

Modelo de innovación educativa según las experiencias de docentes y estudiantes universitarios

Model of educational innovation according to the experiences of teachers and university students

Modelo de inovação educacional de acordo com as experiências de professores e estudantes universitários

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Resumen

El objetivo del presente estudio fue identificar las prácticas innovadoras que utilizan los docentes para desarrollar el proceso de enseñanza-aprendizaje en el aula con el fin de desarrollar una teoría fundamentada sobre la innovación educativa que existe en la práctica docente. En la investigación participaron 17 docentes y 25 estudiantes de una universidad pública del estado de Sonora, México. Los resultados obtenidos revelan un modelo didáctico constructivista con un enfoque socioformativo en las estrategias didácticas y de evaluación formativa, así como funciones y roles docentes humanistas basados en el respeto, la empatía y la confianza, lo cual se apoya con el empleo de medios

y recursos tecnológicos que procuran potenciar el proceso enseñanza-aprendizaje. En conclusión, se puede indicar que los docentes emplean una pedagogía innovadora en los procesos formativos de los estudiantes, la cual se apoya en problemas reales de contexto y en distintas herramientas tecnológicas.

Palabras claves: competencias del docente, estrategias educativas, innovación pedagógica, modelo educativo, recursos educacionales.

Abstract

The objective of the present article is to propose a model of educational innovation based on the experiences of teachers who were qualified as the best by their students and based on grounded theory. The realized study corresponds to a qualitative approach. The research involved 17 teachers and 25 students from a public University at the State of Sonora, Mexico. The acquired results expose the construction process of a didactic constructivist model with a social-formative approach on instructional strategies and formative evaluation, as well in the functions and humanist teaching roles based in respect, empathy, trust and with the use of media and technological resources to improve the teaching-learning process. It concludes that the teachers employ an innovative pedagogy in the formative processes of the students based on real context problematics and supported by technological tools.

Keywords: teacher qualifications, educational strategies, teaching method innovations, educational models and educational resources.

Resumo

O objetivo do presente estudo foi identificar as práticas inovadoras que os professores utilizam para desenvolver o processo de ensino-aprendizagem em sala de aula, a fim de desenvolver uma teoria fundamentada sobre inovação educacional existente na prática de ensino. A pesquisa envolveu 17 professores e 25 estudantes de uma universidade pública no estado de Sonora, no México. Os resultados obtidos revelam um modelo didático construtivista com abordagem socioformativa nas estratégias de avaliação didática e formativa, bem como papéis de ensino humanista e baseados no respeito, empatia e confiança, apoiados no uso de meios e recursos tecnologia que busca aprimorar o processo de ensino-aprendizagem. Concluindo, pode-se indicar que os professores utilizam uma pedagogia inovadora nos processos formativos dos alunos, baseada em problemas reais de contexto e em diferentes ferramentas tecnológicas.



Palavras-chave: competências dos professores, estratégias educacionais, inovação pedagógica, modelo educacional, recursos educacionais.

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Introduction

The objective of the present study was to identify the innovative practices that teachers use to develop the teaching-learning process in the classroom in order to develop a grounded theory about educational innovation that exists in teaching practice. The United Nations Organization (UN) (2016) stated that innovation constitutes a change that affects some structural aspect of education to improve its quality, which can occur at the classroom, educational institution and school system level. Similarly, the United Nations Educational, Scientific and Cultural Organization (UNESCO) (2015) states that “knowledge and innovation are important drivers of development, good learning and good quality education are every more and more decisive in the well-being of individuals, in the progress of the country and in the quality of the common future of humanity”(p. 9).

Various perceptions of educational innovation have been presented, which is defined as a process, change and educational improvement that seeks to optimize student learning and contribute to educational quality. However, it is worth mentioning that not any change or modification implies innovating, as this must be intentional, planned and evaluated to know the impact of these transformations in the classroom, in the students and in the learning processes themselves. Then, the meaning of educational innovation presents different and similar interpretations, although in general it can be said that it is considered as “a strategy to advance in the achievement of institutional ends. His career is still young and requires expanding, consolidating and penetrating all areas of the institution, thus developing a new culture”(Ortega et al., 2007, p. 145).

For Rodríguez, González and Gámiz (2016), educational innovation is a process that has to respond to the needs present in the educational field, so that it must be effective and efficient, sustainable and with transferable results outside the context from which they arise. Educational innovation, therefore, implies transformations in teaching practice. Barraza (2013) specifies four areas of educational innovation: to include new topics or contents to the curriculum, to use new materials and technologies, to apply new approaches and strategies for teaching learning, and to change the beliefs and pedagogical budgets of the different educational actors.

Innovation in the university field represents considering the quality of university education and professional development of teachers, universities have to develop training activities to contribute to the professional development of university professors in exercise, activities that can adopt various training modalities (Porto y Mosteiro, 2014, p. 145).

Consequently, university teaching requires constant and transformative changes, for which there is an alternative: educational innovation:

Teachers are the decisive actors in the processes of educational change and innovations, both pedagogical and technological, are only viable if they have the complicity and prominence of teachers. Likewise, educational innovation demands a certain adaptation of school structures and spaces. (Michavila, 2009, p. 4).

According to González (2014), Innovation in the classroom is an unfinished process of the reconstruction of teaching and its strengthening, of the exchange of transformative didactic strategies that respond to changes in teaching processes and the promotion of meaningful learning.

Innovative education

Therefore, educational innovations have been socialized among teachers; For example, a study with a qualitative approach was carried out in two universities in Spain in order to examine the contents of various calls for innovation projects to establish a conceptual reference on educational innovation and its theoretical meanings.

By way of findings, according to Rodríguez et al. (2016), four main axes were obtained: “The changes in teaching methodologies, information and communication technologies, bilingualism and generation, as well as the dissemination of good practices” (p. 194).

Likewise, in Costa Rica, programs related to pedagogical innovation oriented to teaching practices considered successful have been implemented. The purpose has been to suggest the implementation of processes involving different teams that attend teaching, research, development and professional practice of the different careers. In this way, pedagogical innovation is visualized - according to Miranda, Angulo and Román (2018) - as “the introduction of a change in a given context or situation and that is given through short-term strategies in order to produce benefits through intentional actions or activities ”(p. 6).

Likewise, in Chile active student-centered methodologies have been implemented as development of pedagogical innovations, which has served to demonstrate a better performance in disciplinary contents of students of initial training, as well as a positive perception of them regarding the dynamics of work and interaction in the classroom due to the motivating role that the teacher assumes (Maldonado y Rodríguez, 2016).

Another active methodology used in teaching practices has been the inverted classroom [T-FliC], which is based on the use of free technological resources (Google, Youtuube, among others) that can be implemented in different subjects at the higher level. Basso, Bravo, Castro and Moraga (2018) have verified that this technological proposal encourages the interactions of teaching communities that can share their experiences and expand physical spaces towards a virtual one that favors communication in different teaching communities with national and international reach. In addition, for the student it provides a flexible learning environment, as well as permanent and timely feedback, and a formative evaluation with an emphasis on reflection.

Guzmán, Vargas, García, Núñez and Olmos (2016) also carry out research to design and implement an educational innovation model that allows identifying the areas of opportunity and the strengths of teachers. In this way, we try to generate a work plan and personalized follow-up for the teachers of the institution. From the results of the diagnosis of this study, it was determined that teachers use technological tools such as Nearpod (web tool / app that allows interactive presentations), Google Form (Google Drive application for forms and surveys), Wolfram Alpha (answer finder) and simulators. They also participate in Novus projects (institutional projects that seek to solve a learning problem) and advise other teachers. They have even been evaluators of educational innovation projects in the innovation congress and use didactic techniques such as Flipping the classroom (pedagogical model that transfers learning outside the classroom), POL (technique to find solutions to jobs in various scenarios) and method of case. To evaluate apply face-to-face exam, face-to-face and virtual quiz, as well as team exams. In addition to this, they use digital platforms to provide content, administer the course and evaluate it (Guzmán et al., 2016).

On the other hand, there are several investigations on teaching methods with a socioformative approach, such as the case of Tobón (2014), who mentions that “socioformation seeks to train people with a solid ethical project of life, entrepreneurship, collaborative work, knowledge creation and metacognition to solve problems in changing and complex contexts ”(p. 40). In this sense, Parra, Tobón and López (2015) explain that “from socioformation the development of sustainable competencies in the various social actors (students, teachers, managers, politicians, leaders, among

others) is proposed, which refers to solving problems in complex and changing situations ”(p. 43). The authors focus on generating new alternatives that provide adequate measures to solve problems in real situations, through innovation and research projects that require knowing how to know, know how to do, know how to live and know how to be. In accordance with this idea, Gerlach and Velásquez (2010) affirm that “socioformation is becoming very important, so there is increasing concern for the tasks of training. Education implies both instructing and training people with certain skills and attitudes” (p. 40).

From a study at the Autonomous University of Chihuahua, which aimed to determine the relationship between socioformative teaching and academic performance in university students, various variables related to teaching from socioforming were evaluated. They found that when students show interest in learning, they are usually motivated by the solution of real problems and by executing applied projects. Therefore, it was determined that socioformative teaching serves the interests of teachers and students, and contributes to the integral formation of the student (Parra et al., 2015).

According to the above, the socioformative approach can be considered as an innovation for the educational institution, as it is presented as a change regarding the role played by the teacher, the student and the competences that should be promoted. However, it is important to comment that a pilot test is being manifested in one of the careers of said educational institution in Mexico (Sonora), which should be examined to determine if teachers are generating and using innovative practices or other approaches, theories and Models considered transformers of the teaching-learning processes.

Therefore, once the innovative educational practices have been specified, an educational innovation model can be proposed based on the experiences of teachers best qualified by their students, which is based on the grounded theory. In this sense, the following question arises: what elements do teaching practices contribute to the educational innovation model according to the perception of students and teachers?

Materials and method

The focus of the present study was qualitative because it is an investigation that collects information according to the perception of teachers and students about the theme of educational innovation in the classroom. The research design corresponds to a grounded theory, which - according to Vivar, Arantzamendi, López-Dicastillo and Gordo (2010) - is based on the theory of symbolic

interactionism in order to understand how individuals define a phenomenon or event to Start from your social interaction. The purpose, in short, is to study social phenomena in natural contexts to generate theories that can explain them.

The technique used to collect the data consisted of a focus group, which is defined by Hamui and Varela (2013) as “an opinion space to capture the feeling, thinking and living of individuals, causing self-explanations to obtain qualitative data” (p. 56). This technique is based on an informal group interview that normally involves between 5 and 12 people who are asked to express their opinions, attitudes, beliefs, satisfaction and perceptions on the proposed topic.

To choose teachers, a non-probabilistic sampling was considered. In summary, only those teachers with outstanding results were selected in the last three assessments that students performed on their performance in class. The sampling technique was for convenience or volunteers, since the subjects were selected given their proximity.

In total, a group of 17 teachers from a university located in the south of Sonora (Mexico) participated, of which 8 were women and 9 men. The range of their ages ranged from 32 to 62 years. His professions or careers were the following: graduates in Administration (LA), graduates in Public Accounting (LCP), graduates in Educational Sciences (LCE), graduates in Computer Science (LI), graduates in Tourism Business Administration (LAET) and graduates in Psychology (LPS), as well as engineering (Ing.), engineering in Biochemistry (IB) and Master in Administration (MA).

With respect to the degree of studies, 14 had a master's degree, 2 had a bachelor's degree and one was a graduate intern. The last universities in which they studied were: Technological Institute of Sonora, University of Sonora, Tec Milenio, University of Durango, Technological Institute of the Sea, UNO International, Durango Santander University, Graduate Pedagogical Institute in Sonora and University of Guadalajara.

The 17 teachers had training in the teaching area; in fact, 16 of them had ICT training, while 10 had research experience with participation in papers, book chapters, magazines or books. In addition, 14 had participated in curriculum restructuring (eg, in the development of course programs or planning) and 8 had served as tutors.

In the case of students, random probabilistic sampling was chosen, which constitutes a method by which all students have the same possibilities of being included. Specifically, 25 university students from different careers participated, such as LAET, LCE and LPS, all from the same institution and 6th semester students with a range of ages ranging from 20 to 22 years, randomly selected.

For both groups of participants, topic guides were developed, which consist of a document that conducts the necessary tools to conduct a study. In the case of teachers, 13 items were formulated regarding the topic Educational innovation in the classroom, which were divided into three categories and different approaches, as well as a conclusion. For the questions that contained the topic guide, the perspective categories of educational innovation and teaching functions were considered. The first was constituted by the educational trends indicators and curricular approaches. The teaching functions category was formed by the indicators of didactics (teaching techniques and methods), interaction (tutoring), use of ICT and evaluation.

For the students, 10 reagents were designed divided into four categories. The first concerned the characteristics of the innovative teacher; the second covered strategies or activities in class; the third was related to educational resources, and the last was related to the forms of evaluation.

The procedure focused on the development of the instrument, piloting, the application of the focus group and the collection of the data obtained. The preparation of the instrument consisted in the realization of the operationalization table of the variables. Likewise, an analysis was developed in order to identify the dimensions used to develop categories and measurements based on the information collected, whose purpose was focused on the design of the topic guide implemented in the focus group.

Before applying the pilot test, the instrument was validated by three educational teachers in the area of educational research experts in the field, who provided some recommendations on the wording of the questions. In this way it was ensured that the questions corresponded to the proposed dimension. In addition, for the reliability of the questions, we worked with teachers and students to confirm that they were clear, precise and reliable.

The application of the topic guide was made from focus groups with teachers and students previously organized by an organizing committee whose functions were to serve as moderator or facilitator, secretary and technical assistant.

The moderator or facilitator is the one who leads the session and focuses the discussion through open questions; The secretary collects information in writing, while the technical assistant is responsible for recording the comments, observing the environment and supporting the moderator and the secretary.

Regarding the execution of the focus group Educational innovation practices in the classroom, three focal tables were obtained with a total of 7 teachers in each one, who taught for different careers. Consequently, in each area information was collected differently because there were teachers from

different professions, which generated a diversity of responses, since respondents or participants involved in the focus group session commented, argued and debated their opinions. concerning the central theme and from its educational program. As for the students, these were distributed in three tables with seven subjects from the different careers mentioned above.

The focus group had an average participation of one hour and twenty minutes; During the session the responses were captured by means of digital recorders and the information was transcribed into the Word word processor. The corresponding analysis was carried out by means of saturation tables according to the segments of the participants' testimonies.

Based on the theoretical review, the analysis categories and codes emerged, validated by the expert team in educational innovation. Once the most relevant information about the testimonies of the participants was collected, the corresponding analyzes were submitted to the saturation tables together with the experts on the topic of innovation and use of technology in education. To make the process reliable, open coding was discussed with theoretical coding between three experts to agree on the assigned category.

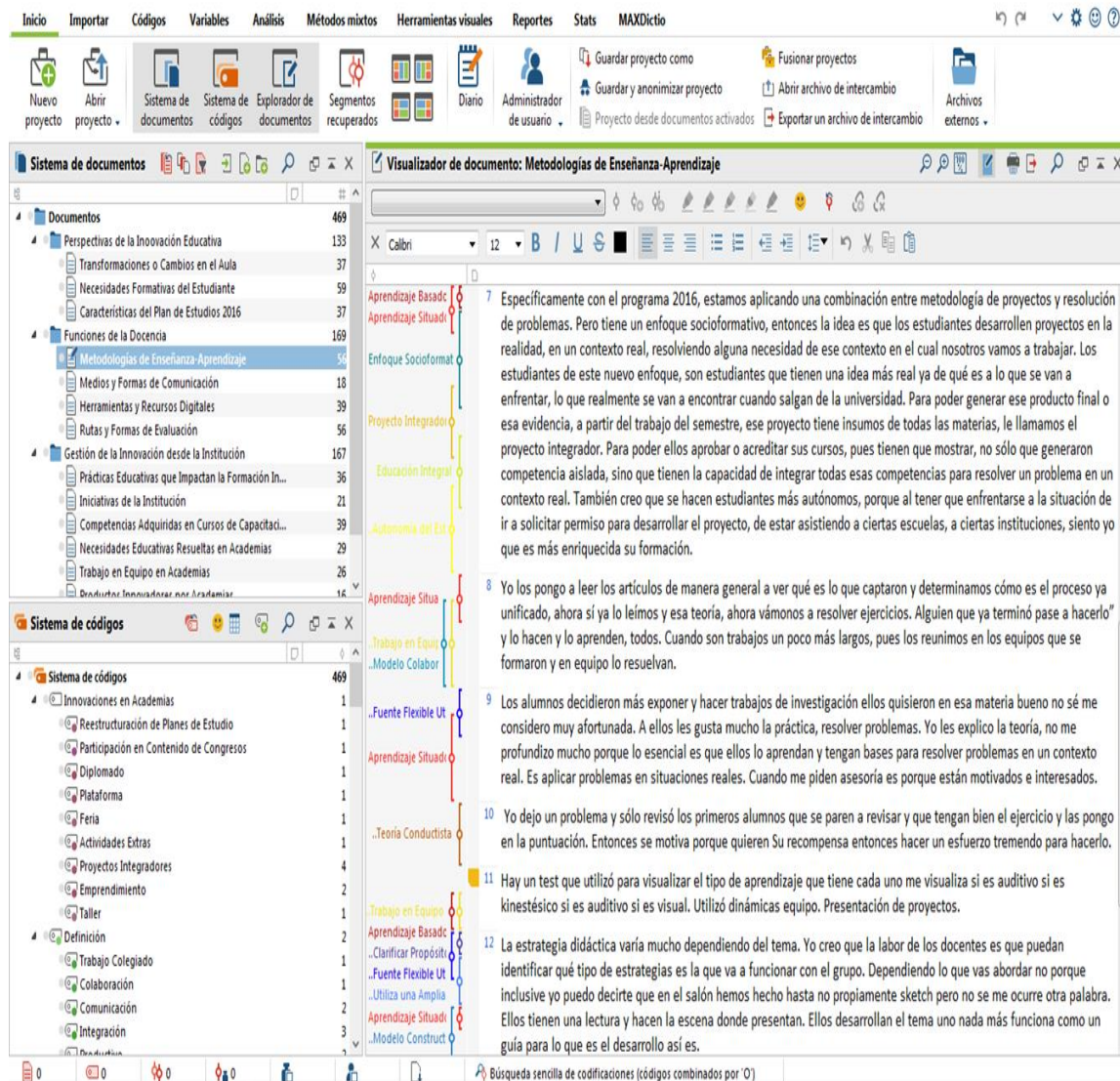
After this, the MAXQDA Analytics Pro 2018 software was used to fulfill the task of processing information using substantive codes, that is, empirical data. In this way, theoretical codes were developed that were recorded from the memos that consist of theoretical ideas about the codes and their relationships, as they arise to the analyst while coding. In the same way, the living codes that came directly from the language used by the informants were identified, as support for the system of categories that emerged from the analysis and in order to obtain a grounded theory.

Results and Discussion

The coding process for the development of categories and subcategories corresponded to the framework proposed by Strauss and Corbin (2002), from the open coding where the concepts and dimensions that emerged from the analysis of the informants (students and teachers) were identified. In this sense, each concept was associated with a color and thus for each category and subcategory, assigning a code supported by the memoranda in relation to the theory. Figure 1 identifies the categories that emerged.

By locating the related categories and subcategories, the results are explained as proposed by Strauss and Corbin (2002) with axial coding and subsequently selective coding, which consists in selecting the central category around the analysis of the other categories, as shown in figure 1.

Figura 1. Análisis de datos cualitativos con el *software* MAXQDA



Fuente: Elaboración propia

When asked, what innovative teaching practices do teachers use to develop the teaching-learning process in the classroom? The categories obtained from the study units were the following: according to the teachers' responses, the first one identifies with the constructivist didactic model, which consists in developing capacities. In this “it is very much encouraged that teamwork is, to make the student more autonomous, for the student to acquire learning through their training needs” (D5). Likewise, teachers point out the following: “It works a lot for me to build knowledge based on ideas that they generate in the group, the student himself can build knowledge within the classroom and manage his growth” (D2).

In the same way, the professors identified the constructivist model with the humanist theory as axial categories, which stands out among the other theories, since it obtained 13 mentions. This promotes integral development and helps the student to become a person, recognizing their freedom. It also generates the teaching of values and attitudes, promotes empathy and provides confidence to obtain a favorable impact on meaningful learning through practice. It is about “being more empathetic with the student” (D11), through “communication of respect, being friends of the students, entering into trust, always supporting them and never intimidating them, threatening them, or making them feel fear; for that reason, there must be that friendship, but not of party, but of respect and that the support to the student feels ”(D4).

Within this theory, the following values stand out as characteristics: respect, empathy and trust, so it is outstanding for the institution that teachers support their practices in humanist theory, since it provides an emphasis on learners and their development as persons.

As for the students, they mentioned four teaching techniques used by their teachers, among which the theoretical-practical collaborative learning, which was more frequent (60% of the opinions), stands out. For example, they expressed themselves on “professional practices, because one goes to everything they have learned and puts it into practice in a school” (E3); Another opinion points out “the practices, as my colleagues say, because we practice and do things and that way we acquire the things, the skills that are necessary for the race” (E6).

In addition to the above, collaborative learning is also presented with seven repetitions, which is equivalent to 18% of the students' opinions. One of them is the following: “The strategies that teachers could use would be, for example, teamwork, that way students learn a little more, but support each other” (E7).

Perceptions were also obtained on the didactic models that teachers implement in the teaching-learning process; in this matter, the constructivist model was the most referenced with 75% of the opinions: “Well, we have a better learning and we can put it into practice” (E5). “When we are in practice or when we are in the workplace, how to improve ourselves in order to teach” (E4). According to the above, the figures and comments of the students, it can be affirmed that one works predominantly with the constructivist model postulates.

On the other hand, the students identified the teaching role. In this regard, the students expressed the following opinion: “I believe that teachers should be more dynamic, be open to different forms (...), implement new forms, so that students can learn more” (E7). Another participant mentioned: “Well, I think that one characteristic may be that yes, that the teacher is open-minded, that he hears

everyone's opinion or is open in the sense that (...) I will now try this in the sense that I will be better, it may be that the student learns better”(E1).

On the other hand, the second axial coding identified was the socioformative approach. This is related to the constructivist model, since it allows the student to create knowledge through action, because it takes into account the learning of skills necessary for self-realization, since it supports the approach and entanglement of educational institutions with society . In this regard, teachers expressed the following opinion: “The idea is that students develop projects in a real context, solving some need; Students of this new approach have a more real idea of what they are going to face, what they are really going to find when they leave college”(D14). In addition, they stood out as a characteristic of facing reality: “We are training students to be competent in any field of work, of their respective turns and in any part of the republic, to make the corresponding analyzes so that they reach concrete results and I can feed them back”(D7). That is, to solve problems in different contexts: "Allow the student to graduate and be sufficiently competent in the workplace" (D4), highlighting the development of skills.

Students, meanwhile, share opinions of achieving greater learning when teachers develop execution or support strategies. This category obtained seven frequency points and 73.5% in the opinions. Some of the most relevant insights were: “For example, that you can express me more for example if it is a new chapter, that touches me on a topic, that is, that he advises me, or that he is there to help us, that is, it helps me to understand it more or, as I say, to always be there, then, in the classroom or outside it to give us advice”(E6). On the other hand, incorporation or metacognitive strategies are equivalent to 20.6%, while processing or cognitive strategies obtained only two points, equivalent to 5.9%. One of the opinions mentioned was this: “Acquire better knowledge, have clearer classes that implement us”(E3).

From the central category arises the theoretical classification that according to the memos generated in the open and theoretical coding is identified with the teaching competencies dimension, which has two subdimensions: functions and teaching roles. These competences are considered as the set of decisions of teachers to develop quality training processes and promote the development of students. Therefore, it is essential to work in the didactic interaction, the methodology, the elaboration of means and tasks (learning environments), the tutorial action and the evaluation (Domínguez, Medina and Cacheiro, 2010).

As for the teaching roles subdimension, this corresponds to the roles that the institution's professors play, which are used to be categorized as innovative. According to Carcelén (2004), an innovative teacher “strives to organize and make available the widest range of resources for learning (p. 7). This role was mentioned eight times by teachers, as shown below: "Depending on what you are going to address, because even I can tell you that in the classroom we have done sketch" (D10).

Continuing with this idea, Carcelén (2004) considers that the teacher has a lot to do with establishing the general mood or atmosphere of the group or class experience. This variable was mentioned seven times by teachers: “Create a favorable learning climate among the group” (D3); “More interactive classes, not only using technology, but also making movements of the place where the class is being taught; [so] there is much more participation and ideas flow much better ”(D6), which creates an atmosphere of acceptance in the classroom.

With regard to the subdimension functions, only the tutorial action was identified as a task that the teacher performs. Medina (2015) defines it as the set of decisions that stimulate each student, teams and classes to build their line of personal and professional development, taking advantage of the most valuable instructional processes and personal and professional projects.

According to one of the teachers consulted, it is about “making an approach, knowing them a little and identifying their weaknesses, in this way supporting them to develop within the academic” (D7). This to carry out the teaching-learning process in mutual and flexible trust, where the teacher can advise the student to meet their established goals.

It is important to mention that the tutorial action carried out by teachers is directly related to the humanistic theory dimension, since the characteristics of respect, empathy and trust are necessary for students to feel in an environment of trust that allows them to perform that approach to express your educational needs or academic problems.

As for the students, five similar categories were obtained in the lowest frequency range with 3.2%, such as the characteristics of good practices / changes that imply improvements in quality; in the same way, the teaching function in terms of teaching methodology and, although less frequently, the teaching role according to taking initiatives to share with the group, being able to become a participating student and accept both the intellectual content such as emotional attitudes. On the other hand, the category is most often related to the teaching function, in terms of teaching methodology with nine repetitions by the participants, similar to 23.1% with answers such as: “Employ new techniques. It uses new techniques so that the student understands a new topic, proposes to use different learning methods towards the students ”(E1).

These opinions have the same meaning as the one raised by Medina and Salvador (2009) on teaching techniques:

Beginning teachers need a broad repertoire of teaching strategies and techniques that work with the students they teach and in the context in which they work; they need strategies to plan, develop and evaluate the curriculum applied to a diverse context, a school space with clearly different students (p. 5).

However, the category less frequently was tutorial action with a mention, which corresponds to 2.6%. The students expressed their opinion: "That he is always up to date with the activities and that he is aware of his students" (E2). The tutorial action, when obtaining only a mention, indicates that teachers of higher education are focused only on what the program or curriculum indicates, although the student needs a guide or a trainer who cares about their needs and that lends itself to help cover them. The only opinion on the tutorial action category may be related to what Gerlach and Velásquez (2010) have argued:

It is very important to raise the need for teacher training in their field of action, as many have different types of professional training, however, it is not enough to know the subject or the contents to be teachers (p. 84).

The teaching-learning strategies dimension is an axial category that is related to the methodology that teachers use in the development of their classes, such as situated learning, which proved to be the most widely used among teachers with 13 mentions. According to Medina (2015), it allows you to build your own learning with elements of its context, since it is a link between theory and practice. Similarly, teachers consider that "a brief explanation is given to the student of the subject to be treated and then a practical case is put in, where the student puts his knowledge, hence to develop that assignment" (D5).

Also reflective and project-based learning stand out. The first deals with a methodology that helps the student build new knowledge and previous experiences through interaction with other individuals. With nine mentions, the teachers declared that it is about "giving more practical experiences, developing a practical theory, whatever knowledge you acquire" (D11). For its part, project-based learning, according to Medina (2015), "is an effort that is carried out in a certain time to achieve the specific objective of creating a unique service or product, by performing a series of tasks and the effective use of resources" (p. 44). From the conception of the teachers, "we are using the project method at the end, because the student develops a project and they expose us, because they developed throughout the course" (D5). This type of idea was mentioned seven times.

Likewise, it is worth mentioning that the teaching-learning strategies dimension is an axial category that is directly related to two other dimensions: evaluation of learning and technological means and resources, since when implementing teaching strategies it is necessary for teachers to evaluate learning obtained by their students. Likewise, during class development teachers use some technologies to complement their methodology.

In this regard, the respondents mentioned five strategies used by teachers, such as intercalated questions (with 12 frequency points equivalent to 43.3%). Some opinions were the following: “Well, we almost always ask questions: Who has any doubts? They urge us to give our opinion about the remaining questions about the previous topic ”(E1).

The interleaved questions are pointed out in the teaching strategies. In the theoretical framework of the research, Medina and Dominguez (2015) define them as questions inserted in the teaching situation or in a text. These have great relevance in student learning, since they can be understood as an activity of dynamism and motivation in a semi-formal context. They can also be interpreted as a feedback mechanism that allows doubts to be resolved and opinions expressed from different points of view.

On the other hand, the illustrations category obtained infrequently with 30%. In fact, in this question a similarity is presented in two categories (concept maps and semantic networks), as well as clues, typography and discursive, with only a mention corresponding to 6.7%.

The learning evaluation dimension, located in the initial stages of information gathering, merits the use of techniques and instruments for this purpose (Arias and De Arias, 2011). In this sense, and to strengthen this process, there is the subdimension of strategies, in which the formative evaluation was located with eight mentions. One of the comments was the following: “Also the formative part either in an exhibition, written exam, in an exhibition of a project” (D1).

In addition, we can mention the summative evaluation with five mentions, which is defined as the one that “values the learning outcomes and, therefore, the procedures and instruments (...) [used to] provide meaningful information about what they have learned the students (Secretariat of Public Education [SEP], 2013, p. 37). On this element, the teachers mention: “The summative evaluation that is established from the beginning, what is the weight that will be obtained by each of the items and in the end a competence is acquired and a grade is given” (D11).

However, and according to the constructivist didactic model that is being implemented in teaching practice, it is vital to focus on diagnostic evaluation, since this paradigm takes into account previous knowledge to associate new learning with the previous one.

As for the hetero-evaluation, it got 11 mentions, which refers in general to the evaluation made by the student's teacher. One of the professors expressed the following opinion: "Hetero-evaluation because in the end the final grade is established by the teacher as mentioned by the teacher according to how much you acquired and what you are entitled to" (D11).

The evaluation, logically, consists of techniques that allow students to collect evidence of student learning to be analyzed and interpreted for decision making in relation to their learning. In this sense, and as a second sub-dimension, the evaluation instruments were identified, among which the rubric and the examination stand out. The rubric allows to identify the level of performance that the student shows in the development of an activity or problem (this obtained nine mentions). One consideration of the teachers was this: "I use the rubric as a feedback strategy because the rubric already tells us if you had that, but you still missed it or you need to develop such a thing or you are excellent in such an area then what I handle" (D11). With five mentions, the teachers explain: "For example, we have a written exam after having done it all, the exams are delivered and a retro is made of which of the main errors of the written exams" (D12).

Regarding the students, in addition to the exams, they manifested formal evaluation techniques: the execution (with 21 frequency points and 38.2% of the opinions) belongs to that category. On this aspect, one of the students considered: "They could be the final projects, they don't give you an exam, but you can do a project, exhibitions" (E5).

However, the semi-formal category exercises and practices / tasks obtained 34.5% of the mentions, which makes it one of the categories with more frequency. On the other hand, the least frequent category was observation, with only one mention, which is equivalent to 1.8%: "Well, no, they do not simply evaluate by exams, but also evaluate your attitude; now they are evaluating us a lot the attitude we take towards things, that is, the activities that they tell us we have to do; The attitude we show is very important" (E1).

The Media and technological resources dimension helps teachers to carry out the teaching process, so there are three subdimensions: didactics, communication and use of ICT. First, didactics refers to the way in which teachers use technology in an innovative way to implement their sessions. This is divided into virtual learning environments and the means of support for oral exposure.

In this sense, virtual learning environments play a very important role in the field of education, since it is not only about taking a course and placing it on a computer, but about combining resources, interactivity, support and structured learning activities (Limón, 2015).

With a total of 14 mentions, teachers considered that it is "dynamics, technology and platforms" (D13). At the same time, they mentioned the "work on the Google Drive platform to share information" (D5), "the subjects, the tasks, the assignments I make them through the Saeti platform, you have to upload all your assignments, to me they don't give me anything, they leave everything there and I check them through that" (D9).

For its part, the means of support for oral exposure are resources whose purpose is to combine traditional presentations through proper planning to achieve greater effectiveness as a means of learning. With a total of eight mentions, teachers considered the following: "First of all the resources that are immediate in the classroom, have the computer, the cannon, the blackboard and now even the smallest blackboard; those resources are used, it depends on the dynamics of which the class is prepared or we have to choose; yes, sometimes Power Point" (D8); "We take advantage of the resources we have in the classroom, in the classroom we have internet, we have an electronic projector, we support each other because today we have a lot of visual media" (D9); "We use in the classroom that are Power Point presentation videos and all kinds of presentation they use" (D14).

In agreement with the educational innovation are the second subdimension referring to the didactic means and resources, that is, communication, on which there were 12 mentions. According to Medina and Dominguez (2015), the new digital resources allow various strategies for social interaction, through e-books, documents, forums, chats, emails, search engines on the Internet, among others.

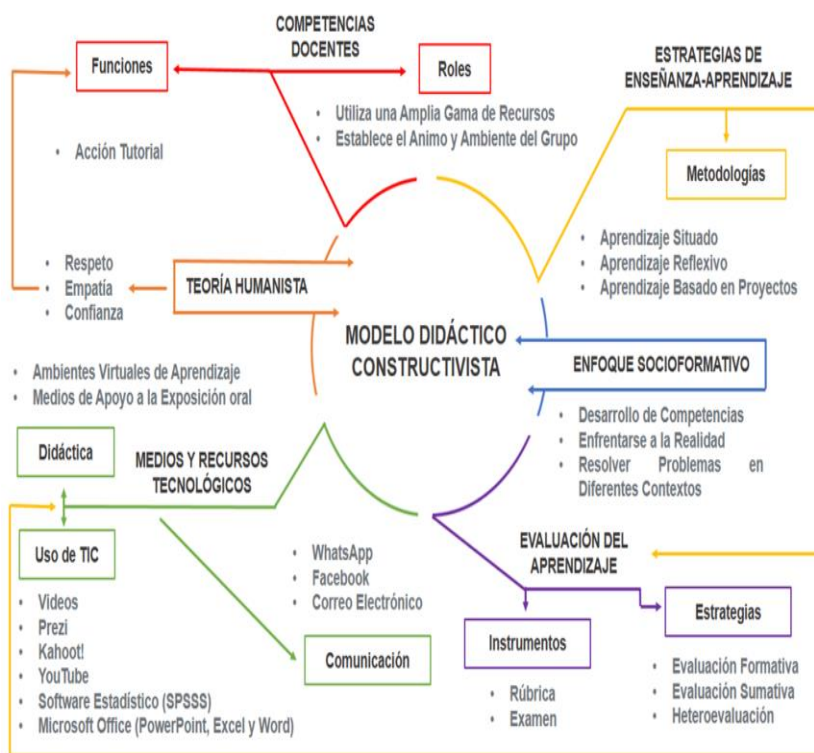
In this sense, and with a total of ten mentions, email proved to be the main means of communication of the teachers consulted: "Personally, what worked for me most is the email on my cell phone" (D4). In addition, some use social networks such as Facebook and WhatsApp (with seven mentions each) to interact with their students and answer questions: "WhatsApp and Facebook, more to communicate something urgent, some concern, any doubt of a student, then I it worked" (D13); "I already share my phone, my WhatsApp, and I think the boys do more interaction with me to ask questions, yes, I do have my schedules; with Gmail mail to me also on my cell phone, for me it is faster to answer emails" (D5).

On the other hand, students perceived six technologies, among which the WhatsApp / Facebook category prevailed with a frequency of 16, equivalent to 36.2%. One opinion was this: "To have a contact with the students, many times then, they create a WhatsApp or Facebook group and the teacher communicates, uploads the activities, or in the exhibitions so they don't get lost, in the WhatsApp as many sometimes they let them know or sometimes they pass the phone number and they already send

a message to a classmate, like the one who sees more confidence and then that one, so that he will let everyone know if he will not be able to attend or if something has been changed”(E3).

The opinion stated above refers to mobile learning, however, the platforms also obtained significant frequency by having 25.5%, without much difference with WhatsApp / Facebook, while the least mentioned was forums with only one mention, which corresponds to 4.3 % of opinions. Next, in figure 2, the model of educational innovation of the university is exposed:

Figura 2. Modelo de innovación educativa en docentes de nivel superior



Fuente: Elaboración propia

Conclusions

From the results analyzed, it can be concluded that the teacher of the analyzed Sonoran university works predominantly with the constructivist didactic model (central category) and is based on the axial codifications of the humanist theory and the socioformative approach. In humanistic theory, values and attitudes of respect, empathy and trust are handled, while in the socioformative approach the development of competences, confronting reality and solving problems in different contexts.

The didactic model is made up of four dimensions. The first represents the teaching competences, based on the Tutorial Action Function and the Roles of the innovative teacher, related to a wide range of resources for learning, as well as establishing the mood and group environment. The second dimension has to do with the Teaching-Learning Strategies that teachers implement in their classrooms, based on the methodologies of situated, reflective and problem-based learning.

The third dimension, corresponding to the Assessment of learning, was constituted by the moments of formative, summative evaluation and hetero-evaluation as an evaluation agent, as well as the rubric and examination as the main Instruments.

The fourth and final dimension refers to the means and technological resources that teachers use to support their teaching. In these, the didactics were found, equivalent to the virtual learning environments and the means of support for the oral presentation; also, the communication was mainly based on the use of email and social networks such as Facebook and WhatsApp; In addition, the ICTs that these teachers use are the videos, Prezi, Kahoot !, YouTube, SPSS and Microsoft Office.

According to the results obtained in general with students and teachers, coincidences can be highlighted regarding the role of the teacher as flexible and mediating in the learning processes, use of reflective and problem-based teaching strategies, and projects, these last as a summative evaluation strategy. Likewise, there is congruence in applying situated learning, as students carry out professional practices that allow them to apply knowledge in a real environment. In fact, they agree to use social networks to establish communication and the use of platforms for homework.

The differences in perceptions are in the role of the tutor, as the teacher believes that he performs this work, while students express a low frequency in this type of academic attention. Likewise, the diagnostic evaluation is not identified by both subjects and the coevaluation is an agent that should be strengthened from the socioformative teaching practice.

Finally, it should be noted that educational innovation is a process of change, of proposed ideas and contributions that serve to improve the quality of education through applied knowledge that must be placed over time to generate benefits that impact society. However, it should be borne in mind that innovation does not consist in using the latest software or device invented, but in taking advantage of the technologies available to enhance teaching practice.

References

- Arias, S. y De Arias, M. (2011). Evaluar los aprendizajes: un enfoque innovador. *Educere*, 15(51), 357-368. Recuperado de <http://www.redalyc.org/pdf/356/35621559006.pdf>.
- Barraza, A. (2013). *¿Cómo elaborar proyectos de innovación educativa?* México: Universidad Pedagógica de Durango. Recuperado de https://redie.mx/librosyrevistas/libros/como_elaborar_proyectos_de_innovacion.pdf.
- Basso, M., Bravo, M., Castro, A. y Moraga, C. (2018). Propuesta de modelo tecnológico para Flipped Classroom (T-FliC) en educación superior. *Revista Educare*, 22(2) 1-17. Doi: <http://dx.org/10.15359/ree.22-2.2>
- Carcelén, C. (2004). *Fundamentos teóricos para la innovación educativa*. Recuperado de https://www.academia.edu/4071081/Fundamentos_te%C3%B3ricos_para_la_Innovaci%C3%B3n_Educativa.
- Domínguez, M., Medina, A. y Cacheiro, M. (coords.) (2010). *Investigación e innovación de la docencia en el EESS*. Madrid: Ramón Areces.
- Gerlach, L. y Velásquez, R. (2010). Formación docente en instituciones de educación superior de acuerdo al nuevo modelo curricular. En Angulo, J., Valdés, A., Mortis, S. y García, R. (eds.), *Educación, tecnología e innovación* (p. 40). Obregón, Sonora: ITSON.
- González, C. (2014). Estrategias para trabajar la creatividad en la educación superior: pensamiento de diseño, aprendizaje basado en juegos y en proyectos. *RED. Revista de Educación a Distancia*, (40), 7-22. Recuperado de <http://www.redalyc.org/articulo.oa?id=54730460002>

- Guzmán, M., Vargas, L., García, I., Núñez, M. y Olmos, N. (2016). *Modelo de innovación educativa para desarrollo docente*. Trabajo presentado en III Congreso Internacional de Innovación Educativa. Monterrey, México.
- Hamui, A. y Varela, M. (2013). La técnica de grupos focales. *Investigación en Educación Médica*, 2(5), 55-60. Recuperado de <http://www.redalyc.org/pdf/3497/349733230009.pdf>.
- Limón, R. (2015). La inclusión de recursos tecnológicos innovadores para enriquecer y potenciar el desempeño humano en la sociedad. En Gonzáles, I., Rodríguez, A., Zavala, M. y Vázquez, M. (comps.), *Aportes de inclusión al conocimiento y alfabetización tecnológica para adultos* (pp. 9-24). México: Tabook.
- Maldonado, A. y Rodríguez, F. (2016). Innovación en los procesos de enseñanza-aprendizaje: un estudio de casos con la enseñanza justo a tiempo y la instrucción entre pares. *Revista Educare*, 20(2), 1-21. Doi: <http://dx.doi.org/10.15359/ree.20-2.14>
- Medina, A. (2015). *Innovación de la educación y la docencia* (2.^a ed.). Madrid: Editorial Centro de Estudios Ramón Areces.
- Medina, A. y Domínguez, M. C. (2015). *Innovación de la educación y de la docencia*. Madrid: Editorial Universitaria Ramón Areces.
- Medina, A. y Salvador, F. (2009). *Didáctica general*. Madrid: Pearson Educación.
- Michavila, F. (2009). La innovación educativa. Oportunidades y barreras. *Revista de Ciencia, Pensamiento y Cultura*, 185, 3-8. Doi: 10.3989/arbor.2009.extran1201
- Miranda, L., Angulo, L. y Román, G. (2018). El programa perfiles, dinámicas y desafíos de la educación costarricense: una propuesta para la innovación pedagógica y la producción de materiales y recursos didácticos tecnológicos en la Universidad Nacional, Costa Rica. *Revista Educare*, 22(1), 1-24. Doi: <http://dx.doi.org/10.15359/ree.22-1.10>
- Organización de las Naciones Unidas [ONU] (2016). *Innovación educativa*. Recuperado de <http://unesdoc.unesco.org/images/0024/002470/247005s.pdf>

- Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura [UNESCO] (2015). *Estrategia de educación en la UNESCO 2014-2021*. Recuperado de https://unesdoc.unesco.org/ark:/48223/pf0000231288_spa.
- Ortega, P., Ramírez, M., Torres, J., López, A., Servín, C., Suárez, L. y Ruiz, B. (2007). Modelo de innovación educativa. Un marco para la formación y el desarrollo de una cultura de la innovación. *Ried. Revista Iberoamericana de Educación a Distancia*, 10(1), 145-173. Recuperado de <http://www.redalyc.org/comocitar.oa?id=331427206010>.
- Parra, H., Tobón, S. y López, J. (2015). Docencia socioformativa y desempeño académico en la educación superior. *Paradigma*, 36(1), 42-55. Recuperado de <http://revistas.upel.edu.ve/index.php/paradigma/article/view/2653>.
- Porto, A. y Mosteiro, M. (2014). Innovación y calidad en la formación del profesorado universitario. *Revista Electrónica Interuniversitaria de Formación del Profesorado*, 17(3), 141-156.
- Rodríguez, M., González, E. y Gámiz, V. (2016). La perspectiva de innovación que se impulsa desde la educación superior. *Journal for Educators, Teachers and Trainers*, 7(1), 193-209.
- Secretaría de Educación Pública [SEP] (2013). *Las estrategias y los instrumentos de evaluación desde el enfoque formativo*. México: SEP.
- Strauss, A. y Corbin, J. (2002). *Bases de la investigación cualitativa. Técnicas y procedimientos para desarrollar la teoría fundamentada*. Bogotá-Colombia: CONTUS. Editorial Universidad de Antioquia.
- Tobón, S. (2014). *Proyectos formativos: teoría y práctica*. México: Pearson.
- Vivar, C., Arantzamendi, M., López, O. y Gordo, C. (2010). La teoría fundamentada como metodología de investigación cualitativa en enfermería. *Index de Enfermería*, 19(4), 283-288. Recuperado de http://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S1132-12962010000300011.

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