RESEARCH SKILLS FROM A DEVELOPMENTAL APPROACH IN TEACHERS IN TRAINING

LAS HABILIDADES INVESTIGATIVAS DESDE UN ENFOQUE DESARROLLADOR EN LOS MAESTROS EN FORMACIÓN

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Date of Receipt: February 25, 2025

Date of Acceptance: March 28, 2025

ABSTRACT

This study is an assessment of the importance of developing research skills on Bachelor's Degree students in Early Childhood Education program, using face-to-face course format. It bases on the developmental approach to student scientific work during the training process, with consistent application of methods such as analysis-synthesis, induction-deduction, and documentary analysis. This approach, from a dialectical-materialist perspective, provides an understanding of the pedagogical importance of coherent attention to the research component and transforms students into teacher-researchers, prepared to solve professional problems with the help of scientific methods.

KEYWORDS: research skills; student scientific work; developmental approach

RESUMEN

Se realizó una valoración sobre la importancia del desarrollo de habilidades investigativas en estudiantes de la carrera Licenciatura en Educación Preescolar en la modalidad del curso por encuentro, sustentado en la concepción desarrolladora del trabajo científico estudiantil en el proceso formativo, con la aplicación coherente de métodos como el análisis-síntesis, la inducción-deducción y el estudio documental, lo que proporciona desde un enfoque dialéctico-materialista comprender la importancia pedagógica de la atención coherente al componente investigativo y convertir a los estudiantes en maestros-investigadores, preparados para resolver problemas profesionales con ayuda de los métodos científicos.

PALABRAS CLAVE: habilidades investigativas; trabajo científico estudiantil; concepción desarrolladora

INTRODUCTION

The 2030 Agenda for Sustainable Development, approved in September 2015 by the United Nations General Assembly, establishes a transformative vision. This is a historic opportunity for Latin America and the Caribbean, including priority themes such as education, like promoting lifelong learning opportunities for all, and as one of its goals, ensuring equal access for men and women to technical, professional and higher training, including university education.

In correspondence with this aspiration, in Cuba, the updating of the guidelines of the economic and social policy of the Party and the Revolution (De Cuba, P. C., 2011) establishes in its objectives 14, 103, 122, and 158 the presence of scientific research in different spheres of economy and society. The professionals trained by Cuban universities must be responsible for implementing this policy.

In this regard, several studies have been conducted addressing the research component in the training process; such is the case of Rojas & Aguirre (2015); Pérez & Fuentes (2016); Rodríguez, Garriga & Álvarez (2019) and Espinoza et al. (2021), with analyses about formation and development of research skills and student scientific work.

Rojas & Aguirre (2015) have studied the research training of education professionals from different perspectives, with the objective of improving the training and professional performance of teachers through the improvement of scientific-research work.

More recent investigations, such as those by Rodríguez, Garriga & Álvarez (2019), present the theoretical foundations supporting student scientific work, as well as its planning from the year group, divided into different stages, ranging from conception to the final year project.

Espinoza et al. (2021), on the other hand, analyze the professional training process in education from a humanistic, ethical and moral perspective aimed at enhancing the development of professional competencies.

Enhancing the capacity to identify professional problems in their context becomes an important task in the training process, so that they can also project, execute and carry out actions based on the application of scientific working methods, raising the quality of the educational process.

Therefore, training competent professionals and committed to social development, capable of analyzing problems critically and innovatively and seeking solutions through the use of the scientific method, is one of the fundamental challenges of the university. Achieving this objective requires the development of research skills in students.

Current demands of the Professional Model in the Bachelor's Degree in Primary Education, due to changes arising from Curriculum Plan E and the particularities of the part-time course, lead to reflection on the value of

pedagogical alternatives to favor Student Scientific Work (henceforth SCW) and the development of research skills in students in training.

MATERIALS AND METHODS

The work is based on the dialectical-materialist method with an eminently pedagogical character, which starts from the analysis and interpretation of previous studies on research skills in students training in pedagogical careers. Supported by induction-deduction and analysis-synthesis, it was possible to process and interpret the information, establish logical relationships and generalizations regarding the role of using pedagogical alternatives to enhance the development of SCW.

RESULTS

Research links university with society. Being a substantive, fundamental function, research is a social duty. Therefore, it corresponds to these institutions to develop capacities in students and incorporate research as a teaching-learning strategy in the curriculum (Hernández et al., 2017).

According to Educación, M. D. (2016), SCW has an important formative role due to the application of the scientific method in their daily task as part of the continuous improvement of their labor as students.

The link between study and work and theory with practice is expressed from the first years of the career through the professional focus of each discipline and the concrete planning of interrelated activities of the academic, labor and research components.

It is known that the research component contributes, in short term, to the student's better performance in tasks related to their scientific activity and, in long term, to the development of knowledge, attitudes, skills and better performance in their function as a teacher-researcher.

Student scientific work gains relevance in the activity due to its contribution to the formation of a general knowledge. According to Delgado & Montes (2010): «Student scientific work is the most important driving force of science

and technological innovation work in universities, while training the future professional with the habit of providing solutions to social development problems, as a way of applying the acquired knowledge, using the scientific method as a way to solve problems».

For the student, scientific work develops from two positions: one curricular (planning of scientific research from the subjects, evaluative or not, and manifested in research projects, knowledge integration projects, presentation of papers, participation in debate groups); the other extracurricular, it develops in the career but is not part of a subject nor is it contemplated in the curriculum, requires extracurricular dedication, and is manifested in participation in scientific research groups, presentation of results in national or international scientific events, writing and publication of scientific articles (Pérez & Fuentes 2016).

According to Mejía (2018), in the organization of SCW, fundamental axes must be taken into account:

- ✓ Student leadership.
- ✓ Development of reflective thinking, cognitive independence, and creativity.
- ✓ Solving problems related to their profession.
- ✓ Enhancement of research skills and capacities.

Regardless of curricular component, the development of research competencies allows them to be creative, face situations or problems in their environment and try to find solutions, as SCW enhances the development of scientific thinking linked to their profession as part of the university training process, as required by contemporary higher education (Suayero, 2013).

In Education, M. D. (2016), it is stated that SCW is an organizational form, whose fundamental objective is to train students in skills specific to technical and scientific-research work, through labor practice and using the methodology of scientific research in the professional training process.

It also defines that the fundamental types of scientific research work are: course work, diploma work, and extracurricular research work. It also foresees its organization by stages:

Stages of Student Scientific Work

First stage: prior to the research, the student obtains an «Approximation to the problem and design» (Valledor, 2005), executed during the first two years of the career. In this period, the ideal social model (ISM) plays a decisive role, assumed by the researcher as a starting reference. It is seen as the set of demands or aspirations that society establishes for education and the objectives it aims to achieve.

These requirements in Cuba are expressed through official documents governing the country's educational policy. From the first year, the teacher incorporates, as part of their culture, the ISM corresponding to their future professional activity.

They will know the general indicators that make it possible to establish the main regularities or characteristics of the teaching process. They will verify manifestations that correspond or not with the ISM. This contradiction between the particular case and the ISM leads to the identification of research problems.

Second stage: Execution, control and regulation of research tasks (Valledor, 2005), which begins in the third year of the career, where they receive contents related to Educational Research Methodology.

In this stage, the following cycles of theory-practice interaction are concretized. During the second cycle, the characterization of the field in the object is done, both, theoretically and empirically; the third includes the proposal and its validation in the school practice of the teacher in training.

This stage should be characterized by homogeneity, concatenation and coherence between tasks and their results. It consists of the execution of tasks involving the collection and processing of all information, theoretical and empirical, the modeling of possible solution to the problem and its validation, until reaching definitive conclusions.

Third stage: In the remaining years of the career, the research is defined in a communication and defense of the research results (Valledor, 2005). The communication and defense of the results are concretized in the whole research when accounting for the work done, the course and diploma works.

The design and each partial result will be communicated and defended before the SCW group and the pedagogical collective of the department, in accountability sessions, articles and papers for events.

SCW is an essential tool that, due to its degree of generalization (planning, execution, assessment and communication of results), allows the professional in training to deploy their potential for scientific development linked to the general tasks of the profession or trade.

This should translate into knowledge that allows all professionals, from their own activity and work experience, to use them effectively and creatively in the implementation of research processes.

The objective of SCW is to develop research skills in students so that they can understand the phenomena of research with creativity, cognitive independence and scientifically solve problems in their scopes of action.

Formation and Development of Research Skills

The formation and development of research skills in undergraduate studies is a topic addressed in several educational research in the international context. A fundamental trend in these studies has been the correlation between the terms: formation skills for research or development of research skills and training for research.

The concept of scientific-research skills offered by Chirino (2002) defines them as «the mastery of the generalizing actions of the scientific method that upgrade the individual for the problematization, theorization and verification of their professional reality», which contributes to its transformation on scientific bases.

This definition is assumed in the present study due to the relationship it maintains with the training process of the professional of education and the development of research skills, showing them as a transversal axis within the substantive processes.

Also, research skill is conceptualized as the mastered actions for the planning, execution, assessment and communication of the results due to the process of solving scientific problems. It is a set of skills that, due to their degree of generalization, allow the student to deploy their development potential, based on the application of scientific methods.

Most General Classifications of Research Skills

- ✓ Basic research skills, skills specific to the particular science, and skills specific to pedagogical research methodology (López, 2004).
- ✓ Skills to problematize, theorize and verify objective reality (Chirino, 2002).
- ✓ Perception skills, instrumental, thinking, conceptual construction, methodological construction, social construction of knowledge, and metacognitive skills (Moreno, 2005).

- ✓ Research skills of greater integration for undergraduate teaching: solving professional problems, modeling, executing, obtaining, processing, communicating information and controlling (Machado et al., 2008).

Characteristics of the Classifications

First classification, a relationship is established between professional training and research skills. The analysis is carried out from the most general to the particular vision, based on the relationships established between disciplines and subjects of a career.

Basic research skills refer to the multidisciplinary relationships established in the curriculum; they are represented by logical thinking skills (analysis-synthesis, compare, abstract and generalize) (observe, describe, compare, define, characterize, exemplify, explain, argue, demonstrate, assess, classify, order, model and understand problems) and general teaching skills, performing information search and communicative skills (López, 2004).

Specific Skills to the particular science refer to interdisciplinary relationships of curriculum. They are represented in «those skills that, taking into consideration the bases of the scientific method and with an interdisciplinary character, should be developed by the different areas of knowledge» (López, 2004).

Regarding to the second classification, the author has attempted an approach between the logic of the scientific method and the training of the education professional from a dialectical materialist approach.

For Chirino (2002), problematization is associated with educational reality, understood as the perception of essential contradictions in the context of pedagogical professional performance, through the comparison of educational reality with the scientific knowledge and ethical-professional values that the subject has, which leads to the identification of pedagogical professional problems.

Theorizing educational reality represents «the search, application and socialization of the essential scientific knowledge to understand and explain educational reality, as well as assuming personal scientific and ethical positions that allow projecting it in an enriched way» (Chirino, 2002).

The research skill, verifying educational reality, corresponds to the permanent verification of the process and the results of the application of educational proposals that are scientific alternative solutions to the problems of educational reality, which allows evaluating their achievements and difficulties from scientific and ethical positions (Chirino, 2002).

The third classification responds to a profile of research skills, where the different skills that are central axis of research training are grouped in an interrelated manner.

This proposal is the result of the criteria of a group of experts and is based on constructivist theory with deep recognition of the active role of students in the individual and social construction of knowledge.

The first three groups bring together skills associated with cognitive processes, perception skills, instrumental and thinking skills. In the following cores, skills are incorporated into the profile «whose form of approach widely reveals the constructive approach from which the practice of research is understood in this study; these are the skills of conceptual construction, methodological construction, and social construction of knowledge» (Moreno, 2005).

Last core references metacognitive skills that metaphorically express«having reached intellectual majority, it is reflected in the way the researcher can self-regulate the processes and products generated while producing knowledge» (Moreno, 2005).

The fourth classification is supported by a pyramidal conception where a system of skills is structured based on the recognition of solving professional problems as the research skill with the highest degree of integration; while modeling, executing, obtaining, processing, communicating and controlling are defined as invariants or main actions of the integrating skill.

The research skill, solving professional problems, is defined as «the mastery of the action aimed at solving contradictions in the technical-professional environment with the resource of the methodology of science» (Machado et al., 2008).

In summary, it can be stated that the development of research skills allows the integration of knowledge, while serving as a support for constant self-learning because they facilitate the solution of the most diverse contradictions that arise in the labor and scientific scope, allow permanent self-training and the systematic updating of knowledge, and are an indicator of competitiveness in modern times.

Research training is designed from the curricular conception of the career, with an interdisciplinary approach and oriented for its materialization in labor-research practice.

The development of this form of organization of the teaching process must guarantee that the professional in training demonstrates mastery of the theoretical and methodological foundations of sciences, through the application and creative reconstruction of them, designs, executes and evaluates projects for the solution of problems detected in their professional performance contexts, permanently and personally reconstructs their professional practice based on the assessments made of their performance, as recognized by López (2004).

This author considers that in labor-research practice, professionals in training must face the diversity of situations presented in the educational institution, which guarantees their multilateral training.

The research training of professionals in training, based on what was stated by Alfonso (2005), reveals the development of a set of professional capacities and skills, of critical and reflective thinking, the performance of creative attitudes, the appropriation of cognitive and methodological resources, which allow the professional in training to detect, confront and seek solutions to the educational problems presented to them through research processes in articulation with teaching activity.

Thus, the scientific training of students involves the mastery of the system of general and specific categories of science and scientific research, the skills to use the general scientific method and the specific ones in handling information and research.

It is, also, to demonstrate in the research activity that they possess the set of values proper to scientific ethics, allowing them to appropriate new knowledge and skills that they will manifest in their creative activity (Valledor, 2005).

The historical-cultural approach has great strength in the Cuban educational field because it is the foundation of the research and methodological work carried out in universities, characterized by the diversity of approaches in relation to its conception.

One of the most important concepts of the historical-cultural theory is the concept of the Zone of Proximal Development (ZPD) by VYGOTSKY (1989), who starts from the general conception of development and uses it to explain the relationship between teaching and development.

This concept allows for more effective and truly developmental guidance for education; its operationalization in educational practice has become an unavoidable necessity, among other things, to be able to base that this practice is linked to the historical-cultural approach.

In the training of the pedagogical professional, from the Educational Model are considered the problems of the profession and the skills to be developed that will be useful in their educational function.

In professional problems of Bachelor's Degree in Primary Education, the use of scientific research for projecting solutions in educational practice is stated, as a way of professional self-improvement; and as a fundamental skill from the educational sciences and the subject that explains alternative solutions to professional problems based on the appropriation of knowledge, skills, values, the logicality of thought and the interdisciplinary approach, the use of information and communication technologies.

From the conception of the different curriculum plans, attention to SCW and the development of research skills has been projected. Below is an analysis of the projection of SCW in the current Curriculum Plan E.

In the first year in both versions (3 years and 5 years), it begins with the subject Introduction to Study Activity; then Educational Research Methodology appears, located in the three-year version in the second year and in the five-year version in the fourth; it will allow evaluating the transition in the research component. Both subjects end with a course work, laying the basis for students to choose the diploma work as a form of study completion. In the last year of both versions, class hours are dedicated to the Study Completion subject.

Students in the part-time course have the possibility to solve a problem from the bank of the institution where they work, although they can also research others assigned by the department. The results of their studies are relevant in science, and they will have the possibility to show their contributions in scientific conferences, events or publications. All this according to their stage of development and year within the career.

A significant aspect in the improvement process of higher education is the fact that all subjects in the curriculum must work to foster research skills. Each teacher has the responsibility to design tasks that develop study, the search for updated information, draw up strategies, pose problems and guide the use of scientific methods and techniques that lead the student to the path of science, but from a professional approach.

With the above, the intention has been to reflect on the importance of student scientific work from the training process, considering that it is necessary to deepen on the formation and development of research skills.

The authors understand that the training process of early childhood professionals requires strengthening scientific-research competencies to fulfill their educational role. It is not enough to know how to determine professional problems but also to be able to propose solutions, with the help of scientific

methods. The Professional Model has a coherent design, which must be complemented through extracurricular ways.

CONCLUSIONS

Student scientific work is conceived to favor the development of research skills in students. The educational model of Bachelor's Degree in Primary Education conceives the solution of problems of the profession and skills that will be useful in their educational function. It is about turning students into teacher-researchers, prepared to solve professional problems with the help of scientific methods.

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