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COLLABORATION LEVELS FOR TEAMWORK IN VIRTUAL ENVIRONMENTS; CONCEPTUAL PERCEPTIONS AND TEACHING EXPERIENCES ABOUT TEAMWORK AND COLLABORATIVE LEARNING OF THEIR STUDENTS

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Abstract: The present research consists of the analysis of the levels of collaboration that can be achieved through the teamwork strategy in virtual environments, for which an online form was applied to teachers of two higher level educational programs in 100% online mode. The objective of the study was to analyze teamwork in virtual mode and the collaboration process within 4 levels that are identified from a review of the theoretical bases of collaborative learning. The study allowed us to determine and locate the level of collaboration reached when working as a team in the different subjects and the impact it has on collaborative learning processes. The above will allow us to propose improvements in the design and orientation of team activities to induce students to reach the maximum level of collaboration.

Keywords: Collaboration, Teamwork, Virtual learning environment, Shared responsibility, Positive interdependence.

INTRODUCTION

Currently, educational contexts, in any of their face-to-face or virtual modalities, have the characteristic of having various technological tools for communication and interaction that allow implementing and enhancing collaborative activities for learning through an interactive system in which a series of communicative transactions. This system generates a particular environment conducive to teamwork and the collective construction of learning, through exchanges and relationships generated and mediated by technology. In a virtual environment, technology offers the possibility of making teamwork more efficient and maximizing collaboration with the intention of enhancing its results.

From a socio-constructivist approach, teamwork in AVA (Virtual Learning Environment) implies more than the

distribution of tasks and the sum of individual work in a final project, it is carried out with the support of technology, for the creation of environments of information, interaction, production and exhibition of knowledge for a group of people with common interests and objectives who seek to maximize not only their individual learning, but also that of others. Therefore, working as a team in an AVA involves the use of information and communication technologies (ICTs), which provide greater quality and educational possibility to share and manage information; as well as learning and knowledge technologies (TAC) that through different digital resources serve as support for the teacher and students; and no less important are technologies for empowerment and participation (TEP) that, through web 2.0, make it possible to interact to create and build content collaboratively.

For example, using this type of tools in a learning situation can facilitate reaching a maximum level of collaboration, allowing students to communicate and interact by dialoguing asynchronously or synchronously to make joint decisions, helping them determine rules, organize the work and set dates, they can define roles and with the help of these tools everyone can make individual contributions that they all share, exchange and allow them to concentrate and review the information generated to together select which one and how to use it to generate new information, do a project or solve a problem. When working as a team, it is important that all its members select tools, resources, etc., that they will use to build collectively and determine the space to exhibit the final work product, the result of collaboration and teamwork.

One of the reasons why collaboration and teamwork have become a fundamental strategy in training processes is because they are considered transversal competencies

that are widely referenced in the academic, professional and social and that help develop a series of essential skills “such as proposing ideas and accepting those of others, managing time well, listening, collaborating, adapting, etc.” (Chica, E. (2011, p. 1). Therefore, the teaching plans of a subject must contemplate the use of this type of teaching-learning methodologies that are adapted to the acquisition of said competencies. The relevance of their use It is related to the fact that national educational policy in Mexico and internationally is changing towards a more active vision of learning where the student is recognized as a subject who learns in society and through interaction with others and with their context. From the above, it is observed that more and more educational models have replaced the passive and individual learning of students with one that is more active, self-managed and that learns in relation to others.

Based on the above, educational contexts have given great importance to teamwork, “where social interaction and collaborative activity are seen as a driver of learning and cognitive development, articulating interaction and social relationships between those They learn as a necessary condition for the construction of knowledge” (Martínez, 2012, p.16). Teamwork is born from a common objective among its members and is a work methodology that implies a form of organization and development of an activity, where the participation, collaboration and joint work of its members determine the achievement of the objective in common.

For Robins (1999), teamwork can be defined as a group of two or more people who interact interdependently and equally to achieve common goals. From a pedagogical perspective of collaborative learning, and also for the purposes of this research, teamwork is seen as the process of intentional collaboration by teachers in a learning activity that seeks to

create and construct knowledge collectively, that is, the whole of actions and elements that lead to collaborative learning and that involves inducing students to experience shared responsibility, make joint decisions, a positive interdependence that allows them to reach the collective construction of significant knowledge to create something new or solve a problem.

The objective of this work is to analyze teamwork in virtual mode and the collaboration process that students experience from 4 levels of collaboration that are identified in a rubric that was built from a review of the theoretical bases of collaborative learning. to form the levels and which are then presented as a construction reference to determine said levels.

WHAT IS COLLABORATIVE LEARNING IN AVA?

The AC Theory is the most representative expression of educational socioconstructivism. The Russian psychologist and promoter of this sociocultural theory, Lev Vygotsky, considers that social relationships are relevant in learning processes and argues that the construction of knowledge is an individual and at the same time social act. That is, the learning of new skills and the cognitive development of any person is largely due to the interaction with other students and the teacher and this way knowledge is constructed individually, but at the same time collectively from the help provided by others, which allows reaching the zone of proximal development (ZPD) which he defined as the distance from the actual level of development and the level of potential development with the guidance and help of others.

For Johnson and Johnson (1998) collaborative learning is “... a carefully designed system of interactions that organizes and induces reciprocal influence among

members of a team” (p. 1). Which means that it is developed through a gradual process in which each of the members feel committed to the learning of others, generating a positive interdependence that is acquired through group or team work. The main characteristic of the collaborative process is the interaction of its members and the contribution of everyone in the generation of knowledge. It is a horizontal scheme, although some of the members can take the role of leader, authority is shared and responsibility is accepted. The diversity of points of view is respected and we seek to reach an agreement to together promote new knowledge.

From this approach, working as a team does not imply a distribution of tasks that each student performs individually and then joins everyone’s pieces into a puzzle for a final project, without knowing how to exchange and discuss the work of others. . Working collaboratively as a team from socio-constructivism implies shared responsibility where decisions are made together and there is a positive interdependence that is reflected when each member contributes to the construction of a coherent whole, that is, work is essential. of each one so that together they can build, based on everyone’s contributions, a new final work and reach the achievement of a common objective. Therefore, when we talk about teamwork, as a collaborative learning methodology, we refer to a way of working in a scenario “where two or more subjects interact to build learning and it is a process in which each individual learns more. of what he would learn on his own, as a result of the interaction of the team members” (Guitert and Giménez, 2000, p.114).

For the design of collaborative team activities, the teacher has a different position from the traditional one, ceasing to be a transmitting agent of learning to become a mediator of the process. In this scenario, the

student is the protagonist of his own learning and the teacher is an active actor who triggers and mediates knowledge through advice, guidance, and evaluation of the educational process, where collaborative activities can range from the comprehensive acquisition of content to those that promote collaborative and situated learning, that is, they are not always aimed at learning and applying the content. It is even possible that an e-activity (online activity) includes both collaborative and independent study tasks or that it goes from an independent action to the next extreme, which involves activities developed in groups and collaboratively (Martínez and Prendes 2006).

COLLABORATION LEVELS FOR TEAMWORK

When talking about levels of collaboration, reference is made to the presence of all the elements that are considered present in collaborative learning processes and that can be obtained through teamwork; from a level of only collaboration (without learning construction or only socialization), to a higher level of collective construction and learning from which the following 4 conditions can be distinguished:

- *Work in pairs without* sharing responsibilities, each one does a part of the task and they put it together, for example, an exhibition where each one investigates on their own and prepares the part they present.
- *The shared responsibility*, During the task everyone investigates, participates, exchanges information and shares efforts, time and knowledge, everyone is responsible for the learning of others.
- *Making joint* and important decisions to carry out the task, for example, defining times, forms, spaces and work schedules,

selecting digital resources or tools, etc.

- *Positive interdependence* They produce and create together a final product, a project or the solution to a problem based on the contributions of everyone and each one cannot complete the work without the work of others because the participation, information, opinions, knowledge, effort, etc., of all are essential to conclude the activity.

From the above, we can differentiate 4 levels of collaboration that can occur in an educational context, depending on several factors, such as the type of activity carried out or its purpose, the role of the teacher as a guide of the process who tells the student what to do. and this only executes from a more active and independent role of the students, where the teacher is only a mediator of the process and the students decide what and how to do their work. Therefore, students share responsibilities and make important decisions together to achieve positive interdependence and the collaborative construction of a final product.

INVESTIGATION METHODOLOGY

The methodological design of this work was carried out from a qualitative approach with the use of the survey technique that was applied to 30 post-graduation teachers from two educational programs in the area of Education and Administration. An online form was used with 2 sections of open and closed questions. The first section was related to the description of the concept of teamwork and collaborative learning that teachers have and the second section is related to the experience that teachers have about students' teamwork, in order to determine the level of collaboration. that they experience. The sample was selected by convenience with an email invitation to teachers to answer the form. The main characteristic of the informants was that they

were online teachers. Once the teachers sent the answers to the form, the information was processed in graphs and an Excel matrix with the emptying and transcription of responses to carry out a discourse analysis of the open questions, word frequencies were identified. in key sentences and ideas that will mark a trend or establish a qualitative relationship with the elements that are identified at each level of collaboration (distribution of tasks, shared responsibility, making important joint decisions, positive interdependence for the construction of learning or problem solving). For the closed questions, percentage graphs were prepared that indicate in percentage terms, according to the multiple choice answers selected by the teachers, the level of collaboration that is manifested in relation to the aspects or elements in teamwork that they mention. They are present in the students' team activities.

RESULTS

Of the teachers who included the form, 93% have more than 10 years of experience in teaching and in the virtual modality, from which it could be deduced that they have some experience in the use of technology and experience in measuring activities as a team or collaborative. The form was divided into two sections: the first with the name of concepts that sought to know the definition that each teacher had of teamwork and collaborative learning to explore a way to measure and relate their answers with the levels of collaboration that entails learning. collaborative in virtual environments. Their responses helped to identify the conceptual elements that characterize the levels of collaboration that are present in their definitions to try to relate their conceptions of the concept with the levels that students experience.

To have greater context, the teachers were asked the average number of activities worked

Student activity	Collaboration levels	Example:
Students are not required to work in teams.	1	There are no collaborative activities in the program
Students work as a team, but there is no shared responsibility	2	The preparation of a presentation, in which each person is responsible for a part of the work and at the end one person joins the parts into a presentation.
Students have shared responsibility, but do not make important decisions together to complete the task.	3	Students investigate information, exchange and share it, and together they create a concept map as a team. The teacher forms the teams, gives them precise instructions on the process or steps to follow, provides them with information resources and tells them what program or tool to use for the presentation (they do not make important decisions).
Students have a shared responsibility, they make important decisions together regarding the activity, but their work is not interdependent.	4	The students have to develop a project or solve a case and they form their work teams, they organize themselves and choose a topic or problem they want to address and decide on the collaboration process, make decisions about the sources of information they will use, the collaboration spaces (forum, shared drive, wiki, etc.), define delivery dates or meetings and choose tools and delivery format and each one can do their part without help from others.
Students have shared responsibility, they make decisions together and their work is interdependent.	5	Students have to develop a project or solve a case and they form their work teams, they organize and choose a topic or problem they want to address and decide the collaboration process, the sources of information they will use, the collaboration spaces. (forum, shared drive, wiki, etc.), they define delivery dates or meetings and choose tools and delivery format and they also dialogue, discuss, negotiate about the construction of the work, everyone contributes and together they build new information with the of everyone and that will serve for the final work, so that each member perceives that he is linked to the others to complete the activity, so that he cannot achieve success until they also achieve it. Success and learning depends on everyone!

Table 1. Collaboration Levels Rubric and examples. (Own elaboration)

on in the course, to which they responded that 9 to 12 in most cases and only 30% of the courses have in quantity. average 2 or more team activities and 70% have only 1 or none. That is to say, there is a low percentage of teamwork in the courses in general, in some cases this may be due to the fact that some courses have a more individual focus such as projects, however the bulk of the courses are of another type that are They consider that they would have the characteristics to include more team activities and yet it is not observed that they fully promote more activities of this type, which disfavors the development of transversal skills that can be developed with this methodology, as well as the collective learning that can be generated. from a constructivist vision and a competency-based approach, which is part of the educational model of the institution to which these programs belong.

TEAMWORK AND COLLABORATION CONCEPT PERCEPTION SECTION

When the teacher was asked to define in his own words the concept he has of the term working as a team in virtual environments; Some of the responses obtained were:

- "It is the activity carried out by a group of people on a virtual learning platform to achieve a common objective".
- "It is making agreements to achieve a goal, among several people with the same interest in it, organizing actions, establishing commitments and times to achieve it".
- "Learn together with my peers through the development of collaborative work, asynchronously and/or in real time, using own and external digital tools from the institutional platform"

- “It is collaborating to carry out a task or project, contributing together”.

By searching for frequencies in key words that define the concept of teamwork, from the vision of collaborative learning, where aspects related to common objectives, shared responsibility, making important decisions together, positive interdependence were mentioned, it was possible to identify that 60 % of the teachers identified as a central element that there is a common objective, 46% mention that it is a collaborative work activity, however, they do not mention details and implications of this process and the majority link it to the use of technology. perhaps due to the virtual modality in which these programs are developed. Only 20% mention in their definition elements or aspects related to collaborative processes such as interaction, communication, construction of products, projects or solutions that refer to a shared responsibility and only 16% relate teamwork to the acquisition of knowledge and learning and only 10% explicitly talk about commitment and positive interdependence.

COLLABORATIVE LEARNING CONCEPT

When teachers were asked to define their concept of collaborative learning, some of the definitions were:

“It is defining a goal among several interested colleagues, establishing an action plan and carrying it out with the purpose of reaching the goal and all students contribute and benefit from the achievement, co-evaluation and self-evaluation are needed for learning to be meaningful.”

“It refers to the acquisition of new knowledge from the joint performance of educational activities through the use of ICT.”

“Didactic strategy that is based on working in teams or with interdependence to achieve the required learning within a virtual environment”

“Generation of knowledge, development of cognitive and social skills, through coordination with other people who seek the same academic objective.”

“Propose together the form of participation, make contributions and review what others make to in the end reach agreements that allow us to enrich the shared task in an atmosphere of cordiality and respect.”

These are some examples of the responses that were given. If we return to what was said before about the characteristics of collaborative learning: it is the interaction of its members and the contribution of everyone in the generation of knowledge, it is a horizontal scheme, although some of the members can take the role of leader, the authority and responsibility is accepted, the diversity of points of view is respected and an agreement is sought to together promote new knowledge.

In the previous responses you can see words present that identify aspects of the concept in the teachers’ perceptions such as; acquisition of knowledge, shared goals, use of ICTs, interdependence, development of social and cognitive skills, shared responsibility, practice of values such as respect and cordiality. In other responses, the richness of the diversity of the participants was recognized, etc.

Among the main ideas found in the teachers’ definitions is that 70% of the responses perceive it as a process of acquisition or construction of learning, of interaction, contribution and joint participation and development of skills. In some cases, you mention the specifically social and cognitive. Nearly 30% associate the process with the use of technological resources and tools and in less than 5% of the responses they manage to identify finer aspects of the process such as co-responsibility, interdependence and even the richness of the diversity of personalities, talents and values such as commitment, respect

and solidarity that can be found implicit in the process, aspects that are considered important to reach a maximum level of collaboration and in which it is still perceived that they are not very present in the conceptualizations of teachers, perhaps because lack of knowledge or experience of the implications of the process that requires more in-depth training in the use of this methodology.

IN THE TEAMWORK EXPERIENCE SECTION:

When asking the teachers which of the following options described the dynamics of their students' teamwork, where the options were 2:

- a) Students share joint responsibilities to discuss and perform the task construction process together and;
- b) The students divide the task and each one does a part and then everyone's parts join together.

A total of 60% of the teachers answered option a) and 40% answered option b). Which means that there are still a large number of students who do not work in a process that involves exchanging, discussing, negotiating, shared responsibility and making important decisions together about producing something new together with everyone's input, there is no collective construction only They seek to unite the parts that each one made individually. However, it would be necessary to see if the objective of the teamwork activity is related to that level of collaboration and does not motivate or guide going further or is it the lack of guidance from the advisor to induce and guide the work of the students at levels higher levels of collaboration, as well as the lack of collaborative skills that students experience to work as a team.

When asking teachers to mention the following 3 aspects that they consider to be fulfilled in team activities: a) shared responsibility, b) important joint decisions

and c) interdependent work, which are directly related to the levels of collaboration that are described in the evaluation rubric, the following was found.

Collaboration level	Description	Percentage of results
1	Students are not required to work in teams.	20%
2	Students work as a team but there is NO shared responsibility.	7%
3	Students have shared responsibility but do not make important decisions together to complete the task.	23 %
4	Students have shared responsibility, they make important decisions together regarding the activity, but their work is not interdependent.	36%
5	Students have shared responsibility, they make important decisions together, and their work is interdependent.	14%

Table 2. Table of results of levels of collaboration through teamwork.

In the previous table it can be seen that 50% of the teamwork carried out by the students is distributed at a level from 1 to 3. It was found that in 20% of the teachers' subjects they still do not work as a team, while that 7% of those who work in teams consider that there is no shared responsibility to do the final work together, that is, each person does a part of the work individually and is only responsible for their part and then they join them together, or It could well be that the type of collaboration in the activity is for socialization purposes and does not require shared responsibility. At level 3, 23% of teachers perceive a shared responsibility in their students, but important decisions are not made together. This can happen when the teacher designs the activity, forms teams and assigns roles and tells them what to do. how to do it, provides them

with the resources, establishes rules, tools and formats for delivering the activity. That is, there is no room for students to make important decisions regarding carrying out the activity.

For its part, level 4 is the one that presents the highest percentage of collaboration in students when carrying out teamwork, 36% of teachers perceive that their students share responsibilities and make important decisions regarding the work to be done, however, they do not. There is evidence of positive interdependence, which is achieved when the work carried out by each member of the group is essential to achieve the common goal, that is, the roles and responsibilities are complementary and are interconnected in the dynamics of the group. since if one of them does not fulfill his function, the entire work of the group will be conditioned because no one can do the work that you are supposed to do and no member can complete the work and reach the goal without the help of the others because the effort and Everyone's work is essential for the construction of learning and the final product of the team. When someone or others assume the work and responsibilities of another member to complete the activity, the cohesion that characterizes the positive interdependence of team members is lost.

Level 5, for its part, shows that only 14% of the teams manage to experience, during the collaborative process, individual and shared responsibility, making important decisions together and positive interdependence, which can be induced and stimulated more easily when The teacher acts as a mediator of the process who must only intervene to motivate and encourage participation, giving his students freedom to plan and organize how they want to work as a team so that they can assume shared responsibility, joint decision-making and positive interdependence. which is reflected in the individual efforts that

will determine the achievement of group objectives. During the process, collaboration implies that the participants evaluate how they are achieving the goals, and what their positive and negative aspects have been in the development of the activity, which will allow them to identify opportunities for improvement, while the teacher must supervise some activities to check that the group is carrying out its process.

CONCLUSIONS

The teaching perception regarding teamwork and collaboration recognizes the conceptions and practices that are put into play regarding their pedagogical, technological and communicative competencies, as well as the ways to create spaces for information, interaction, production and exhibition of knowledge. These conceptions allow reference to the description of concepts of teamwork and collaborative learning, where it is observed that the first concept is more related to the achievement of common goals or objectives, but they do not necessarily associate the collaborative process with the construction of learning, given that only 16% mention in their concepts learning or knowledge as an aspect that characterizes teamwork, perhaps this is one of the reasons why the courses refer to little team activity and more individual work activities.

However, when collaborative learning is defined, 90% of the responses mention or associate the process with group work, teamwork, collective work, that is, if collective work, interaction with others and collaboration are considered essential, mutual help in the group to achieve learning. In this sense, it is striking that in their definition of teamwork learning does not have the same weight as teamwork has in the concept of collaborative learning.

The research then leads to establishing 4 criteria or levels of participation during teamwork and the way in which collaboration is achieved. A first level recognizes the importance of working as a team, however this does not represent that all participants are committed to the task or product, a second and third level involves shared responsibility, they recognize the task and the goal as an achievable educational purpose. where everyone participates and makes decisions but

with different levels of commitment and a last level which represents collaborative learning where all participants work interdependently, this level approach could be recommended when diagnosing forms of teamwork and collaboration in virtual environments. The analysis could also consider the perception of the students accompanied by the teachers, also including the purpose of the learning activity in order to identify if the learning activity only needs to reach one of the proposed levels.

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