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Original article

Research and teaching: Challenges, innovations and transformation in the face of the COVID-19 pandemic in three states of Mexico

Investigación y docencia: retos,
innovaciones y transformación
ante la pandemia COVID-19 en
tres estados de México

Pesquisa e ensino: desafios,
inovações e transformação
diante da pandemia de COVID-
19 em três estados do México

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ABSTRACT

Human beings have experienced changes and transformations in their passage through the world, ranging from an adaptability to being nomads to becoming sedentary; They have faced different processes that have made them evolve and rethink the ways of life in society. This article was carried out with teachers from three states of Mexico: Puebla, Sonora and Baja California in a post-pandemic context. The objective was to analyze the experiences of agents who are or were inserted in Higher Education and who carried out activities in the area of teaching and research during the confinement by COVID-19. The selected methodology was qualitative, with a phenomenological method through an interpretive paradigm to reflect on perceptions of educational reality through two phases applied by a quantitative questionnaire and an in-depth interview. The results made visible the challenges they had in adapting from face-to-face to virtual education; the absence of horizontal participation between research work and teaching; and proposals or strategies for improvement in educational innovation in collaboration with research and university teaching.

Keywords: research; superior professional formation; pandemic and educational innovation.

RESUMEN

Los seres humanos han experimentado cambios y transformaciones en su paso por el mundo, que van desde una adaptabilidad a ser nómadas hasta convertirse en sedentarios; se han enfrentado a diferentes procesos que los han hecho evolucionar y repensar las formas de vida en sociedad. El presente artículo se realizó con profesores de tres estados de México: Puebla, Sonora y Baja California en un contexto postpandémico. El objetivo fue analizar las experiencias de agentes que están o

estuvieron insertos en la Educación Superior y que realizaron actividades en el área de docencia e investigación durante el confinamiento por COVID-19. La metodología seleccionada fue cualitativa, con un método fenomenológico por medio de un paradigma interpretativo para reflexionar las percepciones sobre la realidad educativa a través de dos fases aplicadas por un cuestionario cuantitativo y una entrevista a profundidad. Los resultados visibilizaron los retos que tuvieron en la adaptación de la educación presencial a la virtual; la ausencia de participación horizontal entre el trabajo de investigación y la docencia; y las propuestas o estrategias para la mejora en la innovación educativa en colaboración de la investigación y la docencia universitaria.

Palabras claves: investigación; formación profesional superior; pandemia e innovación educativa.

RESUMO

O ser humano experimentou mudanças e transformações em sua passagem pelo mundo, passando de uma adaptabilidade ao nômade ao sedentarismo; Eles enfrentaram diferentes processos que os fizeram evoluir e repensar os modos de vida em sociedade. Este artigo foi realizado com professores de três estados do México: Puebla, Sonora e Baja California em um contexto pós-pandêmico. O objetivo foi analisar as experiências de agentes que estão ou estiveram inseridos no Ensino Superior e que desenvolveram atividades na área de ensino e pesquisa durante o confinamento pela COVID-19. A metodologia selecionada foi qualitativa, com um método fenomenológico através de um paradigma interpretativo para refletir sobre as percepções da realidade educacional por meio de duas fases aplicadas por um questionário quantitativo e uma entrevista em profundidade. Os resultados tornaram visíveis os desafios que tiveram na adaptação do ensino presencial para o virtual; a ausência de participação horizontal

entre o trabalho de pesquisa e o ensino; e propostas ou estratégias de melhoria na inovação educacional em colaboração com a pesquisa e o ensino universitário.

Palavras-chave: pesquisa; formação profissional superior; Pandemia e inovação educativa.

INTRODUCTION

Human beings have experienced changes and transformations in their passage through the world, ranging from an adaptability to being nomads to becoming sedentary; They have faced different processes that have made them evolve and rethink the ways of life in society. These trajectories are dynamized due to biological, physiological, psychological, social, cultural exchanges, among others, which make possible some repercussions and modifications in the educational sector. In some cases, these transformations are observed in the phenomena of education in times of war, education for all or education in new Information and Communication Technologies (ICT).

Modifications within educational systems have been found in different phases of sociocultural development; in the last century, academic and training systems had remained static in relation to educational methods (Carbonell, 2015). That is why global or national changes had been perceived as far from contemporary reality; however, the transformations resulted in the immediate present. The reason for these changes occurred in the first quarter of 2020, since the world experienced a health phenomenon that soon became a pandemic: COVID-19, derived from the SARS-CoV-2 virus, which in a short time, it spread throughout the world, causing millions of

deaths and collapsing the known social systems.

For the education system, the pandemic left more than 584 million boys and girls worldwide without opportunities and with school difficulties, decreasing the opportunity for quality education (UNESCO, 2020a). In world Higher Education, the indicators determined that approximately 1.570 million students were vulnerable to the change from face-to-face to virtual education. In the specific case of Latin America and the Caribbean, UNESCO (2020b) established a total of 23.4 million students and 1.3 million academics who were affected in their education, management and research activities.

Due to the above, it is important to rethink the role of educational research in the new social scenarios that will be experienced after COVID-19 and link it with academic and scientific work. It should be considered that teaching and research are two activities that should not be isolated and that both should collaborate together. In the Mexican context, the situation was alarming in the teaching field for the achievement of learning and the teaching of school contents in distance mode; The risk factors were: the absence of resources, the lack of training in digital education and pedagogical tools in virtual teaching, which hindered training practices (Dos Santos, 2020).

On the other hand, the consequences of greatest concern were the proposals and lines of action for the link between teaching and educational research, which led to significant help in solving academic difficulties. In a first aspect, the National Council of Science and Technology in Mexico (CONACYT, 2020), together with the National Association of Universities and Institutions of Higher Education (ANUIES, 2020) proposed consultation panels for dialogue and improvement of the practices of teaching in digitization and, in turn, projects and

research associated with education and pandemic were promoted.

It is recognized that the pairing between teaching and research were unrelated activities during the process of adaptability between face-to-face and digital at all educational levels. In reality, it can be assumed that they were two activities isolated from each other in their applicability and function with the vulnerable context in the face of the pandemic. That is why it is considered necessary to reflect on the experiences of the teachers who experienced both activities in their professional work.

The consequences of the pandemic are reflected in the various educational fields, especially in educational research programs and teaching, which could have positive repercussions in the near future in the implementation of new lines of work between technology, actors educational and content. However, the members of the knowledge society suffered effects, to a lesser or greater degree, in the adaptation of a face-to-face system to a distance or virtual modality (UNESCO, 2020a).

Some of the most evident repercussions for teachers and researchers were: the lack of training in educational digitization among educational actors, the lack of technological equipment for administrative, academic or research activities, the lack of connectivity access, budget cuts national level in science and technology, technical problems with digital devices and platforms, decrease in teaching and research enrollment, loss of employment contracts, among others (UNESCO, 2020b).

Throughout more than a century of consolidation of educational research in Latin America and a few more decades in Europe, academic processes are a mystery to some scientists and, even worse, the problems presented by the relationship between

teaching and research. they are not easily fixed. Due to the above, the interest of the study is focused on knowing the educational programs in which they are inserted and that carry out teaching and research work, as well as their relationship with educational transformations during the COVID-19 pandemic. It should be noted that the works on research and teaching in Higher Education are required in a health situation, since they open up a general panorama of the educational reality (Díaz, 2020).

That is why, in this study, the experiences of professionals in the area of educational research and teaching at public and private universities in Mexico are analyzed and reflected upon. In a first aspect there is the Autonomous University of Baja California, the University Center of Tijuana and CENYCA of the city of Tijuana Baja California; in a second case, the Universities of Hermosillo, Sonora such as Tecmilenio and Kino University; and ends with the Meritorious Autonomous University of Puebla and the University of Valle de Puebla in the city of Puebla; all under the assumption that during the pandemic the processes of academic professionalization and educational research have had to restructure their lines of action to face the social, educational, technological and cultural repercussions that the SARS-CoV-2 virus has affected in higher education.

The objective of the research was aimed at analyzing the experiences of the actors who are or were inserted in Higher Education and who carry out work in the area of teaching or research during the confinement by COVID-19. Among the specific objectives are: first, to identify the differences between face-to-face work and the adoption of online work, a result of COVID-19, and second, to know the meaning of current educational research in relation to the post-pandemic educational reality.

The central elements of the research context are currently complex, since for more than

one school year or two academic semesters the classes were completely online; that is, there was an adaptability of face-to-face education to redesign those contents to be implemented through synchronous or asynchronous classes. That is why making a diagnosis of the general panorama of educational research and teaching in Mexico should be a primary task for understanding new actions of educational innovation.

Despite the immediacy of the phenomenon and the measured data shown by international and national organizations on the repercussions caused by the pandemic, to a greater extent negative for the school sector, this study is committed to the members of the knowledge communities and to the whole of society to seek and analyze the strengths and areas of opportunity experienced by the teaching and research pairing with a proactive and innovative purpose for educational improvement, not only from quantitative data and frequency of damage, but rather from the experiences of educational actors in the country.

By virtue of the above, research on Higher Education in Mexico must be reflected from the experiences of those who lived the unprecedented teaching and the new educational research approaches, based on key elements, ranging from the training processes, the management administrative and bureaucratic to the monitoring of the repercussions that educational digitalization has on the new knowledge society (Barbosa-Chacón, Barbosa and Rodríguez, 2015).

In justification of the above, the knowledge society and educational systems must adapt to the new globalized systems in the creation of spaces for professional specialization in a digital, innovative and productive society. In the case of research and teaching, the objectives are aimed at directing the generalization of new theoretical positions; adaptations to the techniques and methods of digital, hybrid and face-to-face teaching;

to the incorporation of school policies, reforms, management and administration in relevant contexts; and to the individualities of its actors, through psychosocial human development (UNESCO, 2020a).

In this way, knowledge about the knowledge and skills of educational actors in teaching and research permeates better solutions towards other educational and social spheres. The following study is based on the problems and lines of change mentioned above, it reflects on the perceptions of the experiences of the educational actors immersed in areas of research and teaching of some universities and institutions in Mexico, to know the meaning and sense that the new ways of investigating and the digital strategies implemented during and post-pandemic for formative learning have.

The conceptual framework is based on the reconstruction of the notion of experience. To start, it is necessary to propose a paradigmatic and theoretical position of contemporary humanism in education, where the elements of human subjectivity, dignity, emotions and one's own integrity are necessary characteristics for the exploration of all parts of the human being (Roméu, 2015).

The use of a humanist paradigm enables the analysis of human experiences, the notion of Larrosa (2006) about the essence of an experience is taken up again, and it is understood as a personal event that happens to me, not only as a fact or social *phenomenon* that I see from the outside, that is, the human experience is what is lived, perceived and felt as part of oneself. In this sense, understanding the experiences of educational actors within the field of teaching or research will allow us to analyze the challenges, innovations and transformations that the pandemic left in education.

Without profaning the word experience, it must be thought from the experiences that occur; in this way it will be easier to resemble what its principles are. As an essential characteristic, the cognitive, affective and bodily processes that people have should be located, assuming that the existence of some principles that serve as the basis for understanding the concept is related to: exteriority, otherness and alignment; subjectivity, reflexivity and transformation; singularity, unrepeatability and plurality; passage and passion; uncertainty and freedom; finitude, body and life (Larrosa, 2006, p. 87).

Considering the theoretical notion of lived experience, professionals in the area of teaching and educational research built a diversity of experiences prior to the pandemic in relation to their work within the labor field; However, in times of pandemic and consequently the change from face-to-face to virtual modality, perceptions, experiences, senses and meanings had a transformation in their practices on work within education.

Due to the transformation of face-to-face education with its lines of action to an era of academic digitalization, consumption of electronic resources and cognitive and affective means to face the new educational reality, the objective was to analyze the experiences of the actors who are or were inserted in Higher Education and who carry out work in the area of teaching or research during the confinement by COVID-19 for scientific reflection on what lines, challenges and innovations educational research aimed at teaching requires.

MATERIALS AND METHODS

In order to achieve the proposed objective, the following research questions were posed:

What relationship does educational research have with the reality experienced in teaching at a higher level during the COVID-19 pandemic?

What are the challenges, innovations and transformations that human experiences refer to the link between educational research and face-to-face and virtual teaching?

What significance does research have in times of pandemic for educational innovation?

The methodological part of the research is derived from an interpretative paradigm of qualitative research, since it fully understands what the human being experienced in his relationship with the world, where individual, cognitive, behavioral, and cultural aspects come together for interaction. of the experiences of those who live the phenomenon directly, but also of those who investigate it (Strauss and Corbin, 2005). The foregoing is structured in a phenomenological approach and method of Edmund Husserl with an educational perspective (Buendía, Colás and Hernández, 1998).

The technique that led the methodological process was a qualitative questionnaire and a semi-structured in-depth interview, which allowed a glimpse of the reality of otherness through its own narrative, in an experimentation of its senses, meanings and experiences on the object of study. It was made through an application called *Google forms* and *Google meet* for the collection of information from students or teachers within the field of Higher Education.

Based on the above, four essential phases were obtained for the search for lived experiences (Larrosa, 2006). The first phase was to identify the study participants; For this, a database was created with the names, profession, email addresses and telephone numbers of teachers and researchers from three cities in Mexico: Tijuana, Hermosillo and Puebla. In the second phase, an online qualitative questionnaire was applied through *Google forms*. The results showed the participation of 25 professionals and five thematic areas between teaching and/or research work and the pandemic.

It is important to clarify that the qualitative questionnaire applied provided relevant information on the lines of action, problems and the disarticulation between teaching and research; however, it was determined that there was a lack of information to understand the experiences lived by the participants. Due to the aforementioned, in phase two a semi-structured in-depth interview guide was developed, which would allow a glimpse of the reality of otherness through its own narrative, in an experimentation of its senses, meanings and experiences on the object of study.

In the third phase, an in-depth interview was applied to nine of the 25 participants who completed the questionnaire, with the purpose of enriching the responses and understanding in depth what happened to them. For the preparation of the interview, the 25 participants were contacted and an invitation was sent to them for their collaboration, of which three from Puebla, three from Hermosillo and three from Tijuana accepted. Once their informed consent was sent, the interview was scheduled according to the availability of each academic and the connection links were sent to them through *Google-Meet*.

The fourth phase of the methodological process was the transcription, systematization and interpretation of the

narratives obtained in the interviews. For this, the data reduction method was followed, frequently used in the social sciences (Simons, 2009). Consequently, the data was transformed into a decoding, categorization and classification.

To end this section, it should be mentioned that the information from the qualitative questionnaire is included as part of the first phase of analysis and the in-depth interview corresponds to the second interpretive phase. However, in the discussions a final report is exposed on the narratives of all the lived experiences of the participants, which were carried out by an in-depth analysis of the qualitative data through open and axial coding (Strauss and Corbin, 2005).

RESULTS

In the present article, the results were determined from an analysis of qualitative data with a systematized methodology for obtaining the information, the organization and transcription of the interviews carried out and by a coding of the information transformed into interpreted categories of the lived experiences of University professors facing a formative change in the face of the COVID-19 pandemic.

Phase I. Qualitative questionnaire

In the initial phase of the qualitative research, the experiences of academics in various areas of knowledge were recovered during the activities they carried out in relation to teaching and research, specifically during the pandemic and post-pandemic. To begin, five thematic axes related to the object of study were analyzed: identification data, most outstanding problems in teaching and research during and after the confinement due to the pandemic, the challenges experienced during the

confinement of the pandemic in teaching and research, the areas of educational research to improve post-pandemic educational practice and innovations and proposals for the link between teaching and educational research.

1. Identification data

One of the first pieces of information in the profiles, which are significant for qualitative research, are the professions of each of the participants; Most of the participants were teachers (they did not specify their training) and from there the Psychology degree followed. With less participation are professors from various areas such as biology, pedagogy, history, administration, gastronomy, communication and law. On the other hand, in the academic degree of each one, it stands out that 60% have a master's degree, 28% with a bachelor's degree and 12% with a doctorate.

Another identification data that gives meaning to the experiences of teachers and researchers who participated in the study is linked to the academic work they do. All the participants work at the higher level (students, teachers or researchers) and some of them carry out research work, followed by teachers who teach basic education with 17.9%, followed by those who carry out teaching and research work. in postgraduate with 10.3% and teachers finish at the upper secondary level with 7.7%.

Finally, other responses found is that most teachers work in various public and private universities and in some of them carry out research work, such as: being in charge of methodology subjects and some are thesis directors or conduct administrative tasks related to the investigation. But when asked about their work in the field of educational research, their answers were that they do not; rather, this activity was reflected in the

description of their work in the educational area.

2. Outstanding problems in teaching and research during and after the confinement due to the pandemic

In particular, the questions about the difficulties encountered during the pandemic were divided with respect to the activities carried out by the participants; For example, in the case of people with research work, their difficulties prevailed in psychological matters and exploration work, such as: discouragement, lack of desire to work on the research process, and lack of motivation to continue with methodological work. On the other hand, in the participants who were focused on the teaching part, the greatest difficulties reported were those related to student learning, socialization, educational needs regarding new technologies and inclusion processes.

In both activities, the most frequent experiences of people were the problem of the Internet connection and the use of digital tools for educational purposes, both in students and teachers. One of the experiences that is taken up is that "Also, a lack of appropriation of technological artifacts by teachers and students is identified. These have not really been thought of from educational practice, they have only served as an extension of traditional formats" (E22). Given the above, the biggest problem was the regulation of academic activities to digitization.

3. Challenges experienced during and after the confinement of the pandemic in teaching and research

The answers were multiple and the most outstanding were related to the teaching challenges within the virtual modality; That is why three categories of analysis were carried out, where the most significant ones

were included. The first category is linked to the *psychoeducational processes*, where the affective competencies of the students challenged the fulfillment of the contents; these challenges are associated with motivation, empathy, school performance, academic interest, among others. The second category of analysis was *access to connectivity*, which is related to socioeconomic and cultural factors. And the third category, the *use of technology*; there are the lack of digital tools for education, the ignorance of digital resources on the part of teachers and students and the generational gaps on the use of teaching technologies.

4. Educational research areas to improve post-pandemic educational practice

The academics determined that the areas where educational research support is needed are the same ones that are related to the problems and challenges that became visible during and after the pandemic. It is important to remember that the problems indicated already existed before the pandemic; however, they increased in virtual classes and their consequences can continue. The lines of research where education can bring changes or benefits within contemporary educational practice are listed below:

- Socio-emotional areas of educational actors.
- Training in the use and understanding of Information and Communication Technologies in the educational context.
- Pedagogical programs to improve didactics in new face-to-face, virtual or hybrid scenarios.
- Teaching and learning techniques through teacher training.
- Inclusive education in virtual teaching and inclusive pedagogical strategies with a technological approach.

- Processes that collaborate in teaching and learning.
- In Mexico and Latin America in general, research processes should focus efforts on horizontal lines of research that favor reflection on educational practices and processes. Likewise, these reflections must lead to changes structural.
- Processes of Higher Education: curriculum; educational processes, management and evaluation; educational policies: teacher professionalization; inclusive practices and virtual environments.

5. Innovations and proposals for the link between teaching and research in the educational field

To finalize the dimensions of analysis of the first phase of qualitative research, a question was asked about the innovations that teaching and research work should do with the purpose that the new Information and Communication Technologies (ICT) do a collective work between research processes and professionals within the classroom, helping to update educational programs through digital resources, pedagogical and technological strategies, inclusion in teaching techniques and promotion of student ethics in the performance of their role in the long distance education.

Regarding the above, the academics understand that their ideas are not innovative in a face-to-face context, such as the search for strategies for the implementation of the contents, the differences between the contexts and socio-historical moments of educational development or the problems of education of yesteryear such as social inequality, desertion, lack of access, etc. But the innovative part is aimed at rethinking post-pandemic education with tools that make it possible for them to access and develop learning.

Thus, in order to comply with these innovations, collaborative work is required between the educational system and all its actors, in order to train thinking people in a new context in which digital tools will continue to develop based on learning and teaching. Due to this, other innovations are updating the way of evaluating with digital methods, providing skills to educational participants and not continuing to distance teaching from research, since they continue to permeate as different activities. For this reason, theoretical-empirical knowledge must be disseminated towards educational practice. other innovations were:

- In the area of professionalization, offer teachers activities that allow them to modify their attitudes in relation to face-to-face and distance education in the management of technological tools, to incorporate them into the educational process.
- Modification of imaginaries: that is, a deep reflection on the relevance of virtual education, which has an impact on significant changes and actions for technological appropriation and strategies for connectivity coverage can be developed.
- Work should be done to generate the competence of adaptability and creativity.
- Do not stop using technology in teacher-student interaction for the teaching-learning-research process.
- Innovate in the study plans, according to the training of the students.
- Free virtual educational resources.

Before finalizing the results of the qualitative questionnaire, several responses were obtained on the importance of the relationship between teaching and research; However, two areas of opportunity emerged: the first is a theoretical reason where the participants do see the link as necessary in

order to promote scientific awareness, the cultural heritage of teacher-students and the motivation to enter the world of research. Other outstanding responses were that research helps to see the needs of the educational sector, or, the relevance to improve teacher professionalization " is essential to offer elements that allow us to reflect on educational processes, their relationship with the context and the need for educational policies that respond to specific needs" (E18).

From another perspective, the participants assure that it is a must; However, the labor, bureaucratic, and economic burdens do not favor research in the Mexican context. Although there are things that need to be changed in the face of the problems that arose from the pandemic, the reality of research is different, and this is due to cultural or social factors. economic that disadvantage the work of the investigation. The people who answered the above know what it takes to be better professionals in education, but they are aware that most teachers lack places in public universities, preventing them from devoting themselves to research as part of their teaching work.

As can be seen in the categories resulting from the qualitative questionnaire, five dimensions were entered to analyze in depth; It is clear that the evidence obtained provided a reflection on the perception of academics in the teaching and research area, in relation to education in times of pandemic. For this reason, these dimensions gave rise to an in-depth interview guide with the experienced agents who lived the aforementioned dimensions. Next, the second methodological phase of the investigation is presented.

Phase II. Deep interview

In the second phase, nine in-depth interviews were conducted with the teachers

who agreed to continue the research project, which lasted approximately 45 minutes, which helped the hermeneutic interaction of the phenomenological method and the conceptual framework of lived experience. The selection criteria were through a final question in the qualitative questionnaire, where they were asked if they wanted to continue in the interview phase. To give greater clarity to the experiences of each of the participants, the following nomenclature will be used: participant, interview number and year of preparation (P01). Subsequently, the most relevant experiences on the five resulting dimensions will be described and analyzed textually.

The results were grouped into categories, following the five outstanding dimensions of the qualitative questionnaire, in addition to a triangulation with the questions and the research objectives. It should be clarified that the in-depth interview collaborated to give voice to each of the narratives and experiences of the participants. It is clear that the questionnaire provided the necessary information for the generation of the main dimensions, but in the phenomenological search it is necessary to understand the subjective reality from the person who lives it.

The categories of analysis followed the lines of five dimensions found in the qualitative questionnaire; From this, each of the interviewees' narratives was deepened and each of the experiences lived was intertwined by means of an open and axial codification. The most relevant areas in the interviewees' narratives are presented below, based on the four dimensions that support the categories found in the qualitative questionnaire.

Virtual classroom experiences during the pandemic

During the interviews carried out, an important topic for the participants was

reflected on: the new techniques, strategies and ways to improve and adapt to the teaching and learning processes. Some of the narratives are based on the assumption that virtuality helped make the content accessible to all students.

...In the 80s you didn't have access to books in PDF format on your phone or tablet, you had to buy the books, you had to go to the library, you had to transcribe or if you didn't have money you had to make copies. Now that you can have all kinds of literature on hand that can be printed so that their learning is more versatile and so they can develop their own self-learning. The duty of a teacher-researcher is to adapt all this and use it to benefit the design of learning methodologies... (P01)

...I can see that they (students) became much more skilled with digital tools, so when I get stuck, they help me. But I have also realized that they do not want to participate, since you are not in front of them, they do not feel the pressure or responsibility to participate. And in terms of activities or tasks, they have fulfilled me quite well, but with class activities it is very difficult for me to keep them paying attention to the class. Why can't you, as a teacher, see if they are paying attention or if they are on the cell phone, since they don't turn on my camera for the world, so asking direct questions works for me, but I have many

ghosts who don't answer me anything (P6).

In relation to the type of learning from technological tools, most of the narratives were positive, since the students are part of an era of digital natives, which helped them carry out their own learning, they were more autonomous and had educational flexibility. However, some of the experiences narrated were that the difficulty and certain problems related to the measurement of the learning obtained and teacher training.

...I had to look for several YouTube videos to learn how to use zoom, which was the first tool they were asking us for, I didn't know how to record, how to share the screen, how to search and know the video call tools. I had to look for different pages so that I could teach. The institution gave us courses, but I also had to individually investigate the use of ICT in order to transmit it to the students (P05).

The students of virtual classes are more concerned with delivering than with learning and in the hybrid modality I feel that the practical subjects pay much more attention to the face-to-face students that I have at that moment than to those that I have simultaneously in virtuality. Regarding methodological issues, I feel and believe that we have a long way to go to find strategies that work for both groups, both face-to-face and virtual, and give them back a sense of learning (P09).

New post-pandemic educational reality: the teaching-research binomial in education

Based on the narratives of each of the participants, a duality was formed between the importance of the teaching-research binomial for the analysis of the new post-pandemic educational reality in reference to student learning, teacher training, lines of research, didactic tools or actions that make a teacher a participant in the research.

In a reading that I was doing, I understood that, in Mexico and Europe, they have worked with responses for education during the pandemic, they are adapting and assuming the new reality... However, it is really impossible to resume face-to-face immediately, on the other hand, they are mentioning (in the text that I read) that the educational backwardness of the new generations is due to the impact of the pandemic, I mean at the level of learning. I think we must go back to what we used before, for example, invite students to do reading comprehension and lead them to mathematical reasoning (P01).

Some of the experiences that the teachers lived was that in their practice they see the need to develop research work for an academic and comprehensive training of their students; However, another of the observations is that they carry out research, but the students refuse to do so, and one of the causes of this is that they misuse and ease virtual tools.

...I believe that if you have the experience of being a teacher and at the same time being a researcher, it makes you much more critical, it broadens the outlook on a problem and, above all, it helps you find a solution. It also makes you critical of what

you do in the classroom and whether or not it really helps the student's academic achievement, therefore, it is a very good opportunity. I believe that by only doing research you become very technical and separate yourself from reality and opinions that you can give. Then it also happens when you are only a teacher and you train to be a teacher, you forget that you can be very objective in research and academic writing (P08).

... The postgraduate course made me want to investigate and learn more about my topic, but I also try to give my students research consumption, on the other hand, I have colleagues and acquaintances who are dedicated to research and I share experiences with them, that gives me full of more desire In the case with my students I investigate so that they know more. However, I have come across a new society that lacks the desire to investigate, before they opened Google and searched for it, now my students just come and tell me that you are going to give me (P04).

The intervention for educational innovation

Another dimension that stood out in the narratives of the participants is making visible that the relationship between teaching and research can be carried out through intervention practices; that is to say, not only think of research as a process within an established institution, or as part of

CONACYT, or in the preparation of a thesis. The link is put into practice when there is training, the teacher's interest in encouraging a class through research methods, training critical and analytical students, among other options. It is here when it can be observed that the teaching and research pairing has innovation processes. But always in a multidisciplinary interaction that is for everyone.

...research for the class, from my perspective, is a matter of innovation, I think that it also comes here, already as something conglomerated, also because everything we are doing now is innovation, that is, to think that for two years at the to date we have evolved by leaps and bounds and there have also been many errors, of course those errors continue to exist, but from my perspective I think that innovation has been somewhat abrupt and also forced. But the teacher who is not innovating, who is not researching (since many think that research is creating a theoretical framework and working on a specific formal element) but for me, research is actually a curiosity about something... I don't know, searching in different sources. So, I think that a teacher who is not in this area of research now is a teacher who is stagnating and who is not going to evolve with the changes that are taking place and that are on the horizon (P22).

Comprehensive process of educational actors: socio-emotional factors

Another aspect that was significant for the narrations of the interviewees is the socio-emotional part that they experienced during their educational processes in the COVID-19 pandemic, from confinement to the new modalities of hybrid classes. This is directly related to their overall stability, learning processes, academic or work performance, and information processing and research.

...The orientation or psychopedagogy for the affective factors in the students and that they could come out of these social problems positively... The school helped maturity to weigh up the emotional issue a little and, on the other hand, it was that the same strategy that was implemented did it was effective, I had to see and live the data that I am providing. We currently have students who are basically at home all day and who sit in their classes, and perhaps they are experiencing problems at home, be it with their parents, with their siblings, academics, not just aggressiveness problems, including economic problems. Therefore, the emotional problems with this pandemic were exacerbated, this problem has affected the performance of the students, that is, it is not only the part of not having technological elements, but also that they do not have the motivation, nor the desire (Q22).

The nine experiences that the participants narrated exposed the challenges, learning, problems, conditions and proposals for changing the relationship between teaching and research in times of pandemic. These results are intended as an innovation in the learning and teaching processes; In addition, in the way of looking at the research, to get away from being just an elite that is not related to the socio-educational reality. Reflecting on the experiences of those who lived through the COVID-19 pandemic can lead to quality and improvement in Higher Education.

DISCUSSION

The results presented in the present investigation on the narratives of the participants are linked to the interpretative paradigm that was selected and with the phenomenological method, since the lived experience was the main line to analyze the phenomenon of teaching activities and research. This in a context of pandemic in Higher Education in Mexico.

It should be mentioned that the research objectives and questions exceeded the expectations of the initial research, by not only identifying the differences between face-to-face or virtual work or knowing the meaning that the research has in relation to teaching. The findings showed that the meaning of educational research is for purposes of training, training, intervention and development of innovations in Higher Education Institutions.

The pandemic context led thousands of students to take refuge in their homes, but from virtuality to continue with their academic activities, which gave lines of research to teaching and scientific work. Prior to the COVID-19 pandemic, educational problems and difficulties were present in

face-to-face classrooms, but through research on what happened in the virtual classroom, the knowledge society can prepare to face the educational reality in the country. Below are the impact conclusions of the theoretical and methodological research presented in relation to its research questions:

- Higher Education has research groups, operation centers, government and social support, but it lacks interest and motivation on the part of the professionals who dedicate themselves to teaching work informally; that is, they are not within a public institution or do not have employment benefits.
- The aforementioned conditions and others associated with the question of employability times, institutional regulations or personal perspectives have turned educational research as something alien to teaching processes.
- On the other hand, there is a minority of teachers who associate research processes as part of their training activities for their students in the academic search, activity modeling and use of teaching techniques and tools.
- In relation to the challenges, innovations, and transformations left by online education compared to face-to-face education, the narratives were diverse when considering that the use of Information and Communication Technologies (ICT) favors or impairs student learning; however, it is known that the adaptability they experienced will result in a transformation in educational processes.
- In relation to the meaning that research has in times of pandemic, the experiences of the participants are dual, but they continue with the perceptions that were held before the

pandemic in face-to-face education. That is, research has a sense of autonomy, elite, economic and knowledge that is not disseminated to educational practice in a horizontal direction.

To finish with this interpretation, one of the most relevant dimensions of analysis was the opinion and perception of the participants on the strategies that are required to promote research work within academic activities; Given these proposals, three general areas can be seen. The first is associated with the impetus that Higher Education institutions should give to the work of educational research, as a strategy for improving educational processes through the creation of workshops, forums, courses, diplomas, and teaching methodology classes. the investigation.

In a second area, it refers to the actors who participate in the research; For this, an assertive, innovative and motivating intervention of teachers, students and even administrative people in specialized research activities is required. This demands that there be teachers interested in learning about scientific processes, their benefits, and the epistemic, ontological, and methodological methods for development and implementation.

The third area as a proposal is the dissemination of science as a result of a research process under ethical criteria, updating and guidelines with educational programs, always in connection with reality and the context in which it will work. At this point, it is understood that researchers and teachers must be updated on social and educational needs, so that in this way they can face the most relevant problems.

It is concluded that understanding the experiences of education professionals who teach and research contributes to better

learning about pedagogical and didactic tools, student training, new lines of research and, above all, to associate the two. activities that always seek improvement in citizenship, research and teaching for the daily activities of education.

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The authors participated in the design and writing of the work, and analysis of the documents.

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