

MOTIVATION FROM THE PHYSICS SUBJECT IN THE NURSING TECHNICIAN CAREER

LA MOTIVACIÓN DESDE LA ASIGNATURA DE FÍSICA EN LA CARRERA DE TÉCNICO MEDIO SUPERIOR DE ENFERMERÍA

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Reception date: February 10, 2025

Acceptance date: March 30, 2025

ABSTRACT

The teaching-learning process of Physics requires a diverse approach, which takes into consideration the students' motivational aspect, as well as the elements relating contents with their respective careers, in order to promote a major learning. This implies strengthening the relationships between what is taught, the affective world of the students, knowledge, theory and practice. This study is a proposal of teaching tasks to encourage the students' motivation to study physics in the nursing career in Moa municipality. To fulfill this purpose, several methods and techniques were used such as theoretical, empirical and

mathematical-statistical method. This proposal helps students to improve understanding related to physical concepts and developing a deeper appreciation of Physics and its relevance in the world around them.

KEYWORDS: teaching-learning process; exact sciences; motivational interests

RESUMEN

El proceso de enseñanza-aprendizaje de la Física requiere un enfoque diverso, que tome en consideración el aspecto motivacional de los estudiantes, así como los elementos que relacionen los contenidos con su respectiva carrera, para propiciar un aprendizaje significativo. Esto implica potenciar las relaciones entre lo que se enseña, el mundo afectivo de los estudiantes, los conocimientos, la teoría y la práctica. Es por ello que, se propuso la elaboración de tareas docentes para incentivar la motivación por el estudio de la asignatura de Física en la carrera Técnico Medio Superior de Enfermería en Moa. Se emplearon para el desarrollo de la investigación diversos métodos y técnicas, tales como: los métodos teóricos, empíricos y matemático-estadísticos. Esta propuesta facilita que los estudiantes comprendan mejor los conceptos físicos y que desarrollen una apreciación más profunda por la Física y su relevancia en el mundo que les rodea.

PALABRAS CLAVE: proceso de enseñanza-aprendizaje; ciencias exactas; intereses motivacionales

INTRODUCTION

The rapid pace imposed on social processes by the development of contemporary science and technology, consequently leads, deep transformations in the teaching-learning processes of the exact and natural sciences. This compels education to propose actions, alternatives and educational strategies that prepare individuals for life.

Physics is an exact science whose object comprises the study of most general and fundamental laws of nature. When approached from a logic corresponding to the teaching-learning process, its own object of science is its object of study; that is, it examines each of natural phenomena with an educational-teaching purpose, introducing students to a conducive environment to their preparation and updating about scientific-technical knowledge.

Therefore, the teaching of Physics requires a diverse approach, that considers as a motivational aspect for students, those elements that relate the subject with their respective career and promote meaningful learning. This involves strengthening the connections between new content, the students' affective world, knowledge, theory and practice.

In this sense, motivation is a relevant element in school learning, manifested in the teaching-learning process through a positive attitudinal climate, essential for fostering greater stimulation for studying Physics.

The teaching-learning process of Physics contributes to the understanding of several processes occurring in living beings and it's particularly important for students in training, as it provides them with basic knowledge that enables the comprehension of such processes, even when motivation for study involves social needs such as: responsibility, the duty to study, preparation for future social life and professional intentions, it is necessary for the teacher to consider individual needs, cognitive interests, the need for intellectual activity and social recognition of students.

In the specific case of Physics teaching, one of the most important incentives for learning is that which awakens students' cognitive interests and intellectual activity. Hence, it is the teacher's task to make the class interesting, promote successful intellectual activity, and evoke positive emotions that reinforce what they have learned and lead them to an active attitude of knowledge seeking.

The above demonstrates the need for transformations in the teaching-learning process of Physics, contextualized contributions to the current educational reality, thereby allowing for increased demands and the setting of high goals in the educational system, based on student motivation towards the activity's objective, maintaining their perseverance, so that it positively impacts their intellectual behavior and mood.

Many authors have researched and contributed to this topic, in this sense, international figures include: García-Carmona (2006); Aparicio (2014); Núñez (2021); de las Mercedes et al. (2023).

Their researches are directed towards conceptions about the purposes of Physics and its role in technology, activities to foster motivation in studying this science, to motivational factors affecting its teaching, as well as motivation and its relationship with learning and strategies that strengthen its study.

Likewise, at national level, key references are: Santiesteban, Pérez & González (2016); López et al. (2020), Rojas-Noriega et al. (2020), who direct their studies towards motivation in the teaching-learning process of Physics and the proposal of teaching tasks for the learning styles of this subject.

Previous research has supported this study, as some aspects have been used to theoretically and methodologically base the proposal. However, the need to deepen this topic at the Medical Sciences Branch in Moa persists, as the analysis of the preliminary diagnosis and the researcher's professional experience, over 20 years of work, have corroborated that the following shortcomings are evident in educational practice:

- ✓ Insufficient motivation for learning Physics.
- ✓ Limited connection of Physics with the content of the Nursing Technician career program.
- ✓ Scarce use of motivating didactic resources, which hinders student comprehension in the study of Physics.

Consequently, the objective guiding this work is the development of teaching tasks to encourage motivation for studying Physics in the Nursing Technician career in Moa, Holguin province.

DEVELOPMENT

The teaching-learning process is the space where direct relationships between the participating subjects are concretized and established; it also takes place during school subjects, and has the essential purpose of contributing to the comprehensive formation of the student's personality, constituting the fundamental mediating path for the acquisition of knowledge, procedures, behavior norms, and values bequeathed by humanity (Rico, 2002).

Therefore, the teaching-learning process must be integrated with educational transformations, which demand changes in the individual and collective preparation of teaching staff: they hold the greatest strengths that universities have to address problems and current contradictions, and promote changes in pursuit of educational quality.

From this perspective, Soler et al. (2022) point out that the teaching-learning process is complex, as it involves multiple variables, that must be measured to seek continuous improvement and the transformation of the learner.

Research conducted in recent years has demonstrated from their different perspectives and investigated themes, that to achieve personality development in learners by elevating the quality and rigor of these processes, it is necessary to implement educational change based on developmental teaching-learning; processes supported by Vygotsky's (2021) historical-logical-cultural approach, based on the author's own learning theory, which has the zone of proximal development as its essential concept, exhorting that education always be one step ahead of the learner's development, inciting, provoking, and stimulating through the guidance of learning; and the zone of actual development, valued as the acquisitions, achievements, and knowledge the student possesses in pursuit of cognitive independence.

However, in the systematization carried out, this conception of the teaching-learning process reveals the need to deepen on the fundamentals that require thorough analysis and precision from didactic, philosophical and psychological perspectives, for the efficient functioning of the human personality, given since the social mission that universities currently hold.

From the didactic and philosophical point of view, the teaching-learning process involves the relationship between its components: objectives, content, methods, means and evaluation; developing within the conceptual environment of phenomena, models, quantities and fundamental physical's laws.

According to the researcher's criteria, it is essential to reflect on this approach to the teaching-learning process, as it starts from the didactic component of problem, that is, the progress achieved by the student and the dialogue of collective activity, which promotes the maximum possible development of the potential of their personality.

In this sense, the teaching-learning process of Physics subject is an essential path for acquiring knowledge, behavior norms and values, as it provides the student with a more complete scientific conception of the world.

In this process, the student appropriates different elements of knowledge such as concepts, laws, theories, and subject content, actively, through a process of interaction with the teacher and other students, fostering learning.

From the logic corresponding to the teaching-learning process, Physics is the science whose object constitutes the study of the most general and fundamental laws of nature; it studies each natural phenomenon with an educational-teaching purpose, introducing the student to a conducive environment to their preparation and updating of the scientific-technical knowledge they must possess.

Likewise, Physics didactics, developed under the dialectical principle of theory-practice unity, performs educational and scientific functions simultaneously. The proper unity of this relationship requires a paradigm shift in pedagogical practice, that is, changing the paradigm of traditional pedagogy, mechanical-Cartesian to the Historical-Cultural paradigm; model of active student, seeking to guarantee students activities that provide the development of scientific knowledge, the acquisition of skills and habits: the only good teaching is the one that advances to development.

In the consulted literature about the topic: Ramos et al. (2012), García (2020), Vega & Oliva (2023), Lino-Calle et al. (2023), García-Septien et al. (2024), reflect approaches concerning Physics didactics, its teaching from an interdisciplinary perspective, experiences for the teaching-learning process of Physics during COVID-19, and this subject with a propaedeutic solution in distance education.

Supported by these conceptions, the construction of new scenarios is possible, imposing the challenge on teachers' work, in and from their own practice, which means, among other aspects, the willingness to elevate the cognitive performance of their students in pursuit of their investigative and creative attitudes.

Hence, Physics subject, as a purely experimental science, aim to a change in the conception of teaching-educational activity, giving special treatment to the practical-experimental component, so that it contributes to student formation, which is endorsed by the use of methods and means that point towards a new conception for methodological work.

This becomes possible when students intervene based on theoretical assumptions in the planning of experiments or activities they carry out, and in turn, are capable of appropriating the method and reconstructing knowledge based on their phenomenological interpretation and metacognitive considerations.

In the researcher's opinion, the teaching-learning process of Physics should be organized so that students perceive that theoretical knowledge guides practical activity, and the latter is the criterion for the validity of their ideas.

This is because the training of university students today is called to develop creative thinking, in addition to the capacity to assimilate new knowledge from several sources and know how to use them in practical activity.

Considerations on Motivation in the Study of Physics

The term motivation originates from Latin, the verb moveré, translated as to move, set in motion, or be ready for action; according to the Real Academia Española (1942), it is a set of internal or external factors that partly determine a person's actions; thus, motivation stimulates and energizes the individual to act in a particular way.

In relation to the term, Nussbaum (2012), cited by Ardila & Álvarez (2020), alludes from the capability's theory, that every human being is capable of developing abilities not only leveraged on achieving material and knowledge elements, but also focused on achieving their well-being, exploiting their capabilities towards achieving educational objectives and having an active social participation that leads to their well-being.

Therefore, motivation should be directed to generate in the student the desire to learn, through the development of inclusive strategies that support them in building their own knowledge, including affective factors, and a positive orientation towards achieving goals and aspirations. In this sense, the teacher's role is essential to activate these factors during each stage of the educational teaching process.

Consequently, motivation and learning in physics are closely linked to the uplift of gestated experiences through the relationship between teacher, student and environment.

The focus of this research is directed to motivation and learning in physics, supported by Bisquerra (2016), Nevarez & Intriago (2021), Arboleda (2023), de las Mercedes et al. (2023), who provide reflections, professional experiences and research, relations between these categories and strategies to strengthen the subject in a motivating way.

Physics teacher should encourage their students to approach physical phenomena naturally, designing experiences with easily accessible resources found in their environment, whenever possible, since Physics is a fundamental science that describes, interprets and understands natural phenomena; for this reason, experience and theory must coincide for progress to occur.

Thus, the teaching-learning process of Physics should begin with determining student's prior knowledge, both theoretical content and experimental techniques and procedures, to be able to carry out a programming and planning of the well-structured subject and as viable as possible.

In such a way, teaching and learning models must be guided and restructured according to innovative alternative didactics, where objectives, content, materials, resources, and organization are influenced by relationships between educator and learner, and among peers; in faster communication environments, supported by technologies and virtuality Pando (2018).

From the above, it is affirmed that a motivating way to teach Physics is with the efficient use of digital technologies, thus, achieving the consolidation of the student's cognitive development.

MATERIALS AND METHODS

For the purposes of this research, the proposal had a population represented by the 110 students of the Medical Sciences Branch in Moa and a sample of 40 first-year students.

The following methods were considered in this research process: theoretical methods, empirical, as well as mathematical-statistical methods, among which the following stand out:

Theoretical Level Methods

Analysis-Synthesis:

used for the analysis of related documents to the object and field of the research, which made it possible to reveal the main research contributions, and then in a synthesis process the information obtained was interpreted.

Historical-Logical:

for determining the main trends of the teaching-learning process of Physics and its historical evolution.

Induction-Deduction:

used for the study of normative documents and consulted bibliographic sources on the topic addressed.

Empirical level methods

Observation:

during class visits and teaching inquiries, to verify the main regularities of Physics teaching-learning process.

Document analysis:

used to consult bibliographic sources, resolutions, curricula, and other normative documents for the teaching of Physics.

Survey:

applied to students and teachers to assess motivation for studying Physics and to verify the main causes and limitations they present for its fulfillment, as well as to analyze the main regularities of the teaching-learning process of this subject.

Interview:

applied to teacher of this career to know the theoretical and methodological mastery they have about the teaching-learning process of Physics.

Statistical level methods

Descriptive Statistics Methods:

mean, median, sum to construct tables and graphs in different studies carried out during the research process.

Percentage analysis:

to process the obtained information.

Teaching Tasks to encourage motivation for studying Physics in the Nursing Technician Career in Moa

To promote lasting and meaningful learning based on motivation for studying Physics, teaching tasks are developed. These are characterized by integrating Physics content with the career these students are studying.

For their elaboration, the author subscribes to what was proposed by Aparicio et al. (2020), who states: «(...) the teaching task is the action that, attending to certain objectives, is developed in certain conceptions (...)» and further affirms «(...) The teaching task, understood as the basic cell of the teaching-learning process; is the action of the teacher and the students within the process that takes place in pedagogical circumstances in order to achieve an elementary objective».

In this sense, the proposed teaching tasks allow increasing student motivation. They are conceived not only as a space for knowledge transmission but also as active and interactive learning spaces, with the creation of conditions and support that will facilitate students' access to new levels of cognitive development.

Teaching Task 1: Practical project

Objective: to conduct simple experiments so that students can observe and participate.

Procedure: demonstrate simple experiments to students about physics principles using everyday materials.

Organization: group work. In-class experiments.

Elements to consider: law of conservation of energy using pendulums.

Teaching Task 2: Physics and everyday life

Objective: to motivate students to the study Physics through the exemplification of real cases.

Procedure: students present a case study of real situations where physics is applied, such as: the operation of cars, airplanes, or even natural phenomena like earthquakes.

Organization: individual work.

Elements to consider: physical and natural phenomena.

Teaching Task 3: use of technology

Objective: to demonstrate the use and application of software that simulates physical phenomena.

Procedure: conduct interactive simulations in the classroom using software or applications that simulate physical phenomena so that students can experiment virtually without expensive equipment.

Organization: individual work.

Elements to consider: use of educational videos that explain physical concepts in an entertaining and accessible way.

Teaching Task 4: Challenge

Objective: to develop problem-solving skills or challenges related to physics through play.

Procedure: create two teams in the classroom with scenarios where students must assume roles (such as scientists and/or engineers) to solve problems using physical concepts. Group challenges can be used. Organization: team work.

Elements to consider: problem solving using physical concepts.

Teaching Task 5: Subject integration

Objective: to foster interest in Physics through interdisciplinary integration.

Procedure: create joint projects with other subjects such as mathematics or biology, to show how physics integrates into different fields of knowledge.

Organization: group work.

Elements to consider: Physics topics from different subjects.

The Expert Judgment method was used to corroborate the feasibility of the teaching tasks presented above; it concluded that the proposal has scientific-methodological value for the teaching-learning process of Physics in the context of Nursing Technician career students.

Furthermore, in the analysis with specialists, they highlighted the viability of the teaching tasks as they conceive in their internal structure the components that encourage motivation for studying Physics and energize the teaching-learning process in these students.

CONCLUSIONS

Physics plays an active role in the cognitive development of students, as it fosters meaningful learning with an educational-teaching purpose to understand natural phenomena. The proposed teaching tasks not only facilitate a better understanding of physical concepts for students but also help them develop a deeper appreciation for Physics and its relevance in the world around them; furthermore, they constitute an ideal way for the process of teaching, learning, and instructing from the Physics subject, to develop with the help of contextualized, flexible, and collaborative didactic resources.

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