Universidad Nacional de San Antonio Abad in Cusco (this university is state-run). Students with an age range of 16 to 20 years represented 58.6% of the total. 27.2% represented students in the range of 21 to 25 years and the remaining 14.2% represented students in the range of 26 years and older (26 to 30, 31 to 35 and 36 years and older). In the context of participants, 51% are male and 49% represent the female where there was not much difference between the two genders. The origin of the university students was represented by 78.7% from urban areas and 21.3% from rural areas. The university students were separated by academic areas as students from the basic sciences area 7.5% (Mathematics, Physics, Chemistry, Biology), engineering area 33.5% (Mines, Civil, Systems and others), arts area 24.5% (Law, Accounting, Administration and others), social sciences area 12.1% (Archeology, Social, Education, others) and health area 22.4% (Medicine, Nursing, Psychology).

### *2.2. Instrument*

The data collection was through the online survey which was adapted to the Peruvian version. The original instrument was by the author [Hernández-Sellés et al. \[47\]](#) which consisted of 31 items but after performing the statistical analyses and the matrix of rotated components, it resulted in 26 items which were used for this research to be validated and was applied in the Peruvian context with university students of the province of Cusco. This measurement instrument measures the dimensions of how university students deal with the group work left by teachers and how they had to work collaboratively to obtain a passing grade and improve academic performance.

This measurement instrument has 26 items distributed in seven dimensions as follows: Dimension 1 pedagogical role (RP 1: Design the collaboration model that leads to learning, RP 2: Select the appropriate tasks to be developed collaboratively that are aligned with the objectives and competencies of the subject, RP 3: Selects an assessment system

consistent with the objectives of collaborative work (coherence of method and assessment), RP 4: Suggests resources to solve the task or improve learning in the subject, RP 5: Acts as an expert in the subject by resolving doubts and leading towards the learning objectives). Dimension 2 evaluation role RE (RE 6: Evaluate the group work process with adequacy to the established criteria, RE 7: Evaluate the result of group work with adequacy to the established criteria, RE 8: Evaluate the effectiveness of the collaboration model you have designed). Dimension 3 social role RS (RS 9: Communicates messages of encouragement and support to the team, RS 10: Attends to students individually when they need it, RS 11: Curbs undesirable behaviors, RS 12: Remembers dates of main work milestones, RS 13: Motivates students). Dimension 4 technological role RT (RT 14: Select the appropriate tools to develop collaborative work, RT 15: Develop the appropriate materials to communicate to students the collaboration model, its work phases and objectives, RT 16: Organize the virtual environment to facilitate access to information and tools, RT 17: Select or generate tools for managing and monitoring teamwork, RT 18: Acts as an expert in the technology that sustains the group work, resolving doubts and leading to its knowledge and mastery by the students. Dimension 5 role of mediator (ROM 19: Exercises leadership competencies, ROM 20: Mediation in conflicts). Dimension 6 ROG organizer or manager role (ROG 21: Forms work teams or provides instructions, criteria and tools for their training, ROG 22: Encourages an initial contact for the knowledge of the participants so that the subsequent formation of the teams is favored, ROG 23: Communicates to students the collaboration model, its phases of work and its pedagogical objectives and the tools that will be used throughout the development of the collaborative work). Dimension 7 personal role RPS (RPS 24: Tries to connect the work of the teams with each other to link the learning community, RPS 25: Provides feedback to the students about the work process followed; ROG 26: Provides feedback to the students during the development of the task).

### 2.3. Procedure and Data Analysis

To collect the data, a survey was developed in Google Form; this survey was anonymous and voluntary, the survey was carried out online which was shared with the students of the selected universities and with the collaboration of the teachers was disseminated in all the groups of the different courses. The survey has a five point Likert scale as follows: 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4= agree, and 5=strongly agree. The survey was validated by seven expert teachers from different areas (basic courses of sciences and letters (2 teachers), specific courses of each career (3 teachers) and specialty courses of each career (2 teachers)) with the sole purpose of differentiating the types of tasks that the teacher entrusts to the student with the sole purpose that they can organize and carry out the task entrusted to them collaboratively among themselves. Before conducting the survey, a test survey was carried out with 32 students (7 students from the area of science, 10 students from the area of engineering, 5 students from the area of letters, 6 students from the area of health and 6 students from the area of social sciences) in which statistical values and reliability of the instrument were measured. The results were positive and had acceptable numerical values which allowed us to continue with the research. Thus, at the end of the research, a Cronbach's alpha of 0.988 was obtained which confirms that the instrument is suitable for research in the Peruvian context and for university students in the province of Cusco.

At the end of the survey, data was downloaded in the Excel sheet which was reviewed in its entirety to see if there was any incomplete answer or any anomalous data that could harm the results and after exhaustively reviewing no data with any anomaly was found, then the Excel sheet was converted into SPSS program format version 24 with which different statistical data such as mean, mode, standard deviation, kurtosis and graphs were analyzed as well as the correlations between the data, reliability analysis and Cronbach's alpha were analyzed. The results of the bar charts were obtained and edited from the form and image editors were used to adapt and present them in an orderly and accurate manner.

## 3. Results

Table 1 shows that the mean of the items (26) is above the expected values, i.e., above the average leading to the interpretation that university students have a good perspective on the type of work that teachers leave in a collaborative way and that the students themselves are very interested in collaborative work to learn and improve their academic level.

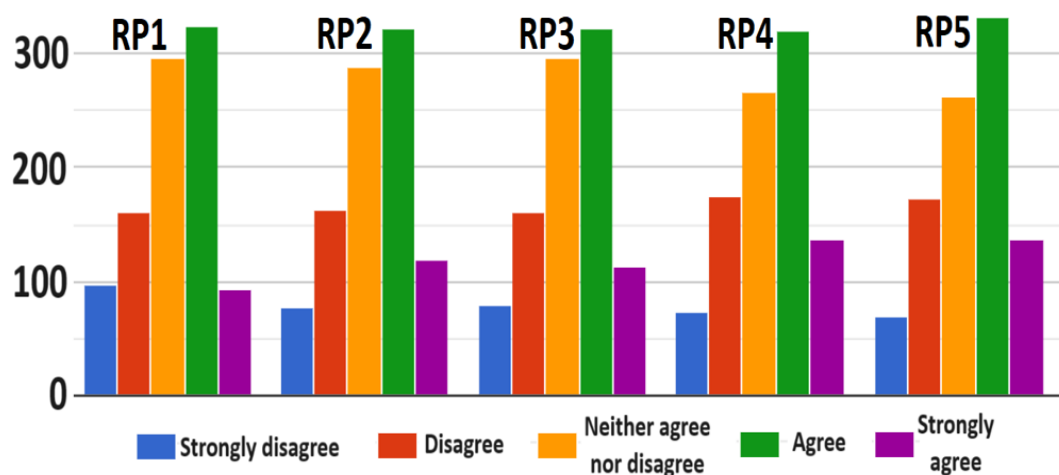
Table 1 shows that the lowest value is in the dimension of the pedagogical role in item 1, i.e., RP 1: if the teacher designs the collaboration model that leads to learning at the time of leaving a job interpreting that students have the perspective that the teacher "does" design the collaboration model and that at least he takes the time within his pedagogical hours to plan and design the type of work that will be left in the course or its courses remembering that the teacher is in charge of 2 to 5 courses in which he has to prepare and design all the classes on a daily basis to be able to teach them in the university classrooms. Thus, the teacher takes the time to look for how collaborative work should be and makes the indications of it so that university students can perform it without any problem. This value obtained in the results is not considered a very low score despite being above the average value, but even so this value should be surpassed for future research. While the highest average is found in dimension 3 in the social function RS 13: Motivate students, a key point that has been practiced for many years, this point had its best effect at the time of the pandemic where students had to listen to their classes virtually but as a result of many difficulties and problems at home, the teachers themselves started more strongly to motivate each student. It is for this reason that this point is key to being very successful in education because without motivation, we will not have future professionals with working capacity.

**Table 1.**  
Distribution of statistical data.

Items	Mean	Standard deviation	Items	Mean	Standard deviation
RP 1	3.156	11.232	RT 14	3.276	11.105
RP 2	3.250	11.196	RT 15	3.289	11.294
RP 3	3.236	11.137	RT 16	3.226	11.168
RP 4	3.280	11.403	RT 17	3.284	11.230
RP 5	3.302	11.291	RT 18	3.271	11.159
RE 6	3.266	11.222	ROM 19	3.297	11.382
RE 7	3.308	11.072	ROM 20	3.218	11.184
RE 8	3.230	10.926	ROG 21	3.270	11.564
RS 9	3.229	11.767	ROG 22	3.257	11.366
RS 10	3.261	11.312	ROG 23	3.292	11.291
RS 11	3.319	11.659	RPS 24	3.273	11.454
RS 12	3.247	11.179	RPS 25	3.254	11.414
RS 13	3.341	11.692	RPS 26	3.267	11.469

**Note:** RP 1: Design the collaboration model that leads to learning. RP 2: Select the appropriate tasks to be developed collaboratively that are aligned with the objectives and competencies of the subject. RP 3: Selects an assessment system consistent with the objectives of collaborative work (coherence of method and assessment). RP 4: Suggests resources to solve the task or improve learning in the subject. RP 5: Acts as an expert in the subject by resolving doubts and leading towards the learning objectives. RE 6: Evaluate the group work process with adequacy to the established criteria. RE 7: Evaluate the result of group work with adequacy to the established criteria. RE 8: Evaluate the effectiveness of the collaboration model you have designed. RS 9: Communicates messages of encouragement and support to the team. RS 10: Attends to students individually when they need it. RS 11: Curbs undesirable behaviors. RS 12: Remembers dates of main work milestones. RS 13: Motivates students. RT 14: Select the appropriate tools to develop collaborative work. RT 15: Develop the appropriate materials to communicate to students the collaboration model, its work phases and objectives. RT 16: Organize the virtual environment to facilitate access to information and tools. RT 17: Select or generate tools for managing and monitoring teamwork. RT 18: Acts as an expert in the technology that sustains the group work, resolving doubts and leading to its knowledge and mastery by the students. ROM 19: Exercises leadership competencies. ROM 20: Mediation in conflicts. ROG 21: Forms work teams or provides instructions, criteria and tools for their training. ROG 22: Encourages an initial contact for the knowledge of the participants so that the subsequent formation of the teams is favored. ROG 23: Communicates to students the collaboration model, its phases of work and its pedagogical objectives and the tools that will be used throughout the development of the collaborative work. RPS 24: Tries to connect the work of the teams with each other, to link the learning community. RPS 25: Provides feedback to the students about the work process followed. ROG 26: Provides feedback to the students during the development of the task.

Figure 1 shows the results of dimension 1 (pedagogical role) where it is observed that the lowest average but higher than the general average is, if the teacher designs the pedagogical part to leave a group work despite the fact that it is above what is expected, teachers are always involved in their "what to do". Preparing their classes, planning what topics they have to teach to train good professionals, teachers are looking at how university students can improve their grades and have a good academic performance. Meanwhile, the highest average within the dimension of the pedagogical role is item RP 5: Acts as an expert in the subject solving doubts and leading towards the learning objectives. This point is very important for the university student because it takes the teacher as a model. Therefore, the teacher demonstrates experience in his subject or course in charge; answer all kinds of questions as long as it is about the topic. If the teacher has the opportunity to tutor, he will have to answer other topics, so every university professor must be prepared. Thus, this dimension of the pedagogical role is very important for university students because it helps them to empower their knowledge and develop their perspective.



**Figure 1.**  
Statistical distribution of the pedagogical role.

Figure 2 shows the results of the dimension of the evaluative role that the teacher has with university students where it is observed that the lowest average corresponds to RE 6: Evaluate the group work process with adequacy to the established criteria. The students have a good perspective with respect to the evaluations made by the teacher at the time of grading



group work but there are discontents when it comes to receiving the results of the grades. There are students who work harder in the group but still receive a grade equal to or lower than what they expected or lower than the other members and this usually happens many times, so the student manages to communicate with the student to make a feedback or any other query. The teacher takes into account the situation and shows that the results of the grades are altered due to some clarifications without harming any university student. Thus, this moment of clarification is also used to do a bit of university tutoring. The highest average in this dimension corresponds to RE 7: Evaluates the result of group work with adequacy to the established criteria, a point that the whole group looks forward to with more eagerness because all work entrusted by the teacher always corresponds to a group grade and is the highest grade of one of the members, the effect of which corresponds to the whole group. This is a very important point because the whole group has to put in their best effort and commitment because there is always an individual grade and the one that waits the most is the group grade.

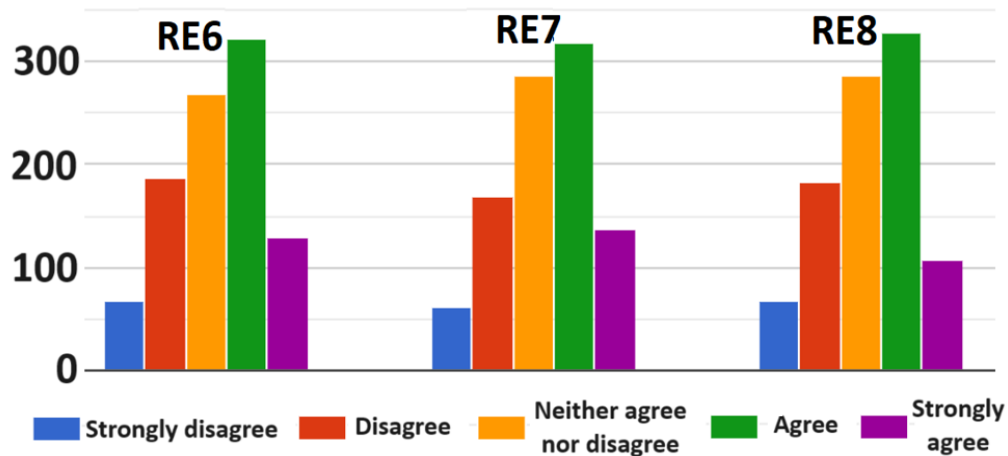


Figure 2.  
Statistical distribution of the evaluator role.

Figure 3 shows the results of the dimension of the social role that teachers have towards university students where it is observed that the lowest average corresponds to SR 9. It communicates messages of encouragement and support to the team despite having a higher value than the average. It is observed that the teacher is not included in the work group or in each group that is formed in the collaborative work but he or she is ready to provide all kinds of consultations about the collaborative work entrusted in class. The students request that the teacher be within each group to solve any type of doubt or controversy that is generated in the collaborative group. While the highest average is RS 13: It motivates the students, some students have the idea that the teacher is part of the collaborative work group (on WhatsApp). Other students are mostly satisfied with the teacher because he is always motivating all the groups to move forward and present the work in the best way because he is always relating the professional career with the work entrusted to him. The teacher is prepared to be able to reach the university student and convince them to carry out this task and the students do it not to fulfill but out of vocation because they like the professional career they are studying.

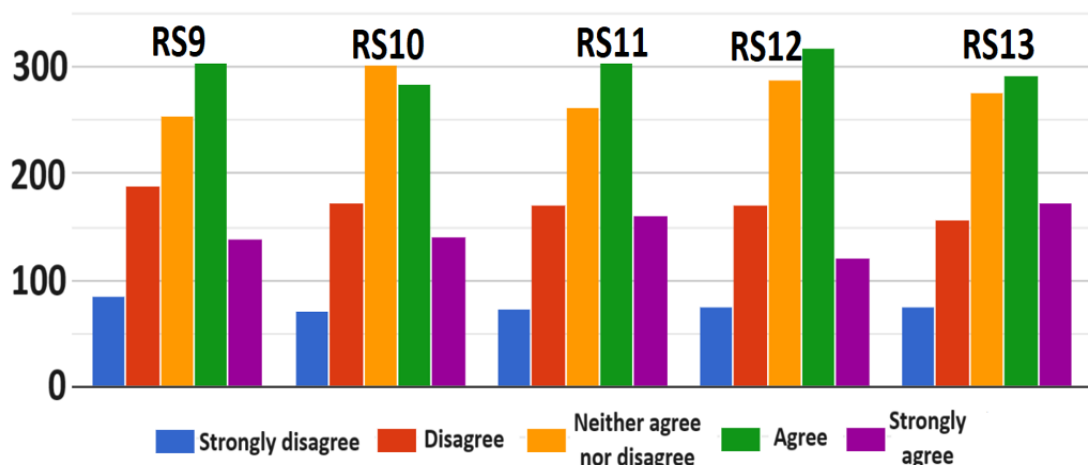
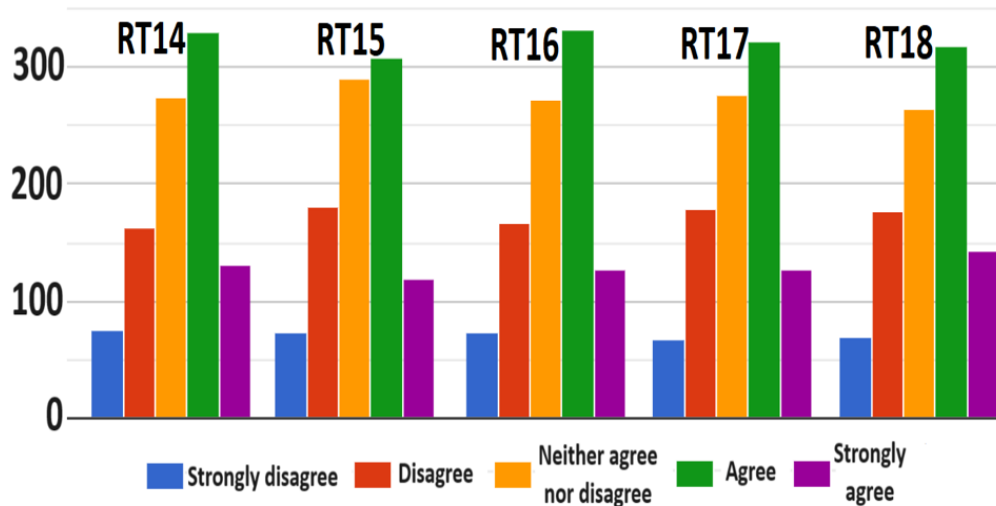


Figure 3.  
Distribution of the social role.

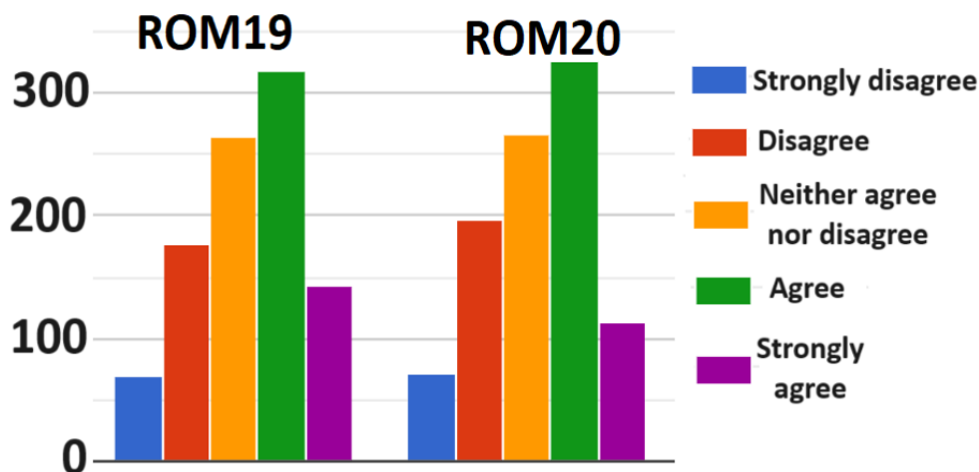
Figure 4 shows the results of the dimension of the technological role that the teacher recommends to carry out collaborative work. At this point, a slight equality of averages in the values is observed. The teacher is well- prepared with the appropriate tools since in times of pandemic; he was training regarding digital skills. For this reason, the teacher selects the tools to develop collaborative work. RT15 develops the appropriate materials to communicate to students about the collaborative work model, its work phases and objectives to be achieved, a point that students love because they

achieve access to all the functions because the teacher creates a link where the responsible student has at hand all the functions of the platform and can use them appropriately. RT16 organizes the virtual environment to facilitate access to information and the tools whose point is a little weak for university students because the corporate accounts that students are limited, they cannot create Meet rooms for more than 40 minutes, they cannot record the meetings and other functions that the student needs to have access to, these functions were limited by the order of the same authorities due to security issues and costs generated by paying for membership. The other items manage to have an equal number of points (averages) between them, such as selecting or generating tools for the management and monitoring of teamwork and acting as an expert in the technology that supports group work, resolving doubts and promoting their knowledge and mastery by students.



**Figure 4.**  
Distribution of the technological role.

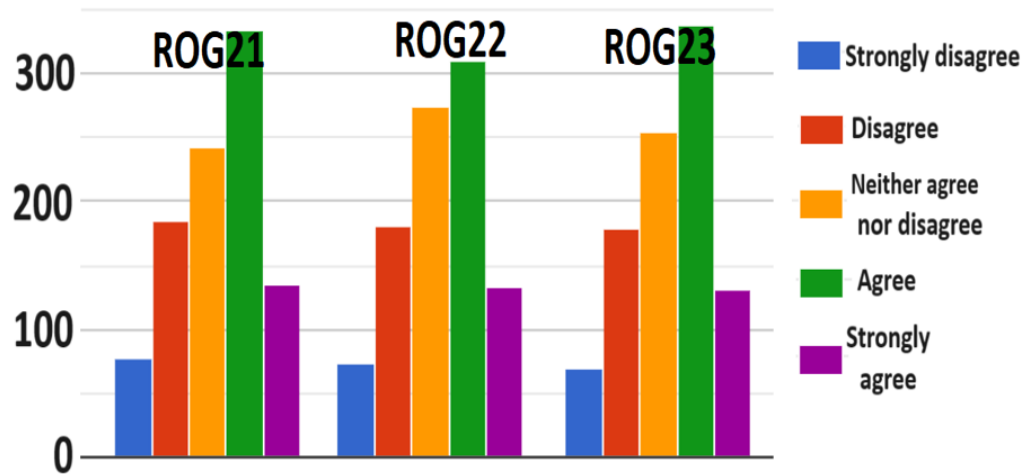
Figure 5 shows the results of the mediator-guide role dimension because there are only two items but with values above the mean i.e., ROM 19: 3.297 and ROM 20: 3.218. At this point, the teacher has to direct and exercise leadership so that each university student fulfills the goal of finishing the professional career and being a good person in the future. When assuming the leadership, the professor will be able to control and mediate in the conflicts among the students either in class or in the collaborative work group because the leadership that they have inside must still be formed and it is necessary to take charge of small groups that must direct them and take them on the right path. Therefore, work groups are formed among students with the only purpose of exploiting the abilities that they manage to have in these groups which is to lead.



**Figure 5.**  
Distribution of the dimension of the guiding mediator role.

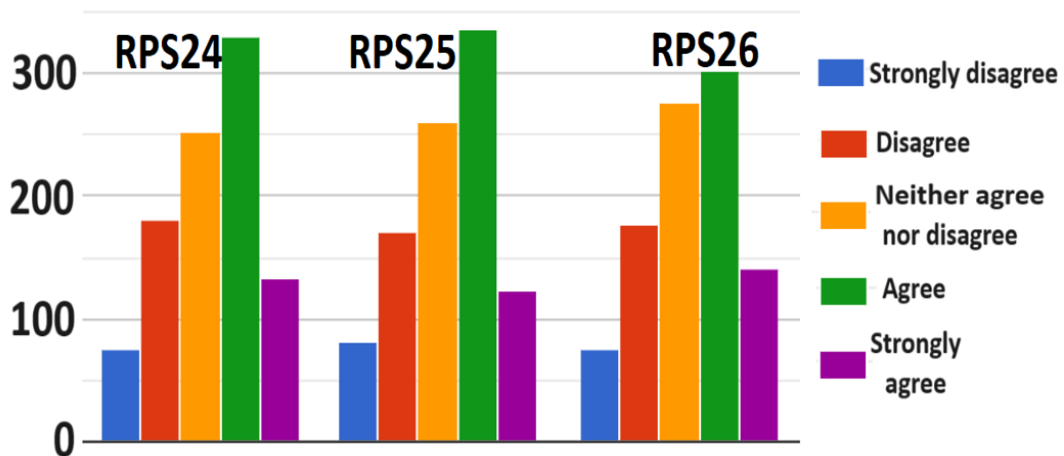
In Figure 6 of the organizing role dimension, an item that also contains three items with very close values, but above the mean, where ROG 22: 3.257 is the lowest value, that is, if the teacher provides a first contact for the knowledge of the participants in a way that favors the subsequent formation of the teams, an item that should be enhanced in each work group on a rotating basis among the students and ROG 23: 3.292 that corresponds to whether the teacher communicates to the students the collaborative work model, its work phases and its pedagogical objectives and the tools that will be used throughout the development of the collaborative work. 292 that corresponds to whether the teacher communicates to the students the collaborative work model, its work phases and its pedagogical objectives and the tools that will be used

throughout the development of the collaborative work. This indicates that the teacher forms a team and indicates the academic rules that must be met for its subsequent qualification as well as encourages friendship among the students so that in the following collaborative works they can join and form the same group. The teacher is in charge of communicating how to work as a team where everyone must collaborate for the common good.



**Figure 6.**  
Distribution of the organizing role dimension.

Figure 7 shows the results of the personal role dimension with three items well-adjusted in its mean which RPS 24: 3,273 is the one with more points that corresponds to the teacher tries to connect to the work of the teams among themselves, to link the learning community and supervise the collaborative work while RPS 25: 3,254 is the lowest point but acceptable and above the expected value and corresponds to the fact that the teacher provide feedback to the students about the collaborative work process, a point that should be reinforced more in the collaborative work, since it is more focused on explaining the indications to the groups in its three stages (before, during and after) of the collaborative work, it is here where the university professor acts as a tutor and performs the feedback so that the university students are very clear about how to perform the collaborative work.



**Figure 7.**  
Distribution of personal role.

Table 2 verifies the correlation between the elements, i.e., between the 26 items resulting in the correlations values being above 0.687 which means that it has a significantly positive correlation.



**Table 2.**

Correlation between elements.

Items	RP1	RP2	RP3	RP4	RP5	RE6	RE7	RE8	RS9	RS10	RS11	RS12	RS13	RT14	RT15	RT16	RT17	RT18	ROM19	ROM20	ROG21	ROG22	ROG23	RPS24	RPS25	RPS26
RP1	1.00	0.787	0.803	0.749	0.738	0.748	0.738	0.744	0.714	0.697	0.707	0.707	0.726	0.757	0.754	0.749	0.728	0.702	0.714	0.688	0.710	0.740	0.723	0.722	0.684	0.704
RP2			0.784	0.762	0.749	0.759	0.749	0.747	0.725	0.686	0.712	0.721	0.734	0.767	0.762	0.750	0.736	0.724	0.722	0.720	0.733	0.747	0.737	0.727	0.676	0.703
RP3				0.771	0.781	0.788	0.779	0.761	0.734	0.704	0.735	0.745	0.738	0.763	0.770	0.754	0.759	0.732	0.726	0.717	0.740	0.753	0.757	0.742	0.709	0.714
RP4					0.753	0.785	0.764	0.773	0.721	0.736	0.754	0.737	0.741	0.775	0.767	0.744	0.747	0.717	0.732	0.709	0.731	0.749	0.733	0.744	0.716	0.702
RP5						0.760	0.779	0.744	0.711	0.681	0.743	0.744	0.732	0.753	0.766	0.740	0.734	0.745	0.745	0.740	0.758	0.759	0.754	0.734	0.701	0.692
RE6							0.810	0.819	0.755	0.732	0.759	0.776	0.742	0.772	0.784	0.751	0.770	0.761	0.752	0.732	0.756	0.780	0.758	0.765	0.715	0.734
RE7								0.797	0.746	0.744	0.769	0.772	0.757	0.812	0.792	0.774	0.784	0.747	0.754	0.740	0.765	0.787	0.762	0.765	0.729	0.696
RE8									0.758	0.750	0.752	0.783	0.761	0.800	0.799	0.764	0.781	0.764	0.737	0.740	0.757	0.778	0.749	0.768	0.733	0.723
RS9										0.774	0.745	0.784	0.807	0.772	0.781	0.732	0.771	0.725	0.740	0.729	0.750	0.765	0.762	0.750	0.732	0.723
RS10											0.753	0.780	0.780	0.765	0.755	0.739	0.741	0.741	0.718	0.708	0.727	0.753	0.735	0.745	0.748	0.708
RS11												0.779	0.793	0.793	0.791	0.767	0.761	0.748	0.760	0.757	0.757	0.762	0.747	0.756	0.744	0.724
RS12													0.780	0.810	0.784	0.774	0.781	0.763	0.752	0.739	0.777	0.799	0.779	0.766	0.743	0.716
RS13														0.804	0.818	0.772	0.802	0.755	0.772	0.740	0.774	0.782	0.793	0.785	0.750	0.754
RT14															0.842	0.829	0.826	0.805	0.788	0.770	0.795	0.803	0.789	0.795	0.762	0.752
RT15																0.810	0.834	0.797	0.772	0.774	0.794	0.804	0.783	0.804	0.760	0.743
RT16																	0.816	0.812	0.780	0.777	0.772	0.800	0.770	0.781	0.762	0.742
RT17																		0.816	0.815	0.778	0.800	0.810	0.809	0.815	0.780	0.749
RT18																			0.811	0.788	0.783	0.814	0.787	0.807	0.758	0.747
ROM19																				0.818	0.846	0.812	0.797	0.803	0.773	0.751
ROM20																					0.804	0.806	0.760	0.771	0.758	0.745
ROG21																						0.839	0.821	0.814	0.792	0.759
ROG22																							0.835	0.844	0.792	0.781
ROG23																								0.818	0.807	0.783
RPS24																									0.794	0.787
RPS25																										0.846
RPS26																										1.000

#### **4. Discussion**

Collaborating with interconnected work knowledge made it possible to identify hidden obstacles preventing learning integration[1]. Since collaborative learning is of utmost importance, team building and the need for constant evaluation are also part of the improvement of collaborative skills and processes in any academic and work environment [3]. Therefore, it is important to manage and distribute learning activities in the context of collaborative work to optimize team performance over time and contribute to theoretical knowledge in this field [4] as it is closely related to the moral sensitivity and loss of care of professionals especially in the health area in recent times [8]. Therefore, collaborative work should be proposed in the new curricula to train professionals with this profile and apply it in their professional life and their personal life.

Collaborative work in many situations is essential because providing tools and structures to coordinate collaborative work processes and promote interaction between team members [9] despite knowing. Students and university teachers need to strengthen their knowledge for digital competencies because now the demand is at a higher level. Collaborative work is an effective strategy to improve quality and efficiency in the health area, but now the advancement of science is being applied in all areas [10] especially education but is still being carried out only as training or testing as it is being evaluated to make it official in some universities for its full applicability despite the practice has been applied in student leadership in a positive way [11].

The results of any group activity are influenced by the attitudes of each team member. Therefore, continuous training based on theory and the use of collaborative tools is important to encourage the development of collaboration and test the concept of joint preparation [12] since critical thinking helps to improve teamwork. The following three fundamental points reflect the main efforts aimed at strengthening team collaboration: The first is the expansion of the strategic direction of the development of experiential learning based on cooperation. The second is the promotion of community service with a moral civic responsibility and the last is the integration of the development of service learning in the field of university education [13].

These characteristics of the collaborative personality and the way they express their emotions can have a positive impact on collaborative team performance in various areas such as creativity, integrity, and aesthetic appreciation. These points are essential for team leaders to bring together group members with a variety of personality traits and express themselves emotionally in their team as these attributes can favor the development of collaborative work and therefore, the effectiveness of the team [14] faith in collaborative work experiences a marked improvement after the group's participation in long-term projects within the academic semester [15]. It is highly beneficial to generate changes in the way interdisciplinary collaboration is perceived especially when it is based on shared leadership and when considering the positive effects of intervention in classrooms focused on oral language stimulation [17]. Collective work makes it possible to integrate knowledge from different areas of knowledge [19] even more so if they are university students from different cultures since in the universities that were surveyed, the rejection of forming collaborative work groups was observed at first but the more work groups were formed, the more satisfied they were with the work entrusted to them.

University students' value collaborative research in diverse teams considering that it brings additional value compared to more conventional team tasks. Therefore, it is important to keep in mind that it takes time to develop collaborative work skills. In this sense, collaborative learning provides university students with opportunities to express their creativity, exercise and strengthen their interpersonal skills [21]. Undergraduate students have the opportunity to gain essential collaborative work skills through simulations supported by experienced faculty, faculty and students value the learning opportunities these simulations provide. However, it is important to note that this learning process can be challenging, demanding and overwhelming. In this context, it becomes evident that a collaborative team is required to effectively teach teamwork skills [22] replicating in different universities at the regional and national level to evaluate the positive effects of collaborative work.

Communicative apprehension seems to negatively affect confidence in teamwork skills both directly and through its influence on confidence in communication skills while belief in one's ability (self-efficacy) is positively related to these skills [25] as there are university students who do apply this type of work but did so without a theoretical basis. After research work, they only realized that they were already applying it in their family workplaces. It is very beneficial to improve interprofessional training by including collaborative work in various areas especially for those professionals who are taking their first steps in their professional careers who are afraid to carry out some work activity [26]. Implementing the planned positive feedback approach has the potential to strengthen resilience and promote more favorable attitudes toward a collaborative work environment. The periodic incorporation of this strategy to promote positivity could represent an economical and easily scalable initiative to improve well-being in an organization [27]. If the entrepreneurial businesses of some close family members are taken as a model, collaborative work could be implemented and trained to improve their economic status and social well-being.

Most university students have a solid understanding of the concepts related to collaborative work and design thinking, collaborative teams work effectively which allows them to acquire beneficial skills [29] to improve or perform academically in the university which is why within the framework of significant changes in the work environment. Employees who participate in a collaborative work culture and who perceive that they are well-informed are more likely to experience a greater sense of readiness to face changes [31] of a personal nature, so that university students after a brief explanation of collaborative work already feel the pressure to group and start working on the different aspects entrusted by the teacher. Teamwork training provides not only employees with the essential skills required to collaborate but also has effect on college students effectively in various assigned tasks which will ultimately result in higher team performance and better qualifications for their professional profile. Collaborative work enforcement tactics particularly those related to task

interdependence, collaboration effectiveness and performance play a critical role in improving outcomes in academics and team-based service environments [33].

An important relationship is observed between team collaboration and satisfaction in the academic field as effective team collaboration leads to greater job satisfaction and this can act as a prevention factor against teacher change in academic semesters [35]. The level of performance in collaborative work remains consistently at a high level as most organizations are focused on improving team collaboration due to its influence on performance in a personal way [38] whose effect is implemented in team collaboration in which it is integrated with the implementation of scientific security principles that it offers. This approach is supported by evidence of sustaining changes of a complex nature and by increasing the reliability of any cognitive process and development [40]. The more frequently stressful situations in teamwork are the absence of leadership or the absence of shared mental models, since if these factors were present they would be effectively related and there would be an effective team flow [41].

Collaborative work in university students is of utmost importance because it allows them to develop in a personal way to acquire leadership in the group to develop communication skills among people or their peers and this is accompanied by digital skills that they have to manage among their peers. This research is of utmost importance because it also allows them to know and implement the skills of collaborative work that they will have to learn from the university to perform well in the work where they perform as professionals. Collaborative work for university students aims to train students and achieve a future professional with leadership at work. This research will serve as a basis for future works as research projects and references are included in the curricula on collaborative work. So the question remains open as to how this methodology could be applied to master's and doctoral students. Since they work in different places and in different specialties, the question is how will the academic environment be in collaborative work with master's and doctoral students of different specialties?

## 5. Conclusion

It was possible to analyze collaborative work in university students in the province of Cusco which is applied by teachers concluding that it has an effect to use this methodology of collaborative work in students to improve their academic level and with a secondary effect to detach the leadership in a personal way.

Concerning the pedagogical role, it stands out that the teacher always demonstrates to have the answer to every student's consultation, this makes the teacher be trained more and more every day with the advance of science and technology to be ready for any consultation of the university students which guarantees every objective set out in the course to achieve 100% learning in the university classrooms.

Concerning the evaluator role, the teacher practices with the university students at the moment of evaluating the results of the work, he does it in an adequate way showing the criteria set out at the beginning of the task. One of the main roles of the university teacher is to motivate students.

Another conclusion is that the teacher is always constantly updating his teaching materials because information and communication technologies help significantly. These technologies not only help the teacher but also the student because the student maintains and enhances his leadership spirit.

These types of roles that the teacher exercises and puts into practice when leaving collaborative work significantly affect university students.

## 6. Limitations

There are certain limitations in this research. First is the fear of the teachers when it is mentioned that they want to survey collaborative work because they think that we want to evaluate their teaching performance or their way of working with students. Once explained to the teacher, he just agrees to share the survey among his students virtually. They also have the excuse of not wanting to participate in the research (respond to the survey) due to the lack of megabytes on their electronic devices. The lack of support from some universities to be able to talk to professors and ask for help to share the survey link but mostly this lack of support because they argue that they do not have time or that you must request permission from the university and must be formally submitting a document with which they could just share the link to the survey. Acceptance to share the survey link, after submitting a document takes from 7 to 30 working days to respond as long as the teacher is also willing to share it; otherwise it will be necessary to wait for a direct order from their immediate superior.

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