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Educación del talento mediante la física como texto cultural que media entre la realidad cotidiana y los estudiantes

Talent education through physics as a cultural text that mediates between everyday reality and students

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Palabras claves:
Educación, Talento académico, preparación docente

Resumen

En este artículo se revela como problemática la insuficiente preparación de los docentes para asumir, entre sus objetivos, la educación del talento académico de los estudiantes desde la Física. Se presentan herramientas al docente para su preparación en la educación del talento académico de los estudiantes, a partir de nuevos fundamentos semióticos que permiten darle cumplimiento al objetivo: utilizar los códigos culturales y cotidianos para la motivación intrínseca de los estudiantes, se proponen principios, definiciones en que este se sustenta, así como sus elementos condicionantes, dimensiones e indicadores, que se concretan mediante las orientaciones metodológicas.

Keywords:
Education, Academic talent, teacher preparatory

Abstract

In this work, the insufficient preparation of teachers to assume, among their objectives, the education of students' academic talent of Physics, revealed as problematic. Tools are presented to the teacher for their preparation in the education of the academic talent of students from new semiotic foundations that allow the use of cultural and everyday codes to motivate them intrinsically, principles, definitions on which it is based are proposed, as well as its conditioning elements, dimensions and indicators, which are specified through methodological guidelines.

Introduction

One of the most important goals of education is to promote potential of all students so that they achieve maximum academic and personal development throughout their schooling, for which the necessary conditions must be created from teaching. It is precisely from this perspective that the education of talent in students it takes on special relevance.

The education of students' talent is sometimes poorly attended to by the education system, because little differentiated help is provided. At the same time, The partial and biased interpretation of the notion of higher students prevails, understanding it only in the case of subjects who, due to their special circumstances, are

disadvantaged and have greater difficulties in benefiting from school education. However, contrary to what is often thought, it is not easy to organize an educational system tailored to the needs of talented students, in addition, They, to a large extent, have not felt that studying activities were something rewarding and meaningful in life.

It must be reflected in the educational work strategy of the centers, the orientation adjusted to the needs of the students' talent that must be planned, developed and evaluated with rigor. This is an activity that requires and generates processes collaboration between teachers, students, the institution and families.

The international scientific community is paying increasing attention to this problematic. Among the authors consulted, at the international level, are: Rubinstein (1972) highlighted the relationship between genius and talent; De Bono (1974) who proposes procedures to stimulate creativity; Renzulli (1992), proposes a cognitive model of talent; Silverman (1993) and Aleçar and Spoza (2001), typify the interindividual differences in cognitive and learning styles; Gagné (2007) makes a cognitive proposal focused on knowledge and skills; Aroça (1974) states that to achieve success a high volitional effort is necessary and to use one's skills; Tannebaum (1993); and Mönks and Van Boxtel (2003) extend the model of Renzulli including the social context.

In Cuba, in the last years of the 20th century, various investigations have been carried out aimed at establishing and implementing alternatives to address talent and students' creativity (Lorenzo, 1996; Córdova, 1996); Castro, 1997; Amechazurra, 1999; Ávila, 1999); Gallardo, 2000; War, 2001; Martínez, 2001; Perez, 2002; Castellanos, 2003; Campos, 2007; Lopez, 2008; Delgado, 2011; Lorenzo, 2012). These investigations are aimed primarily at primary and secondary education. secondary school; while in the pre-university only the preparation of students, who participate in knowledge contests.

In the province of Mayabeque, it was found that everything related to customer service Academic talent in students was fundamentally reflected in activities of preparation for national and international competitions, in addition, students were little motivated by studying.

Development

In recent decades, there have been several authors who have conducted research from Physics taking into account the cultural dimension from different fields of study. Among these researchers are Valdés. R and Valdés. P (2001), who initiated the study of creativity from Physics in Cuba. In their article published in the magazine Varona, they state that the most general objective of education is to communicate to the new generations the main elements of the accumulated historical and social experience (knowledge,

experience in carrying out actions, attitudes and general standards of conduct), to transform the socially significant into personal meanings. They express that it is not enough for the teacher to exhibit social meanings with his actions.

These authors argue that knowledge of Physics is part of everyday culture, but they take as an object of study the content of science, in correspondence with that of the culture of society, andIt is essential to demonstrate that in the students' activity these meanings must be integrated with the personal ones, that the social historical experience is connected with the personal one. They emphasize the use ofthe experience accumulated in research activity (essentially creative) and the attitudes and standards of conduct typical of men who are dedicated to scientific research. His didactic proposal has been argued fundamentally from the theory of activity, significant learning, the historical-cultural approach and is concretized in the class and in the classroom, from these theories, in breaking down the proposals into the general steps of an investigation in order to refute hypotheses, demonstrating some ways or forms of doing scientific research.

Although the arguments and some stages coincide, especially the research stage, they do not delve into how the academic talent of pre-university students can be stimulated from Physics, using the everyday context as content to be problematized.

Another author turns outPérez (2001) states that the main contribution of his research is given in that the analytical-synthetic and generalization processes are revealed under a new perspective, by delimiting their dialectical relationship with the creative potential of adolescents in the context of the PEA of Physics, presents a model characterized by the classification of qualitative and quantitative problems, which allowed to reveal the place of such types of problems in the learning of sciences and established a methodology that integrates stimulation to the solution of problems and the didactic resources that serve as support to the generalization process.

This model has an interesting cognitive proposal, but it focuses only on one of the dimensions of the education of the academic talent of students from Physics, addressed in this research.

A research that declares the cultural dimension is that of Colado (2003), who raises the need to transform educational practice, with a concrete and feasible proposal for renewing the conception of experimental activities as an enriching application of the innovative strategy of the teaching-learning process of sciences in its three-dimensional nature: conceptual, procedural and attitudinal, in terms of the treatment of problematic situations and the systematization of observation and experimentation at the secondary level.

This author takes the development of attitudes from the cultural dimension and focuses on experimentation, creating learning situations based on certain classroom conditions,

not coinciding in the field with the daily cultural dimension of the student's academic talent, to which current research refers.

Pedroso (2008) presents a proposal that allows the coherent structuring and organization of courses in different subjects in better correspondence with the current sociocultural context and the new model of the professional who aspires to be a teacher of exact sciences. He concretizes his research in the school practice of new objectives and contents, focused on a real social and humanistic vision, for the teaching of Physics as a decisive and enriching element in the training of teachers of this discipline. His research is focused on the curricular design and the use of ICT, not on the education of the academic talent of pre-university students from Physics.

Travieso's research (2008) aims to explain the formation of comprehensive general culture: the conceptual systematization of the theoretical foundations around the development of scientific culture from the establishment of essential relationships between the components of the teaching-learning process of Physics and scientific culture, supported by the investigative approach and developer learning, demonstrated in a coherent way in the educational practice of the teaching-learning process of Physics.

Its purpose was not to develop problematic projects in the daily sociocultural context of the student in order to develop the education of the academic talent of pre-university students from Physics.

Vega (2010) shows a strategy that pays tribute to the teaching of Physics in the training of Mathematics and Physics teachers for secondary education, based on modeling the teaching-learning process of the subject Fundamentals of School Physics II, in order to contribute to the improvement of scientific education, expressed in actions of the teacher for teaching and of the student for learning.

It is a cognitivist proposal in which the daily sociocultural context of the student in training is not taken into account for the education of the academic talent of pre-university students from Physics.

Suárez (2017) presents an integrative didactic model, based on the precisions achieved in the teaching-learning process of Physics from an integrative and interdisciplinary perspective in the IPVCE, contributing to the level of cognitive performance of the student through the dynamics of the PEAF. In this research, the teacher continues to offer the problems, it is not the student who identifies the problems in their daily context.

These investigations do not argue for Physics as a cultural text that mediates between everyday reality and students, they generally use culture in a generalized way as content that must be integrated into Physics and not as everyday culture that must be taken to

processes of generalization and theorization as forms of stimulating academic talent from Physics..

In addition to these investigations, the methodological guidelines of pre-university Physics (MINED, 2016) reaffirm the cultural orientation of its teaching-learning process, raising the importance of the contents of this discipline for the culture of the students, given its significance for the development of humanity, particularly in contemporary conditions, in which we are not only surrounded by a "constructed world" of high technology, but the typical ways of acting of the research activity of the exact and natural sciences have penetrated all spheres of society's activities.

In the MINED pre-university education study plan (2016), objectives are proposed related to problem solving on the facts, phenomena and processes that occur in nature, linked to daily life and professions, with a transformative, responsible and evaluative performance, establishing interdisciplinary links and creatively using means and methods of study and scientific research, especially information and communications technologies as a means of learning and work tool, in correspondence with their level of development and individual particularities.

In order to solve these problems related to everyday life, it is necessary to understand the cultural dimension of education in order to contribute to cultural orientation through education. According to Lotman (2005), culture is information, and as such depends on human consciousness. He emphasizes that the “objects” of culture are both subjective and conscious by nature. Therefore, reality provides material for cultural objects and is also at the same time an object of cognition.

Lotman (2005) states that culture is a semiotic system, which he called semiosphere, in this model the relationships between the parts and the whole of culture are dynamically represented, he states that it is composed of those systems based on natural language as primary modeling systems that acquire additional superstructures in the form of secondary languages that can be called secondary modeling systems or metalanguages (mathematics, physics, art ...), and as part of the everyday culture that mediates the development of personality, they allow to model human behavior. He called these modeling systems or metalanguages cultural texts.

These modelling systems intervene in the student's development through daily cultural mediation in an empirical way and pedagogical mediation composed of the treatment of content and methods of the different subjects in order to make the educational act possible, within an education conceived from participation, creativity and expressiveness. Languages, social texts, metalanguages, new and old representations, imaginaries, educational, social, economic, work, family and personal conditions are interwoven in it. Barnett (2000)

It is in the curriculum of the educational institution where this mediation is concretized through educational projects that reveal how the school or school group should be to fulfill its social mission; it starts from the diagnosis of the contexts and subjects participating in the educational work and integrates all their aspirations regarding the education of the students and the activities to achieve them.

To achieve this, it is necessary to theoretically base mediation as a complex process, since it reveals processes and situations of a cultural, communicative, formative, technological and organizational nature that must be taken into account for its understanding and application, requiring the teaching staff that produces pedagogical mediations to work transdisciplinarily in order to be successful.

Mediation is a cultural process and establishes the relationships between reality and the academic talent of students to understand this reality by forming new creative criteria for it.

Knowledge is a media representation, it models in one way or another the fundamental elements and relationships of a certain field, allowing the discovery of nature, society and thought. In other words, it is the way in which reality is perceived, it promotes and directs human activity, which builds the social and cultural order.

Within the consulted models, Castellanos, D (2003), Lorenzo (2010), and Vera, N (2011) can be seen the psycho-pedagogical mediation that starts from the foundations of Vygotsky (1989), who states that the student, when interacting with historical-cultural products, appropriates an entire culture; but at the same time his own cognitive development is modeled and reflects the social and cultural structures of his environment. Through joint activity, the student goes from what he knows how to do to what he cannot yet do alone, that is, "the zone of proximal development (ZPD) is defined as the difference between the current development of the person, as determined by an independent problem-solving task and the highest level of potential development as determined by problem-solving under the guidance of an adult or in collaboration with more capable peers" (Vygotsky, 1989: 122)

Note that, in this definition, emphasis is placed on help from another person, which is reaffirmed when it is stated that “an essential aspect of learning is that it creates the ZPD, that is, learning awakens a variety of development processes that are capable of operating only when the student interacts with other people in his or her environment and with his or her peers” (Vygotsky, 1978: 90).

Determining the ZPD allows us to determine what characteristics intervention programs should have, with actions aimed at enhancing, modifying, and reorganizing psychological development, based on the principles of individualization and personalization of the

pedagogical response based on the needs and potential of each student. Its content is made up of resources, supports, and aids that should stimulate each individual to reach their maximum development (Gayle, 2002).

Through instruction, the teacher provokes in students advances that would not occur spontaneously, giving life to those functions in the process of maturation in the area of potential development. This type of help focuses on cognitive, metacognitive and playful processes, which favors a mostly extrinsic motivation; it benefits dynamic diagnosis, whose mediation is given in the characterization of the level of knowledge of the curricular contents, which due to their static condition limit intrinsic motivation.

Another aspect of mediation is its semiotic analysis, analyzing physics as a cultural modeling system and also as a metalanguage, which is achieved as significant learning from the problematic situations of daily life, in transdisciplinary fields that surround the social and communicative relationships of students, which would contribute to intrinsic motivation and deep commitment to the task.

Lima, Morin and Nicolescu (1994) declare that the transdisciplinary vision is definitely open in that it transcends the field of the exact and natural sciences, encouraging them to communicate and reconcile not only with the humanities and social sciences but also with art, literature, poetry and other spiritual experiences, without ceasing to possess rigor in argumentation, taking into account all available information, as the best barrier against any possible distortion. It implies openness, acceptance of the unknown, the unexpected and the unpredictable, tolerance as recognition of the right to exist of ideas and truths that are opposed to our own.

Conclusions

In this article the theoretical elements have been analyzed, which are summarized in the following aspects:

- From the dialectical materialist approach, theEducation, as a complex system of influences, in which the whole society participates, which, as a general rule, the existing social relations act as processes of cooperation, social communication and social mediation, in which men play the role of active and creative subjects.
- Science that deals with the transformation of human beings must engage in interdisciplinary and transdisciplinary dialogue with other sciences that contribute to this objective through different aspects in order to support the growing needs of current development.
- The category of academic talent is assumed to be a qualitatively superior psychological formation with an emphasis on a cognitive approach where

cognitive and socio-affective learning styles, skills and abilities are integrated, and creativity constitutes a dimension of this formation.

Conflict of interest

There is no conflict of interest in relation to the submitted article.

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