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TEACHING THE CONSTRUCTION OF RESEARCH
PROBLEMS IN TEACHER TRAINING FROM AN
INNOVATIVE PERSPECTIVE

LA ENSEÑANZA DE LA CONSTRUCCIÓN DE PROBLEMAS
DE INVESTIGACIÓN EN LA FORMACIÓN DE PEDAGOGOS
DESDE UNA PERSPECTIVA INNOVADORA



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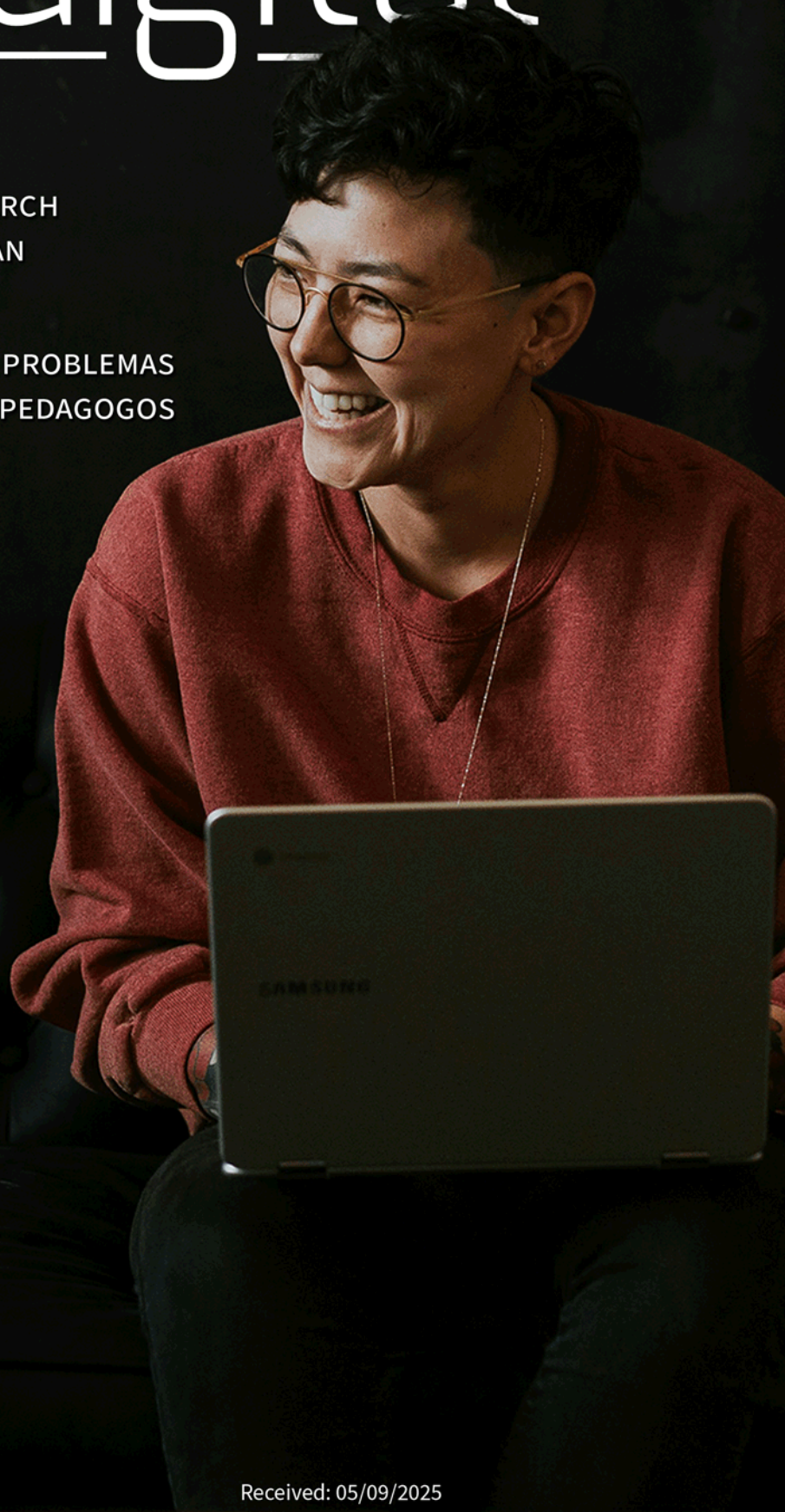
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LA ENSEÑANZA DE LA CONSTRUCCIÓN DE PROBLEMAS DE INVESTIGACIÓN EN LA FORMACIÓN DE PEDAGOGOS DESDE UNA PERSPECTIVA INNOVADORA

ABSTRACT

The work of the educator is linked to various areas of education, allowing them to be an agent of social impact in each of the areas in which human beings are being educated. This responsibility is related to various research activities that this professional must carry out. In this sense, the educator observes their reality in order to problematize it and contribute to research processes. This questioning is reflected in each step of the scientific research methodology, which is essential in the construction of scientific knowledge. This is where the importance of training educators with a didactic foundation based on educational innovation comes in, using information and communication technology tools, as well as artificial intelligence itself, to implement methodologies that help students get closer to reality.

Keywords: research, problem solving, innovation, teaching, artificial intelligence

RESUMEN

El quehacer del pedagogo se vincula con diversas áreas propias de la educación, permitiendo así que sea un agente de impacto social en cada uno de los ámbitos en los que el ser humano esté siendo educado. Esa responsabilidad se relaciona con diversas acciones de investigación que este profesional debe llevar a cabo. En este sentido, el pedagogo observa su realidad para problematizarla y contribuir a los procesos de investigación. Esta problematización se ve reflejada en cada paso de la metodología de investigación científica, la cual es esencial en la construcción del conocimiento científico. Es aquí donde se incluye la importancia de la formación del pedagogo con un fundamento didáctico que parta desde la innovación educativa, la cual utilice las herramientas de la tecnología de la información y la comunicación, así como de la propia inteligencia artificial, para implementar metodologías que ayuden al alumno a acercarse a la realidad.

Palabras clave: investigación, problematización, innovación, didáctica, inteligencia artificial

1. INTRODUCTION

Before discussing the great social evolution that humanity has achieved, it is important to address the importance of building scientific knowledge. This is a key element in the development of science and technology. Therefore, it would be impossible to imagine life as we know it today, because without technological and scientific advances, answers and alternatives would not have been developed to respond to the various problems and needs that exist in reality.

Research is a key element in the development and evolution of societies. Therefore, it must be based on detailed observation of reality. This generates questions, concerns, and approaches to various phenomena that occur in the immediate context of individuals. Observation has accompanied human beings since the most primitive forms of knowledge, such as magical and traditional knowledge. These allowed humans to address social and natural problems within the historical moment in which they found themselves. Subsequently, a much more rational approach was established. To this end, philosophical thought once again used observation to question its environment and find answers through dialogue and social interaction.

Observation is the main tool for developing scientific knowledge, as it allows researchers to identify various issues within the context. In this step, researchers can delve into a complex process such as research methodology (Álvarez Mendiola, 2020). Constructing the object of study based on the social context itself, as well as the discipline, the historical moment, and the researcher's own unknowns, is a very complex challenge. This is an important precedent in the research process. Therefore, it is a great scientific and disciplinary responsibility.

2. DEVELOPMENT OF THE TOPIC

2.1. The delimitation and contextualization of the object of study

When beginning any scientific research process, it is important for the researcher to experience a brief period of *courtship* (Hernández Sampieri and Mendoza Torres, 2018). Therefore, it is important to develop a deep understanding of what catches our attention, through empirical, academic, and communicative experiences in which the individual is involved. This *courtship* could remain a vague and lost process, but it is important to carry out various actions that allow us to focus on the object of study that we want to propose in order to solve the problem through research.

This is where the researcher must *ground* the object of study through delimitation and contextualization. This allows the research to be relevant to the needs of reality. Delimitation is important because "big problems are often complex and multifactorial; therefore, small parts are addressed and, little by little, a more complete solution is constructed" (Elizondo Cortés & González Videgaray, 2021, p. 24). The magnitude of the various problems under study that may arise from the researcher's observation should be focused on a geographical and temporal space, which will help to focus the actions of the research itself.

One of the key elements in defining the object of study is to specify the areas of interest, as well as to establish the scope and decide on the boundaries of space, time, and circumstances that will be imposed on the study. To do this, it is necessary to consider how the subject and the object of research relate to each other (Chaverri Chávez, 2017). In the particular case of the social sciences and humanities, such as pedagogy, it is important to "clearly indicate the geographical and historical context in which the fieldwork carried out in the research project is circumscribed" (Chaverri Chávez, 2017, p. 190). This requires the researcher to clearly and timely establish the space in which the research process will be carried out.

2.2. Identification and analysis of the problematic situation

Once the researcher has clarified the object of study, the topic around which the research will revolve is established. It is important to problematize this object by means of questions that help identify what may be unconscious, unknown, chaotic, questionable, or ignored, and which therefore needs to be investigated (Aguirre Chávez & Coaguila Manero, 2018). According to Aguirre Chávez and Coaguila Manero, "the problematic situation is the result of comparing actual behavior with ideal behavior" (2018). This state of the object of study is what allows the researcher to chart a course that helps guide the research work. It also sets out what the researcher seeks to resolve through each of the methodologies implemented.

This is where the researcher must immerse themselves in existing theory so that they can become a thorough analyst of their chosen subject of study, in order to describe and contrast their personal and empirical positions with what the discipline itself has already resolved or addressed (Velasco-Salamanca & Pardo-Adames, 2022). Reviewing these theoretical postulates allows for the detection of causes, effects, implications, and factors associated with the research problem. This helps the scientist to have a broad overview of those routes that have worked and those that have not been entirely successful (Escalante Angulo, 2009).

It is based on this problematization and questioning that the researcher can justify the importance of the research, impacting disciplinary, scientific, and social development. This generates research that is sufficiently relevant in various fields (Dzul Escamilla, 2013). By constructing the justification, the researcher understands the reasons that have motivated them to carry out their research process, thereby imprinting their style and personal reasons.

2.3. Constructing the problematization

Specifically, educational research has particular qualities. These stem from the dynamism inherent in education, its constant change, and those who make up the object of study. In this sense, when constructing the problematization of the object of study, it is necessary to raise problematic issues. These seek to:

Identify, prioritize, and discover potentialities, needs, and/or problems in the educational community through participatory dialogue and critical reflection on lived realities (life experiences) and testimonies from community actors who are directly or indirectly involved in educational activities (Tapia Domínguez, s.f., p. 4).

This reality allows us to understand that the experiences of specialists in the field of research are essential for participating in the process of problematization, since here the researcher finds real links between the object of study and educational practice. Therefore, at this point, the researcher gets as close as possible to the object of study with reality. This occurs before beginning to implement the methodology selected for the research process. This contrast with reality allows us to understand the situation in which the object of study finds itself. In this sense, the most immediate needs are addressed, in accordance with the context in which the phenomenon under study fully develops.

2.4. Formulating research questions

One of the key moments in research is the formulation of research questions, which accurately summarize the entire process of problematization of the object of study. This is where the entire problem statement is reduced, as well as its justification, and where the researcher frames what they are trying to resolve throughout their research process. According to Hernández Sampieri et al. (2014), research questions are "questions that guide the answers sought through research. They should not use ambiguous or abstract terms." (p. 38).

These research questions, together with the research objectives, guide each of the actions that will be taken in the following steps of scientific research. This epistemological questioning allows the researcher to take a critical stance toward the object of study, understand what they want to achieve, and clarify the problem they are trying to solve. This contributes to the development of scientific knowledge, based on an understanding of the reality in which the phenomenon is developing.

2.5. Teaching innovation for constructing research problems in the classroom

According to leading theorists in educational research methodology, the best way to train researchers is to have them conduct research, thereby gaining insight into the reality of the phenomenon under investigation through the scientific research process (Sánchez Puentes, 2014). However, many of the elements that need to be applied in research processes require theoretical foundations that allow for the proper application of methodology, as this theoretical review will lead to better results throughout the process. In this sense, the following teaching strategies are proposed to address theoretical knowledge: debates, discussion tables, creation of graphic organizers, and analysis of scientific texts.

Each of these theoretical lessons developed through the aforementioned teaching strategies are reflected in practical terms through the development of various skills. These skills enhance heuristic knowledge, which stems from constant interaction with their social and academic reality. That is why some of the strategies proposed to activate this knowledge are: Project-Based Learning, Academic Advising, and Methodological Design.

It is important to mention that, given the nature of the topics covered, plenary work is of vital importance, as the fact that students socialize and discuss the issues with their peers will help to further deepen their understanding of the subject matter. This work in plenary sessions helps to develop various axiological skills that are of vital importance in the education of students. For example, active listening, empathy, and respect for others, but above all, reasoned participation.

Today, digital skills have become an essential part of university students' education. For this reason, integrating information and communication technologies (ICT) has become a must in teaching practice, as they create a direct link between what students are learning and what is used on a daily basis in the workplace. Therefore, it is important to use tools to generate pedagogical innovation both inside and outside the classroom (Tabla 1).

Table 1

Tools for pedagogical innovation

Tool	Description
<i>Eminus 4</i>	It is the institutional platform used by the University of Veracruz (2017). It is a perfect space in which to develop various virtual learning environments where students can continue to develop their research process through a virtual space.
<i>Google Docs</i>	It allows for the development of written work that is implicit in research processes, facilitated through the use of platforms that enable cloud storage and asynchronous work.

Artificial intelligence	Students can be introduced to the use of artificial intelligence tools to automate the processes of searching for and organizing information.
<i>Canva y Genially</i>	The creation of various graphic organizers becomes a platform for digital design, allowing students to develop their creativity and work more efficiently.

Each of these proposals must be adapted to the specific needs of the student, as well as to the characteristics of the context, so that no complications arise when implementing them inside and outside the classroom.

3. CONCLUSIONS

The teaching process of educational research is quite a challenge, as it is a key element in the comprehensive development of 21st-century educators. Getting students involved in research is a complex task, especially when introducing them to a social phenomenon that is truly interesting or disturbing to them. Currently, social dynamics have made knowledge less interesting, as momentary trivialities have generated fleeting interests that lack scientific weight or value.

Bringing students closer to problematization through research allows them to generate a much richer and more complete knowledge of the pedagogical discipline, where they can delve deeper into the various lines that make up the educational phenomenon. Here, the epistemological process becomes a reality, as continuous questioning and comparison of the object of study allows students to put their critical and analytical skills into practice through in-depth questions, where reality can be viewed from different perspectives.

These questions will help students to problematize their reality and see research as an opportunity to contribute directly to the generation of alternatives that will enable them to solve their real problems. This allows young university students to see research as something truly useful in their reality. This first step in research is vital, as it is responsible for developing future researchers. This is achieved by making the right decision regarding their object of study and problematizing it to such an extent that they see it as a real necessity in their pedagogical training.

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