

Epistemological Foundations for a Pedagogical Model Based on a Complex Perspective for a Superior Educational Organization

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ABSTRACT

The XXI century brings human beings significant changes in their way of living, thinking and relating to other human beings and to the environment. Issues such as conflicts among countries and within them; unemployment, economic, social and cultural inequality; environmental factors related to the access and control of natural resources; new knowledge resulting from discoveries and inventions, as well as the way new technologies have revolutionized the world at all levels; have resulted in ways of living and working being transformed. All these situations present a significant contrast with the modest changes the educational sector offers to address this reality, and make me reflect on the importance educational organizations must give to having appropriate pedagogical models to offer solutions to these changing realities.

This paper is a work in progress, building on the epistemological foundations of a pedagogical model based on a complex perspective for a superior educational organization.

CCS Concepts

Education => Digital libraries, archives environments, and collaborative learning. Information retrieval => document representation.

Key Words

Pedagogical models, Complexity in education.

1. INTRODUCTION

Children and young people in many significant ways live in a virtual world where the continuous use of internet, social networks and cellular phones, among other means of communication, makes it possible to have access to any person or information everywhere, every time [1]. On the other hand, these uses of technology have also some negative aspects such as the

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weak bonds that people may have with family and other people close to them; or the difficulty of creating and keeping new face to face relationships, because for many people, especially young, it is easier to have relationships with virtual friends that they may not have real contact with [2].

In this way, the world has also changed as well, as have ways to communicate and learn. However, there has not been a concern for creating new social bonds that help to build bridges among children, young people and adults, who belong to previous generations and have many different values, beliefs and knowledge. These are some of the reasons in many cases adults, including some teachers; do not have a close relation with modern technologies.

Those situations need a change of mindset, and present the challenge of leading transformations in organizations, and also the challenge of how we adapt to and work with the new environments those changes imply. In this context, educational organizations have the responsibility to think about the kind of preparation they offer to their students, taking into account society's need for professionals prepared based on knowledge of the local, national and international reality, with solid disciplinary and humanistic foundations, respectful of nature, themselves and others, and with a critical vision to build a more equitable and humane society. The Colombian National Constitution [3], the Colombian Law of Education [4], and the National Decennial Education Plan 2016-2026 [5], point out that the community has to participate in the direction of educational institutions. This participation is undertaken especially through the Institutional Educative Project (Proyecto Educativo Institucional PEI) that is the navigation chart of educational organizations in Colombia (in some countries PEI is known as the Strategic Plan). In any PEI, aspects such as the mission, vision, principles, goals, resources, pedagogical model, teaching and student regulations, management systems, among other issues, are described. The PEI must respond to students as well as local and regional community needs.

The context of this research is Universidad Libre in Colombia, a private educational organization. It has branches in six different cities of Colombia, situation that makes it multicultural and pluricultural. Among other aspects, Universidad Libre's PEI states that its pedagogical model identifies the relevance of guiding academic processes in accordance with the postulates of the Self Structuring Pedagogical Model [6]. In this model the student is the craftsman of his/her own building and its goal is to help the student to self transform himself/herself. This pedagogical model, according to the university PEI, considers theories from Piaget, Bruner, Ausubel and Vigotsky. From Piaget it considers the genetic epistemology that proposes a paradigm based on research

focused on human development. From Bruner it reflects the human development that occurs in different stages according to the subject's mental representations of himself and of the world. Ausubel brings meaningful learning; he considers students as active processors of information. From Vigotsky the model takes the concept of socio-cultural learning which says that the processes of development and learning are based on interaction between the person and the social environment.

The population of this research are professors, students, directors and graduates of Universidad Libre who were asked in 2019, through a questionnaire based on Ortiz [7] about their knowledge related to the current pedagogical model the university follows, and their suggestions for improving or transforming it. The directors and some professors will also be interviewed about their opinions related to the pedagogical model.

The questionnaires have been answered by 49 professors, 41 graduates and 35 students from Bogotá branch, I expect to have information from the other branches next academic term. So far, the information shows that a good number of students and graduates, and some professors, do not know about or do not have a clear conception of the university's pedagogical model in spite of it is being presented on the website page, distributed in a printed document, disseminated in many academic events and, being presented once per academic term for the students. Some students affirm that their opinion is not taken into account for the building of the pedagogical model.

The information taken from the questionnaires was divided into the four categories I describe in the following paragraphs:

1) The model should: Be enriched with new tendencies superior education has in international, national and local contexts; have different modalities of educational proposals such as virtual education; take into account more and better technological resources as well as educational platforms; respond to the current society demands, show the relation among the pedagogical model and the university main functions; enrich the physical infrastructure to improve the learning spaces and, work on environmental sustainability, gender policies and pluralism.

2) It is necessary to take into account: A more comprehensible and coherent pedagogical model with transdisciplinary dimensions; varied epistemological perspectives; the international character of education and culture; avoiding to be subordinated to economical, technological, educational and political powers; emphasis on political education and better development of communicative and socio affective competences the reality of the XXI century and the societal demands.

3) About professors and students: It is necessary to enrich institutional belonging to the university of some professors and students by offering ongoing professional development, among other activities.

4) They pointed out some questions: What are the pedagogical and epistemological foundations of the pedagogical model and how is it different from others? Are professors identified with the pedagogical model? Is the pedagogical model taken into account when professors plan their classes? Is the pedagogical model relevant to face the current social dynamics?

In addition to the questionnaires, I undertook a documentary review of the pedagogical models of the nine Colombian multicampus universities that currently have been awarded accreditation of high quality by MEN [8]. It is important to say

that Colombia has public and private universities. The private ones can be from religious communities or non-denominational. Four of those universities belong to religious communities and the other five are non-denominational. Two of the nine are public. Two of those universities do not explicitly say they have or follow a pedagogical model.

The information found was organized in four categories:

1) Mission and Vision. In this category the nine universities agree on offering an integrated education to students as well as consolidating an academic community inserted in a multicultural, globalized world and, contributing to preparing reflective, critical, ethical, creative, entrepreneurial, pluralist professionals, who help to build a more democratic society.

Three universities agree on orienting their actions to form citizens able to live in community, to be tolerant and respectful of their own ideas and beliefs as well as others' ideas and beliefs. In addition, to enrich the development students' local and national identity, respectful of human rights, social development and sustainability of the environment.

Two universities agree on forming future leaders of society and its transformation.

2) PEI Principles and/or pedagogical model principles. Some universities affirm having PEI principles while others say they have pedagogical models principles, without explaining the reason of that. The one principle all of them agreed upon was: knowledge building and transfer.

Three universities affirm the importance of values such as freedom, ethics, autonomy, participation, and pluralism, in the formation of their students. Two talk about the importance of professional and human development, culture of participation honesty, respect, responsibility, inclusion, democracy and participation as well as social mobility.

Other principles mentioned were: Political culture, sense of belonging, morality, democracy, equality, research and academic excellence, and social projection.

3) Conceptual, pedagogical and axiological foundations. All universities have diverse theoretical and conceptual foundations to address ongoing reflection about the nature of learning. From them, the universities adopt the teaching methods, organization, materials and evaluation as well as the relation among the actors of the process. They agree in the issue that models pedagogically correspond with the demands of people and society and their socio-cultural conditions to improve human life in a specific time.

Three universities agree on:

a) The academic content has to be worked in a dialogic relation among professors and students who are transformed in the process of interaction itself.

b) Foundations for an integrated model where the student is at the center, and their needs and the problems of the socio-cultural, economical contexts are axes of the curriculum, as well as professors with a mediator role.

For two Catholic universities formation is related not only to conceptual foundations but also related to ideological and philosophical conceptions with high excellence. One university states a proposal of knowledge management where meaningful learning is the articulation axis.

None of them describe the way they assume the challenge of technologies and the opportunities they bring to the educational process or take into consideration the way they face the differences and diverse realities and needs their campuses have around the country.

4) Professor and student profiles. All of them agree on having a professor of high personal, pedagogical and professional qualities. A professor with research competencies that permits him/her to produce knowledge; to strengthen students' capacities and competencies; to cooperate to establish agreements with local, national and international companies, and establish academic networks with other educational organizations and companies to strengthen formation, research and extension processes. Besides, an active student with his/her own personal, professional and integrated formation, with identity and leadership.

As for the main conclusions of the documentary review, I can mention that there are many similar issues in the pedagogical models of the multicampus universities with high quality in Colombia. Some of them show important elements but do not mention the theoretical foundations they are based on. I think it is good because they are not limited to specific theories but open doors to more global ones. Only one university explains what pedagogical model it follows.

It is important to point out that none of the universities takes into consideration the feeling of uncertainty the new times provide in issues such as the reality that in the medium term (2030) [9] many of the jobs we currently know, will change or disappear, due to some degree of automation of jobs or duties. Significantly, we do not know how to deal with that reality.

From the description given in previous paragraphs, it can be inferred that the Self Structuring Pedagogical Model does not consider many of the necessary competencies and abilities required to live in the complex world the XXI century brings, that are mentioned in this paper. That is why the main objective of this research study is to contribute to the building of the epistemological foundations of a pedagogical model for Universidad Libre that guides the processes of teaching and learning, and the formation of professionals according to the needs and characteristics of the XXI century, taking into account the complexity paradigm.

2. CONCEPTUAL FRAMEWORK

2.1. Pedagogical Models

A pedagogical model is a paradigm that analyses, interprets, understands, guides and transforms education. Besides, it is a formal theoretical construction that interprets, designs and adjusts the pedagogical reality that corresponds to a concrete historical need. It implies the content of teaching, the development of the students and the characteristics of the teaching practicum.

Throughout the history of education and around the world, many types of pedagogical models have been recognized and organized according to different criteria.

One of them deals with the place that the teacher, the student and knowledge have occupied in the process of learning. Authors such as Not [10], De Zubirá [11] and Ortiz [12] agree on three as the most important pedagogical models, as follows: The first is called Hereto Structuring which is characterized by the predominant role of the object of knowledge and the teacher in the learning process, the student having a passive role and being a receptor of cumulative knowledge. The school was seen as being

similar to a factory, educating children and young students with obedient and submissive attitudes. It is based on psychological behavioral theories, and predominated until the beginning of the XX century.

In this model knowledge is organized from the outside, and education is a kind of external production to form the student. In addition, school work is intended to transmit human culture to new generations in an authoritarian manner, giving information and norms, but not thought development.

The second is called Self Structuring. It has two well defined stages. The first one is related to the Active School that began at the end of the XIX century, which states that the student has an active and meaningful role, and he/she is a subject and not an object of the educational practice. It defends action and experimentation as conditions that guarantee learning: learning by doing. The second stage is formed by the constructivist approach developed during the XX century especially by Piaget, Bruner and Ausubel, who argue that cognitive processes are mental constructions or constructs. Students and teachers are not mere mechanical repeaters but scientific researchers who create and build knowledge. In this model school work is to facilitate socialization, promote interests and make the student feel happy. The teacher does not have a relevant role.

The third and last model in this brief summary is called Inter Structuring or Dialogant. It considers that the purpose of education is not centered in learning but in the development of the human dimensions: Analytical or cognitive, socio-affective, and praxical. These dimensions are interdependent and framed in the historical and cultural contexts where students live. In this approach the key factors for the acquisition of knowledge are seen in the interaction of the subject that knows and the subject known. This interaction is understood as inter structuration.

It follows a historical cultural approach based, among others, on Vygotsky, Kohlberg, Feuerstein and Freire's theories. The socio-cultural theory understands that the functioning of the human mind is mainly a mediation process that is organized by cultural artifacts, activities and concepts where the structure, organization and language use are main ways of mediation.

On the other hand, different authors have considered other criteria to conceptualize pedagogical models that can be summarized in the following way, based on Flórez [13].

1) From the conception of how people learn. One of the demands of current education is to form students to successfully face the world. That is, with the ability to solve problems, work in teams, learn by themselves, among other competencies that are needed to especially develop critical thinking and social relationships that enable students to properly and effectively communicate with others using all the means they have at hand.

This pedagogical model considers five different approaches based on the learning process. The first is Problem Based Learning where students have to use critical thinking and abilities to solve "real" problems, shown by the teacher, working collaboratively in small groups. The second one is Cognitive Modifiability, based on Feuerstein's discoveries. He states that intelligence is a dynamic construct and the human cognitive faculty is flexible. The third one is called Meaningful Learning. It gives importance to previous knowledge and its connection with new ones where the relations of new information to what people have learned encourages them to understand in a meaningful way. The fourth one is Conceptual,

Attitudinal and Axiological Change. It is proposed from a constructivist view which points out that knowledge is an individual and collective construction. In this conception previous knowledge is very important and based on how students process information and build new concepts. Students not only change their cognitive structures but also their attitudinal and axiological ones. The fifth approach is Conceptual Pedagogy, which is related to understanding the structures of learning and how they change through time. It also considers the importance of activating learning through questions, the importance of affect in this process that is an axis by itself because of the crucial role of developing the affective and social dimensions of human beings.

2) From the perspective of how to teach. It classifies pedagogical models in five ways. The first is called the Traditional Pedagogical Model that has as its main objective to transmit knowledge and traditions. It is based on norms, rules and regulations. The relationship between teacher and student is vertical. The students have a passive role and the teacher has an authoritarian one. It does not take into account the context where knowledge takes place. The second is the Behavioral Model which fixes and controls instructional objectives in a way that is accurately formulated and permanently reinforced. The teacher's role is to direct students to learn through memorization and recitation techniques. The third is the Romantic Model that claims the most important content for child development comes from the child himself/herself, and because of that the pedagogical environment should be as flexible as possible. The teacher has to be an auxiliary or a friend of children's free, natural expression. The fourth is the Developmental Model. Its goal is that each person builds his/her own knowledge based on his/her particular needs. Teachers should create the best experiences to ease children's access to cognitive structures. The fifth and last is the Socialist Pedagogy Model that proposes the maximum and multifaceted development of the individual's capacities and interests. In addition, development is determined by society, and the teacher and student relationship is dialogic.

3) From the relation among teaching, learning and technology, the model is called Connectivism [14] that takes advantage of technologies to focus on learning as a connected activity and to engage students in open conversations with peers, teachers and other people, in an online networked world. In this way, learning happens not only within an individual, but within and across networks.

As described in this paper, pedagogical models have responded to specific moments in the history of education. However, many of them have not considered such theories as the theory of complexity, or chaos theory, among others. Those theories would enrich the discussion for the building of a pedagogical model where dialogue and appreciation of the learning and the teaching processes are seen as processes of increasing complexity, in which teachers, students, knowledge and environment have important roles to play.

2.2. Complexity in Education

Talking about complexity, it has been discussed and studied through time. Who have studied it in a deep way coincide that it is immersed in the world we live in and its study needs dialogue in all fields of knowledge. For Gell-Mann, the concept of progress according to complexity sciences lies in quality, and the goal of knowledge is rebuilding or building relationships of harmony with the environment [15]. From my point of view,

those characteristics must be taken into account in any pedagogical model.

In the same sense, Maldonado [16] says complex sciences are sciences of those phenomena and systems that cannot be solved from the classic science. Similarly, Morin [17] affirms that there is complexity when we cannot separate the different components of a whole. In this way we can say progress of science is not done by accumulative methods but because of ruptures, discontinuities, disruptions, bifurcations, and they require other types of paradigms.

It is how Freire [18] understands the world, as unfinished, and in movement; he also sees human beings as historical, incomplete individuals, and this is where education gives possibilities. For him, true education is given by dialogue and through a horizontal, reflective, critical and transforming relationship among teachers and students. This theory has close relationship with Morin [19] when he says XX century has discovered the loss of future, it is to say its unpredictability. The OECD agrees with them when it affirms future is unpredictable because it is always under construction and we do not know in advance the kind of transformations will continue and which ones will change.

Uncertainty is tightly related to the concept of post modernity. According to Novo [20] it means not to be sure about our certainties and deals with the non-acceptance of any kind of reality as an objective, absolute, autonomous, unique one. Pedagogy that is framed in the postmodern paradigm has to do with contingencies and chances as well as sensitivity, individual interests, diversity, religious and cultural liberty, and the multiplicity of visions of the world that should be included in the educational systems [21].

In this way, postmodernist pedagogy deals with topics such as attitudes, wishes, and representations of individuals in order to form them towards and in plurality and interculturality. To do that, it is important to take into consideration the constructed history and to understand the social and human problems that have been studied in other times and contexts as the roots of the postmodern society [22].

According to the description made about some aspects of the educational reality of the XXI century, among others, the diversity of student population, and especially given that in Colombia many students are very young when they start university studies, even minors, they require closer curricular and extracurricular guidance; it is imperative that education gives answers to the expectations and needs of a society that has changed and to students who need to develop competencies and abilities to develop themselves personally and professionally in a world of growing uncertainty.

An education that develops students' analytical capacities that would be translated into abilities to work in changing digital environments, to work in networks, to develop flexibility in citizen competencies to be open to constant learning, and also to relearn and adapt themselves to environmental requirements without affecting their own identity, is needed.

It is also necessary to develop students' ecological abilities that guide them to increase care and respect towards the natural and social environment, as well as abilities to facilitate resilience, that is adaptation to uncertainty and abilities for solving problems, for thinking and generating knowledge and to transfer it. Also abilities for team work, for developing creativity and innovation,

and for interacting in an effective way with people from different cultures, values and ideas.

For authors like Gell-Mann, Morin and Maldonado to name some, the human being is an autonomous subject that lives in an uncertain world, as a product of the life cycle: intuitive, reflexive, informed, organized and interdependent. To do that, he/she needs complex thought and to develop interdisciplinary work that takes into consideration the past and the present: the historical process of all involved as well as the needs of the context where he/she is going to develop their work.

Reviewing the concepts of these authors about complexity in education, they agreed it is characterized by a high level of indeterminacy and uncertainty. No one has the absolute truth because we have different interpretations of reality. Escotet [23] says that the fundamental task of education in times of uncertainty is to teach to think, dissent and respect ourselves and the other. He also says that there are affective and not cognitive components. In the same way, Morin [24] claims that in complex situations where uncertainty emerges, a strategic attitude of the subject facing ignorance, perplexity and bewilderment, is necessary. In this way, uncertainty in the field of education can be defined as confrontation, doubt, controversy and challenge that requires new ways that permit us to give answers to the new realities of the XXI century.

In the same way, Freire [25] affirms that human beings are unfinished and that they have consciousness of that. This is why education is an issue exclusively of humans. He does not conceive of dialog without communication and without education because learning is dialogic with the mediation of the world. As well, Morin 1999b, understands the mission of teaching as the transmission of a culture that permits us to understand our condition and to help us to live. On the other hand, Maldonado [26] says that a classroom can be seen as an open system sensitive to processes, structures and dynamics of the environment. For him, education is understood as possibilities for and of life and not only as abilities, cognitive contents or behaviors.

Finally, Morin and Delgado [27] concur with OECD [28] in the need to develop attitudes that permit students to contextualize and globalize, besides, to develop capacities to state and solve problems that facilitate and give them tools to face the changes that this century presents.

3. METHODOLOGY

This is an Action Research Study. I am in the first of three stages. This stage deals with data collection and interpretation for validating the problem and construction of the theoretical framework. In the second stage of the research, interviews will be developed with some professors and directors of the University. In the last stage the triangulation of the results and conclusions will be presented as well as the proposal to enrich the pedagogical model to be submitted to the University authorities.

4. CONCLUSIONS

So far, I can say that educational organizations must build their own pedagogical models and not follow foreign ones that do not take into consideration the idiosyncrasy, context, needs, traditions, and culture, among other characteristics people have.

A pedagogical model must take into consideration the advancements of technology in education, the theories that have supported the history of education, the reality of the current

world, the competencies and abilities professionals have to have in the current century such as multiculturalism, emotional education, environmental education and sustainability, and the science-humanism relation, among others.

On the other hand, a good quantity of professors and other professionals who are specialists in one or more areas but do not take into consideration or worry about being up to date in areas different from the ones they are experts in although they are also very important in their work. They need to understand, in a better and wider way, how the process of learning takes place and how current events, discoveries, inventions and other issues the world provides, have an impact on the educational process; to be able to offer better solutions to real situations than if they work on them in isolation. That is to say, they should have a complex thought.

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