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# BACKGROUND

## OF THE PREPARATION FOR THE PEDAGOGICAL PROFESSIONAL ORIENTATION IN THE PHYSICS EDUCATION MAJOR

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## OF THE PREPARATION FOR THE PEDAGOGICAL PROFESSIONAL ORIENTATION IN THE PHYSICS EDUCATION MAJOR

## ANTECEDENTES DE LA PREPARACIÓN PARA LA ORIENTACIÓN PROFESIONAL PEDAGÓGICA EN LA CARRERA DE FÍSICA

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ABSTRACT

In the article, a logical-historical study of the preparation for professional orientation was carried out during the initial training of students who will become Physics teachers for Secondary Education, which revealed the stages that constitute milestones in the study plans of the major. Empirical methods were used to carry out the study: interviews, surveys, review of study plans and other official documents related to the major and theoretical methods as: analysis-synthesis and induction-deduction were also used. The historical-logical method was used to reveal the transformations in the actions of preparation for professional orientation within the formative process of the major and to delimit the regularities and tendencies of its development.

Keywords:

Vocational guidance, initial training, education, physics.

RESUMEN

En el artículo se realizó un estudio histórico lógico de la preparación para la orientación profesional durante la formación inicial de los estudiantes que se preparan para profesores de Física para la Educación Media, que reveló las etapas que constituyen hitos en los planes de estudios de dicha carrera. Para realizar el estudio se utilizaron los métodos empíricos: entrevistas, encuestas, revisión de planes de estudios y otros documentos oficiales relacionados con la carrera. Del nivel teórico se utilizaron el análisis-síntesis e inducción-deducción. El método histórico-lógico se empleó para revelar las transformaciones en las acciones de preparación para la orientación profesional dentro del proceso formativo de la carrera y delimitar las regularidades y tendencias de su desarrollo.

Palabras clave:

Orientación profesional, formación inicial, educación, física.

## INTRODUCTION

Since the origin of universities in the twelfth century, their roles, functions and characteristics have changed in a continuous adaptation to the different circumstances of society. Its mission requires appropriating the constant movement that occurs in science, technique and technology and even more of the individual and collective needs.

For this, in Cuba universities are organized from a set of majors of various specialties, which are governed by a curriculum. One of its main documents is the Model or Profile of the Professional, which explicitly or implicitly expresses to where the processes of training and development of professionals or higher technicians are directed.

In particular, the training and development of professionals in pedagogical majors who deal with the teaching of Physics, is of vital importance for the improvement of the country, since they are the ones who are responsible, together with other teachers, of promoting scientific education in students, so that they should express in their values and attitudes the interest and motivation for being participants in the scientific and economic growth of the country. Therefore, it is necessary to achieve a more efficient and committed training process so that students, from the completion of their university curriculum, do positive influence in the process of professional orientation towards their students in high school.

In studies carried out in the province of Holguín, as part of investigations of the sectoral project "Impact of job training in the training of education professionals", the deficit of teachers of Physics at the secondary level was verified, while it is counterproductive that the admission to higher education in the pedagogical major directed towards Physics do not cover the plan of assigned capacities. For example, the major did not open in the 2016-2017 academic year due to lack of enrollment and currently, it is tiny and does not meet the requirements of the territory; some of the students even come from nearby provinces. This fact shows the need to deepen the preparation of students, who are involved in the Bachelor of Education major, on Physics so that they are able to contribute to reversing this situation.

In Cuba, one of the fundamental functions that teachers must perform is that related to educational guidance. The investigations of Alonso &Torres (2019); Alonso et al.(2019); and Peña et al. (2019), shows that, In general, the preparation of teachers to assume such a role is insufficient. One of the factors that influences is the insufficiencies that students drag from the initial formation in pedagogical major.

On the other hand, studies carried out on the preparation for professional orientation of secondary school teachers (Hermida et al., 2015; García & Despaigne, 2016; Cervantes, 2019) show the need for an approach to this aspect, from the initial formation of the major.

In normative and methodological documents, the preparation for professional orientation towards the major of Physics teachers is indicated, but in a fragmented way in the components of the curriculum. In the E study plan of the Bachelor in the major Physics Education refers that educational guidance is one of the tasks for which future teachers must be trained. It is related to applying vocational orientation strategies towards majors where physics plays an essential role, in particular towards their major, according to social needs, interests and possibilities of the students with whom they works.

The study carried out on the training process in the Bachelor of Physics Education major, allowed us to verify the following limitations:

- Students are not given some necessary tools that favor preparation for professional orientation towards their major.

- The preparation actions during the major are carried out in an unsystematic manner, which is why it constitutes one of the factors that contribute to the insufficiencies in the performance of the students during the work practice and once graduated.

- There are insufficient ways and forms to follow, in order to achieve, since initial formation, the preparation for professional guidance, in their future job.

- The scientific arguments of the preparation for the professional guidance as content of the initial formation are insufficient, due to its strategic importance of the formation, in the professionals, motives and interests towards the major in their scope. Taking into account the aforementioned, the objective of this study was to reveal the main historical trends of the preparation that students receive during the initial formation in the Physics teacher major, in Holguín, Cuba, to carry out the professional orientation towards their major, in the mid-level of education.

The importance of the study, is that it allows determining the positive aspects in the course of professional training during the transit through the different study plans, and what remains to be achieved, for adequate professional orientation in future, when they be working at schools of mid-level Education.

## DEVELOPMENT

A research, that combines the quantitative and qualitative paradigms, was developed, as part of studies that respond to the doctoral training program in Pedagogy, of the University of Holguín, Cuba, taking into account the analysis and arguments given in the main theoretical foundations, which supports the investigation on.

To carry out this work, methods of the theoretical level are used, in particular the analytical-synthetic, inductive-deductive and historical-logical methods, in addition, direct observation of the development of the teaching-learning

process; interviews and surveys to officers, students and professors of the major are done. Study plans; A, B, C, modified C, D and normative documents of study plan E, are taken as a sample.

To obtain relevant information about the particularities of the study plans, the following primary sources of information are explored: the testimonies of professors and officers with vast professional experience in the major, resolutions and normative documents, including the models of the professional. As secondary sources, Mendoza's doctoral thesis (2001), and Gómez's master's thesis (2002), among other materials and articles, are analyzed.

In order to carry out the trend study, the following indicators were taken into account:

- The curricular conception in the initial formation of the students of the pedagogical major of Physics teacher.

- The use of ways and means that can contribute to the preparation for the pedagogical professional orientation.

- Research works, on the preparation for professional pedagogical guidance, from initial training.

The trend analysis, carried out through the established indicators, made it possible to specify three fundamental stages in the preparation for professional orientation, from initial training. A first stage (1977-2009) when the training of the students to become teachers of Physics, begins and is perfected; a second stage (2010-2016) when the Labor and Investigative Training discipline is established and the professional problems for the major are considered; and a third stage (2017-2022) when professional pedagogical guidance begins to materialize from the model of the professional.

I Stage (1977-2009). Start an improvement of the training of the graduated of teachers of Physics

During this stage study plans A, B and C take place. The major takes various names in relation to the specialty: teacher of: Physics and Astronomy, Physics and Electronics and Exact Sciences. The curricular conception of initial training reflects an emphasis on mastering the knowledge and skills of physical and mathematical disciplines, student scientific work is introduced for the first time as a fundamental part of the training process of the future teacher and the principle of the link study - work is applied.

In the modifications of plan C, the subject "Educational Guidance" appears, which is worked in a very general way with a total of 20 class hours, no training content was conceived to contribute to the preparation of students for the deployment of this guidance function in the job training process in the spheres of action once they graduate.

The teaching practice is organized in different modalities and progressively gains space in the permanence of the students in the school of training, since the first semester in two academic years, to cover all the academic years in the last year of the major.

This component, structured in the form of a system, allows the progressive involvement of students in the development of specific activities of their profession, with the systematic application of the knowledge, acquired in the academic component. In addition, his practice helps him to detect problems whose solution is part of the investigative component.

At the end of this stage, the academic, labor and research components are included, with the labor component being the central axis of the preparation. However, no resolution, rule or regulation aimed to prepare students for orientation towards the major is recorded.

The culmination of studies is carried out by different variants such as: diploma work, state exams and professional exercise, where the student has to show, a court the scientific-technical and methodological domain of his profession. Throughout this stage no reference, to the extensive component, is made.

Traditional teaching methods are used, the ways and means that are used, prevent teachers from understanding the need to contribute to the link of their subject with professional orientation. During this stage, the preparation of the teacher has been studied by a considerable group of researchers from different angles, standing out among these: Abreu & García (2004); and Etkina (2005); Buller (2012); Boysen et al. (2014); and Boysen (2015ab), among others.

From a general perspective, Del Pino (1998), when addressing the incidence of teacher preparation for adequate professional orientation, bases that the pedagogical profession is eminently interdisciplinary, which is directly associated with the need for the interdisciplinary nature of teacher preparation. Recarey (2004), proposes a didactic model that promotes the preparation, of the comprehensive general teacher of basic secondary school in initial formation, in educational orientation contents, linked to the performance of the orientation function and López (2004), designs a methodology, based on a pedagogical model, to the evaluation of the labor-research component in the initial training of teachers, which can be used in all pedagogical majors.

Specifically, for the Physics teacher major, Gómez (2002), proposes an alternative to solve the insufficiencies of basic preparation, in relation to the physical contents, presented by the students who enter the specialty of Physics and Electronics teacher. For her part, Etkina (2005), proposes a preparation program for the Physics teacher based on teaching with the same methods that students should later use, knowledge of pedagogy, technologies and the recreation of environments that they will later face.

II Stage (2010-2016). Introduction of the Investigative Labor Training discipline and professional problems of the major.

At this stage, the major is called a Bachelor of Mathematics-Physics Education, with a curriculum that is characterized by receiving a dense program of Physics and Mathematics, which complicates the completion of the major for students. The labor linked with the investigative activity is strengthened, based on the discipline Labor and investigative training and the movement of assistant student. The culmination of studies is carried out with diploma work or a state exam, depending on the academic results of the student.

The labor practice is planned during the five years of the degree in the following way: during the first two years as systematic (carried out one day a week), in the third and fourth years, concentrated (carried out two weeks in a row in the second period) and in the fifth year responsible (carried out throughout an academic year period, with the direction of the educational process of a group) directed through the integrative discipline, Investigative Labor Training.

The extensions component and a document that contains a system of actions that coherently integrate the general aspects of the profession into the curriculum, which require the participation of all disciplines, complement the comprehensive training of professionals and contribute to: motivation for the profession, knowledge, the development of qualities, professional problems solutions, modes of action and fields of action of the professional.

Traditional teaching methods are maintained, the way used to prepare students is the class and the means used depend on the skills and experience of the teachers.

During this stage, investigators develop research works on the the professional orientation: Suárez et al. (2015); and Rodríguez (2016), among others. Pujols et al. (2014), addresses the need for teacher preparation in professional orientation towards pedagogical majors and the insufficient preparation of teachers and non-teaching staff to do a good job in this regard. For his part, Suárez (2015), makes an approach to the content of professional preparation for the direction of the teaching-learning process. While Rodríguez (2016), investigates the professional pedagogical orientation towards the degree in Mathematics-Physical education in the pre-university and proposes, as an ideal way, to achieve the training and development of the professional skills of students in initial training, through research job-practice, which is a way of applying the principle of link study-work, one of the guiding principles of Cuban pedagogy.

III Stage (2017-2022). Concretion of the pedagogical professional orientation from the model of formation.

The major is called “Bachelor of Education. Physics”. In particular, the new study plan E responds to the need of preparing Physics teachers separately from those of Mathematics, fundamentally due to major selection problems and the fact that the integrated training of teachers of these subjects together, requires an excessively dense plan, due to the amount of content that were considered essential in the professional training.

In the programs of the disciplines that pay tribute to the pedagogical professional orientation, with emphasis on the first years, such as Psychology, Pedagogy, General Didactics and General Physics, the work with the professional orientation does not explicitly appear, for which a methodological work is necessary, specifically in the subjects of the curriculum of the pedagogical group, to guarantee an adequate professional orientation.

As part of the Investigative Labor-Training discipline, there is a subject called Labor Practice, which is designed with a progressive increase in the complexity of the tasks that each student must execute, according with the type of practice that corresponds to them (systematic, concentrated or responsible). In such a way that, when the subject is finished, the student is in a position to assume, responsibly the teaching-learning process, with the students of Secondary Education, without the need for special supervision. So, the work in the educational center is the area in which the student contrasts, the theoretical preparation that he reaches and the practice that he carries out. The optional subjects “Vocational Training” and “Professional Orientation” are incorporated into the curriculum. The culmination of studies is done with a state exam or diploma work. The extension component is promoted with fixed and organized activities with the participation of students and teachers.

Traditional teaching methods are used, the most used form is the class, although actions are carried out to involve the students of the major as protagonists in “the day of the open doors” and in the recruitment of pre-university students to the pedagogical majors. Written means such as brochures, methodological guides and programs that support teachers to conduct preparation for professional orientation continue to be limited.

During this stage, the preparation was approached by researchers from different angles, standing out among them: Barrera et al. (2018); Guzmán et al. (2021).

Ruiz (2016), argues, as an important element of the training process, the methodological work of the team of discipline, in its preparation, the close relationship established with the tutors in the work of pedagogical advice, that they develop in the teaching units, as a place where the future teachers are linked with secondary students for the development of work practice, as well as the understanding of the scope of concepts such as: Integrating Main Discipline, integrating objectives, cognitive nodes,

integration, professional problem, integrated knowledge, interdisciplinary, which must be systematically treated by the work developed at the aforementioned levels.

Barrera et al. (2018), elaborate a pedagogical professional orientation strategy with a group approach, which contributes to the development of pedagogical professional interests in students from the first to the third year of the major of Mathematics-Physics teacher.

Martínez de Osaba et al. (2020), carry out a diagnostic study of professionalism in the Bachelor of Physics Education major, of the University of Pinar del Río "Hermanos Saíz Montes de Oca", which reveals that compliance with the established entry plans are not achieved and the enrolled students show low levels of motivation and identification with the specialty. They propose a model that aims to counteract the main educational needs that in the investigated context are found in the cognitive-affective, persuasive-guidance, investigative-technological and managerial-evaluative orders. For their part, Guzmán et al. (2021), propose a system of activities to increase the level of professional preparation and therefore strengthen vocational formation towards pedagogical majors.

The curricular conception in the initial formation of the students of the pedagogical major of Physics begins marked by the excessive academicism of the syllabuses, which hinders the specific formation of the teaching staff towards the guiding function.

As it goes through study plan C and then C modified, it includes the academic work and research components, with the work component being the central axis of its preparation and professional orientation is established as a priority, to improve the graduate's performance. The subjects that are introduced make it possible to address content that can prepare students for this purpose,

In the pedagogical field, Álvarez de Zayas (1999), expresses the importance of preparation: "to satisfy the need for preparation of the citizens of a society, it is necessary to train them… training is the process and the result whose function is to prepare the man in all aspects of the personality…. an individual is prepared when he can face the problems that arise in his job and solve them". (p.57)

For Abreu &García (2004), the process of training students for the sake of their comprehensive development goes through three levels: preparation, consolidation and projection. Preparation is a process in which the subject incorporates knowledge, values, ideals, convictions, attitudes and ways of acting. At this level the purpose of development is already contained. In the consolidation, based on what was acquired in the preparation, the necessary solidity is reached to favorably modify the student's mode of action. The last level represents development, in which all the qualities of the student's personality fully emerge during the performance in the various contexts.

Although the guiding function in the professional role of the teacher was institutionalized, in the design of the study plan E, training content was not conceived, to contribute to the preparation of students for the deployment of this function in the process of job training in the spheres of action after graduation.

In the second stage, which is described for the first time, a document appears that contains a system of actions that coherently integrate the general aspects of the profession into the curriculum, which require the participation of all disciplines, complementing the comprehensive training of professionals and they contribute to the motivation for the profession, the knowledge, the development of qualities and professional skills in the different modes and fields of action of the professional.

For the first time in the educational-teaching process, the extensions component appears.

Even when trying to perfect the study plan E, which appears in the last stage analyzed and is currently in force, it appears in the professional model, professional guidance within one of its functions, as a professional problem, and a program is elaborated for an optional subject of vocational formation and professional orientation, emphasizing professional orientation as a transition stage of this process and not as training content.

From the historical study, of the curricular conception, for the preparation for professional orientation, since the initial formation of the students of the pedagogical major of Physics, the following trend of the behavior is found:

ØFrom an insufficient recognition of professional orientation in the curricular design as a formative content of the major, up to its identification as a professional problem to be solved; without even achieving its methodological concretion from the pedagogical and disciplinary teams.

The ways and means that can contribute to the preparation for professional orientation used in the different stages prevent teachers from understanding the need to contribute to the link of their subjects with professional orientation, they continue to work with traditional teaching methods, and there is few means of support for teachers that facilitate its materialization in practice.

From the historical study of the ways and means that can contribute to the preparation for professional orientation, it was possible to reveal the following trend of behavior:

ØAn insufficient implementation of ways and means for the introduction of the contents of professional orientation, towards an integration in the actions of the academic, labor, research and extension components, which respond to the achievement of adequate preparation of future teachers for fulfill this role in their work setting.

In addition, a study of the epistemological assumptions that support the preparation for the pedagogical professional

orientation, from the initial training in the major that trains Physics teachers was carried out. The research carried out, in Cuba, on the process of preparing teachers and students for pedagogical professional orientation reveals the following characteristics: It is recognized that secondary school teachers are not prepared to carry out this task, which must be addressed from the initial state of the major, there is extensive information on major guidance as a transition stage through the university, in the review of master's and doctoral theses of higher education, it does not show evidence of the approach to preparing for major guidance towards majors that form Physics teachers. On the other hand, in the revision of the normative and methodological documents, some of their contents appear in a fragmented way in the components of the curriculum, In the Investigative-Labor Training Discipline in the Teaching of Physics, the process is directed more accurately by addressing actions and activities that students must carry out as part of their training as counselors. The leading role is given to the Didactics of Physics, where the mode of professional action is systematized and developed; and is specified from the educational projects of each academic year.

Deepening the study reveals the following regularity:

Ø The investigations that address the preparation for professional pedagogical guidance, in some of its aspects, can be taken into account to prepare students for Physics majors, but they do not argue how to integrate training actions and take advantage of the potential of the pedagogical process itself of said major to develop professional guidance as formative content.

## CONCLUSIONS

Two trends and a regularity were determined in the historical evolution of the preparation for the professional orientation of the students of the pedagogical major of Physics, which facilitate a better identification of the achievements and challenges to be faced in this process. The trends correspond to the recognition of professional orientation in the curricular design as a formative content of the major, and the ways and means that are used. The regularity is specified in the insufficient theoretical approach in scientific research related to the subject.

The analysis carried out reveals the following characteristics:

Ø Irregularities in the subjects of the study plans to contribute to the preparation for professional orientation.

Ø Unsystematic intentionality in the training model about preparation for professional guidance;

Incoherent treatment of the preparation for professional guidance as training content in initial training, which guarantees the good comprehensive performance of the graduate in his work scenario.

Ø Limitations in the ways, actions and means that are used in the preparation for pedagogical professional guidance as training content.

Among the main challenges to be overcome in this process, it was considered to develop new theoretical-methodological constructs that facilitate the work of teachers, such as: strategies, methodologies or action systems based on preparation for professional orientation.

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