

The interdisciplinary-curricular-virtual principle in the teaching-learning process in professional formation

El principio interdisciplinar-curricular-virtual en el proceso de enseñanza-aprendizaje en la formación del profesional

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Date of reception: October 17, 2020.

Date of acceptance: November 29, 2020.

ABSTRACT

This article aims to analyze the incorporation of digital technology in the professional training process related to the creation of new dynamics in the integration of academics, work and research. The analysis is carried out from the technological, organizational and training perspective proposed by the current models for the virtualization of substantive university processes in Cuba. Theoretical methods were used in order to carry out the analysis and synthesis of documentary and bibliographic reviews on the subject studied. From the development of the analysis carried out, a principle emerges that is called Interdisciplinary-Curricular-Virtual.

Keywords: Interdisciplinary-curricular-virtual principle; Professional formation; Teaching-learning process; Interdisciplinarity

RESUMEN

Este artículo tiene como objetivo analizar la incorporación de la tecnología digital en el proceso de formación profesional relacionado con la creación de nuevas dinámicas en la integración de lo académico, lo laboral y lo investigativo. El análisis se realiza desde la perspectiva tecnológica, organizativa y formativa que proponen los actuales modelos para la virtualización de los procesos sustantivos universitarios en Cuba. Se emplearon métodos teóricos a fin de realizar el análisis

y síntesis de revisiones documentales y bibliográficas sobre la temática estudiada. A partir del desarrollo del análisis realizado, emerge un principio al que se denomina interdisciplinar-curricular-virtual.

Palabras clave: Principio interdisciplinar-curricular-virtual; Formación del profesional; Proceso de enseñanza-aprendizaje; Interdisciplinariedad

INTRODUCCION

The university environment in Cuba is showing significant transformations in the teaching-learning process, derived from the incorporation of virtualization processes, consequently actions are implemented aimed at establishing virtual classrooms in all careers, taking advantage of the conditions existing and the experiences of integration and interdisciplinarity developed in different careers in order to contribute to developing an integral general culture, based on computerization processes, thus facing the current challenges generated by the updating of the Cuban socialist model.

The current pedagogical model from face to face requires looking for alternatives such as virtual classrooms as support for this process, as it requires training where self-learning constitutes the center of the training process with a systematic dedication of the student to study, with independence, creativity and a high development of the ability to manage their own knowledge with the use of Information and Communication Technologies (ICT). (MES, 2005)

One of the premises of this model is the prioritized attention to the professional training of the future graduate, fostering the integration of academics, work and research from the first academic year, for this a conception based on the interdisciplinary principle is put into practice - curricular - virtual, as a result of research which makes it possible to offer an interpretation of all the activities with an integrative conception and the possibilities of its implementation in the careers studied at the university, a conception of this principle that is discussed below.

In this sense, the approach of Silvestre (2002) cited in (Sagó, 2006, p.36) is assumed, "the didactic principles in each historical epoch must have modifications so that the teaching-learning process that they govern responds to the demands that society imposes on the school as a social institution."

Therefore, the objective of the work is specified in: proposing a theoretical approach to the conception of the interdisciplinary-curricular-virtual principle in the teaching-learning process in professional training.

DEVELOPMENT

Theoretical bases of the interdisciplinary-curricular-virtual principle

In the studies on interdisciplinary relations there are dissimilar classifications and levels of interdisciplinary relations, approached by different authors, for the purposes of the present work and derived from the systematizations carried out by different authors, the levels of interdisciplinary relationship proposed by (Fiallo, 1986, p.27), these are: *Transdisciplinary, multidisciplinary, multidisciplinary, interdisciplinary, intradisciplinary or disciplinary*. While the level of interdisciplinary relationship is assumed, due to the possibility of contributing to the achievement of more integrative and qualitatively superior didactics, in the context of professional training.

The level of interdisciplinary relationship is assumed as a way of solving the objective of this work, as it is the second level of interrelation between disciplines, classified as complete interdisciplinarity, according to this author, in which cooperation between various disciplines leads to real interactions, In other words, there is a true reciprocity in exchanges and consequently mutual enrichments that can contribute to interrelate the contents of the disciplines of the career curriculum. The conception of interdisciplinarity in the context of the teaching-learning process in the training of the professional in higher education, is based on the dialectical relational conditioning, for its concretion it is based on the terms of the interdisciplinary-professional principle for the professionalization process from the curriculum of pedagogical careers defended by Dr. Fernando Perera Cumerma, which constitutes a legal basis for the proposed conception.

The interdisciplinary-professional principle is one that directs the teaching-learning process towards the preparation of a future professional capable of comprehensively solving the problems that they will face in their future professional performance.

This principle

“means the direction of the teaching-learning process that involves and commits the subjects in the active appropriation of knowledge, skills and values, through the establishment of interdisciplinary links, with the aim of helping to train them as professionals capable of solving comprehensively the problems they face in their work practice and self-improvement, continuously updating their knowledge.” (Perera, 2002, p.50)

According to this author, the design of the interdisciplinary-professional task system consists of tasks whose statement directs the execution of the interdisciplinary relationship between Physics and Biology, as well as the application by students of scientific work methods, enhancing the work method interdisciplinary.

Taking this principle into account, Perera Cumerma has developed an interdisciplinary-professional methodology and raises the following general requirements for its fulfillment: The interdisciplinarity between the sciences (knowledge, methods, attitudes and values, language), the relationship between the content of science and the methods and forms of work used in its teaching, attention to professional training problems, the interdisciplinary nature of the teaching-learning process, its dialogical relationships between the subjects involved in the process, as well as flexibility and open character; the continuous improvement of the process and finally the systemic nature of the process.

“The interdisciplinary-professional approach presupposes that one of its features is the democratic participation of the people involved in its development. The teacher-student relationships and how the former performs their role are of utmost importance, which should serve as a professional performance model for the students.” Martínez (1999) and Gil (1994) cited in (Perera, 2002, p.48).

On the other hand, in the works of Dr. Jorge Luís Barrera Romero related to the results achieved in the scientific project “Communicative Didactics of Sciences”, belonging to a territorial project, he addresses the theoretical-methodological problems of the social and humanistic sciences, including the link and interrelation

of these with the natural and exact sciences; constitutes a reference for the present work based on interdisciplinarity in the context of virtual education. The aforementioned project refers to the communicative, investigative, sociocultural and interdisciplinary approach to teaching science. (Barrera, 2007, p.33)

Consequently, Interdisciplinarity-Communicative has been understood

“as a didactic conception that, based on interdisciplinary communication, systematizes relationships of this nature in the curriculum, its development and in practice, has communication and communication as an inter-object. as nodes, the sign, language, text and their methods of analysis; especially, to collaboration and cooperation. At the same time, it can be conceived as a circular process that begins in the diagnosis of a problem, formative or interdisciplinary learning and passes through the following levels: diagnosis, the epistemological, theoretical, methodological and pragmatic; it presupposes the establishment of interdisciplinary communicative relationships.” (Barrera, 2007, p.40)

For Dr. Sagó Montoya (2006), all this favors an approach to an Interdisciplinary Didactics, from the gnoseological point of view, which explains its epistemological nature in the design of integrative teaching tasks and self-learning strategies, which favor the sense of students to learn to learn in the appropriation of integrated knowledge, from a form of blended teaching.

This author maintains that *“An Interdisciplinary Didactics that studies the relationships that exist between school disciplines, must contemplate the establishment of common methodologies, languages and techniques.”* (Sagó, 2006, p. 71) The deployment of a new type of methodological work is based on the previous statement to solve the problem of the fragmentation of didactic processes. Therefore, it assumes and defines the Interdisciplinary - Communicative principle, as

“the guiding idea that guides the practical orientation of interdisciplinary relationships in the methodological work of career groups, through processes of interrelation, interaction and integration of disciplines, in a way horizontal and vertical, depending on the Integrative Main Discipline and

characterized by the communicative approach, as a basic requirement of its content and organization to ensure the formative approach of the professional training process, from an effective psychopedagogical and methodological preparation of professors in Conditions for the Universalization of Higher Education.” (Sagó, 2006, p.75)

On the other hand, in the context of the professional pedagogical process of the Labor Education and Computer Science career, Dr. Rubén Clairat Wilson proposes that the interdisciplinary-pedagogical-technical constructive-experimental principle constitutes an essential and novel aspect in the conception of the integrative task as the cell of interdisciplinary procedures in this career, as its content is aimed at the consolidation of competencies, both in the student and in the teacher, it defines it as

“describing, explaining and representing the integration process in the pedagogical process professional in the Labor Education career and part of the idea of understanding the necessary interdisciplinary didactic-pedagogical-technical constructive and experimental conception from which it emerges, likewise, allows a more viable treatment to the integration of Labor Education and Informatic Science, as enables the development of skills; among them: The curricular integration of ICT to integrating tasks.” (Clairat, 2014, p.8)

These theoretical references, serve as support to the ideas raised in the present work, are related to others approached in the task of the research project related to: Integration in the Labor Education-Informatics career, which allows to establish the conception of a principle interdisciplinary-curricular-virtual that directs interdisciplinary relations in Physical Culture career, from the perspective of the virtualization process of university processes.

Approach to the teaching-learning process in virtual environments.

Cuban authors Silvestre and Zilberstein (2002) suggest that a contemporary definition of Didactics should recognize its contribution to a scientific theory of teaching and learning that is based on laws and principles, as well as on the unity between instruction and education, the importance of comprehensive diagnosis, the role of activity, communication and socialization, and the unity between the

cognitive, the affective and the volitional, in order to prepare the human being for life, which can respond to their socio-historical conditions concrete and ensure the development of human potentialities.

The study of a considerable number of recent investigations allows us to recognize a wide movement of ideas from different authors towards the search for a greater deepening of the teaching-learning binomial.

As the authors Addine, Rico and Silvestre (2002) state, among others when approaching the teaching-learning process, they have historically characterized it in different ways, ranging from its identification as a teaching process, with a marked accent on the central role from the teacher as a transmitter of knowledge, to the most current conceptions in which the teaching-learning process is conceived as an integrated whole, in which the leading role of the student is highlighted. (p.12)

In this approach, the integration of the cognitive and the affective, the instructive and the educational, as essential psychological and pedagogical requirements, criteria shared by the authors of this work, is revealed as a determining characteristic.

The teaching-learning process takes place over the course of the subjects, constitutes the mediating way for the acquisition of knowledge, procedures, standards of behavior and values bequeathed by humanity, and its essential purpose is to contribute to the integral formation of the student personality; thus, in the development of the process, the student will learn different elements of knowledge, notions, concepts, theories, laws that are part of the content of the subjects, and at the same time, will appropriate the procedures that man has assimilated for the acquisition of the knowledge.

The integrality of the teaching-learning process is achieved, precisely when it responds to the demands of the intellectual and physical development of the student and the formation of feelings, qualities and values, all of which will fulfill the objectives of education, in the sense of general, and in particular, to the objectives at each level of education and type of institution.

The virtualization of the university curriculum that is carried out in the university, presupposes a necessary understanding of the transformation of the processes associated with training activities, teaching-learning, research, extension and management, determine some of the essentialities that characterize the use of technological means in education in the 21st century university.

Among these pioneering investigations are those of Moore (1991), Garrison (1997), Keegan (1997), cited in (Salinas, 2000, p.203). They recognize the need to adapt educational categories to the specificities of the use of technological means, suggest that in virtual teaching-learning environments where the teacher and the student are physically separated, technology plays an important role in supporting the educational process; they agree with the importance of interactivity and communication, the significance of social, collaborative and technological means in the training process. They establish that the intersubjectivity between the teacher and the student occurs in learning characterized by the separation between the processes of teaching and learning.

Virtual education for (Moore, 1991 and Silva, 2007, p.35) is *“a set of procedures whose purpose is to provide instruction by printed and electronic media to people who participate in a regulated learning process, in different places and times to the professors.”* It highlights the role provided by the communication of learning in virtuality, but reduces virtual education to its role as a teaching medium, however, but the possibilities of handling tools and resources are recognized by the authors of this work.

According to Silvio, 1998 cited in (Silva, 2007, p.37), virtualization is at the same time, *“a process and a result of the treatment of communication through computers, and of data, information and knowledge.”*

Indistinctly, the terms environment, environment or virtual teaching-learning classroom have been used, in any case to designate this special type of space or situation in which a process of teaching and learning is carried out online, characterized by the predominance of the physical separation between professors and students, independent study and communication mediated by technologies. (Scagnoli, 2001, p.20)

In this sense, virtual environments are telematic spaces that mediate the interaction and interactivity of netizens. The etymology of the word “environment, from the computer point of view means: set of extrinsic conditions that a computer system needs to function, such as the type of programming, process, the characteristics of the machines that compose it, etc.” and “virtual; It has an apparent and not a real existence.” (DRAE, 2001)

Other authors such as Guerrero-Muguerca, Sánchez-Pérez & Moreira-Carbonell (2020) define virtual environments as *“spaces of sociocultural-educational exchange configured in telematic networks, made up of synchronous and asynchronous communication tools.”* (p.89)

Based on these considerations, the authors assume as virtual environments (EV): *“spaces configured in the telematic network, which promote the pedagogical-instrumental mediation of their participants, based on synchronous and asynchronous activity and communication based on ICTs.”* (Sánchez, 2010, p.18)

The materialist dialectic allows addressing the relationship between the virtual teaching-learning process, from its objective conditioning and revealing the concrete historical character of its links and its ultimate determination by the socio-economic and technological development of society. In addition, it bases the analysis of the relationships between society and the virtual teaching-learning environment from the systemic point of view, establishes the correlation between this and the philosophical foundations that sustain the elements, relationships and functions from the contradictions that development implies.

Virtual environments promote the wealth of spaces, didactic processes and interrelations that are manifested in the conception of the principle that is presented. In addition, it is a holistic process that encompasses the complexity of the activity of the teacher, the student and the group, as well as the necessary interrelation that occurs between all.

Various studies have shown the importance of social interactions as facilitators of the development of the individual's personality, these social interrelationships occur in different socio-cultural contexts and mediated by activity and communication. Vygotsky (1982, 1987).

The unique nature of virtual environments conditions the nature of the teaching-learning process, Vygotsky (1979) states that cooperative learning requires study and work groups, because it is in group work where professors and students can cooperate with students. less favored in their cognitive development, have access to knowledge or improve their learning.

From this approach, ideas have been developed for the application of this theory in the teaching-learning process in virtual environments, in which the need for professors in multidisciplinary teams to take advantage of the resources of the virtual classrooms of each of the subjects of the careers to conceive learning strategies based on integrating axes, which allow adapting the contents on the basis of curricular interdisciplinarity. (Clairat, 2014, p.74).

In the authors' opinion, this requires a conscious interdisciplinary conception, through the cooperative work of professionals, who assume the design of the courses (virtual classrooms), as well as flexible teaching strategies that allow such adaptations, both by of professors and tutors, as well as of the students themselves, based on the results of an initial participatory diagnosis.

Based on an intradisciplinary or interdisciplinary axis, its internal content is the problems that occur in the context of the teaching-learning process in professional training, for their solution it is necessary to use and apply the knowledge integrated in a subject such as Primary link, between subjects that make up the academic year, in a discipline or several of them within the virtual environment. Meanwhile, the interdisciplinary-curricular-virtual principle must be based on the following integrating axes:

The horizontal integration axis: It is one in which the integration is carried out on the basis of the selection of the base subjects and the rest of the same year, they determine the cognitive nodes of interaction, based on the objectives of the year and has an interdisciplinary nature.

Vertical integration axis: Vertical or disciplinary axis attends to integration in the logic of science, the systematization of learning, it is part of the object of direction of the discipline; here the integration takes place from the gnoseological point of view through the levels of systematicity of scientific knowledge, that is, concept,

law, principle and theory; while from the didactic point of view, integration is manifested through the links of the process, it is synthesized in the coherence of each year and in the discipline as a whole it has an intradisciplinary character.

The transversal or diagonal integration axis: It is the main integration axis, it addresses the logic of the profession as a whole and synthesis, that is, it integrates at its most essential level the training of the professional in a certain specialty, it is consubstantial with the integrating process of academics, research and work. The integration that occurs in this axis is the synthesis of vertical and horizontal integration whose object of integration is the direction of the teaching-learning process as a whole, in correspondence with the integration links at the career level, it takes place in the process of training from the Main Integrative Discipline.

The interdisciplinary-curricular-virtual principle emerges and is contextualized in the necessary implementation of interdisciplinary relationships in the process of virtualization of careers at the university, it is sustained and directed from the perspective of activity and communication in connection with the aspects fundamentals of interdisciplinarity, from the integration of cognitive, methodological, axiological, investigative, labor and extension components; it leads to higher and more complex wholes, in its theoretical expression and its concretion in practice.

The systematization of the referents and theoretical foundations discussed so far, allow to establish the definition of the interdisciplinary-curricular-virtual principle as: *“the one that directs the teaching-learning process of the interdisciplinary curriculum in a virtual environment based on instrumental, pedagogical mediation and sociocultural, in the professional training process.”*

From the philosophical point of view, the conception of the principle is sustained in the materialist dialectic, meaning its approach to the system, its principles, laws and categories, its conception from activity and communication, the humanism contained in the social project in which it manifests and its adaptation to the specific analysis of education as a phenomenon, is also inserted in the process of computerization of Cuban society as a supreme aspect.

Meanwhile, instrumental mediation is characterized by two essential forms, the first by means of tools or instruments created by culture, which oriented towards the outside, are used to transform reality, the second, by means of signs, which oriented towards the inside, are systems of different levels of complexity that link, regulate the psychic processes of the subject and allow the transmission of meanings.

Virtual environments are based on the instruments and tools supported by ICT, which allow access to new concepts, new knowledge, new forms of communication, new signs, symbols, and new understanding of current events and phenomena.

From the conception proposed by Álvarez (1996) and Lima (2005), it can be considered that the teaching-learning process in virtual environments should be assumed as a pedagogical mediation process. This concept is applicable to any modality, face-to-face, blended or distance as it becomes a new form of organization of this process, brings with it new demands on the teaching team in virtual environments.

On the other hand, sociocultural mediation from a Vigotskyan conception establishes the function of these social mediators, it cannot be other than to serve as conductors of communication and influence on the object of the activity, which causes changes in the subjects.

In virtual environments this does not happen intuitively in each subject, the cultural, pedagogical and technological training of the teacher, tutor and / or moderator must mediate, while the subject learns from others and with others, in intimate relationship with them. other mediators: the instrumental and the pedagogical. (Sánchez, 2010, p.21)

These mediations discussed above emphasize the active role of the subject, in his own personal configuration; By mobilizing him affectively, he becomes a mediator of his own development, which is revealed when he interacts and communicates through ICT, where he participates with all his individuality and socio-historical-cultural legacy.

CONCLUSIONS

The aspects addressed allow us to conclude that both the interdisciplinary-professional principle proposed by Dr. Perera Cumerma, the communicative interdisciplinarity proposed by Sagó Montoya, and the interdisciplinary-pedagogical-technical constructive-experimental principle addressed by Clairat Wilson, constitute references to be proposed in the context of the professional training process, the interdisciplinary-curricular-virtual principle.

Taking into account that the essence of this principle lies in describing, explaining and representing the integration process in the teaching-learning process, as well as understanding the interdisciplinary didactic conception from which it arises, allowing a more viable treatment of the integration of knowledge in careers, because it has allowed the integration of the curriculum from the classroom to the virtual, reflected in a practical way in the conception of integrative teaching tasks and their insertion in the virtual classrooms of the different subjects in the Physical Culture career.

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