



Revista Diálogo Educacional

ISSN: 1518-3483

dialogo.educacional@pucpr.br

Pontifícia Universidade Católica do Paraná  
Brasil

de Lima Ferreira, Jacques; Carpin, Lucymara; Behrens, Marilda Aparecida  
The university professor who builds up innovative knowledge for a complex, collaborative and  
dialogical practice  
Revista Diálogo Educacional, vol. 13, núm. 38, enero-abril, 2013, pp. 69-84  
Pontifícia Universidade Católica do Paraná  
Paraná, Brasil

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## **The university professor who builds up innovative knowledge for a complex, collaborative and dialogical practice**

*O professor universitário construindo conhecimentos inovadores para uma prática complexa, colaborativa e dialógica*

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### **Abstract**

The considerations and reflections referred in this article are results of a qualitative approach research, as a study case, done with 15 professors who teach at a college in the city of Curitiba where majors for technologists are developed, and it also aimed at identifying the teaching

methodology adopted by the educators in their pedagogical practice, and if there is any investment on their continuous education, having in mind the educational obstacles educators have been facing in this new century. In the discussions, the investigating process took into account the challenges demanded by the adoption of an innovative, dialogical and cooperative educational attitude which, in a participative and critical manner, needs the adoption of strategies that stimulate the creativity, construction and reconstruction of meaningful knowledge. In that innovative context, the educator must consider the social, political and economic practice. Thus, the educator must adopt a new complexity paradigm (MORIN, 2000, 2001, 2009), in which the educational and methodological process require a proactive attitude in the sense of investing in his/her continuous professional development, especially when it comes to pedagogical practice, using technological resources in the benefit of a collaborative and mediating educational action.

**Keywords:** University teaching. Pedagogical practice. Teaching methodology. Technology. Continuing education.

### **Resumo**

*As considerações e reflexões abordadas neste artigo são resultantes da pesquisa de abordagem qualitativa, tipo estudo de caso, realizada com 15 professores que atuam em uma faculdade da cidade de Curitiba que desenvolve cursos superiores tecnológicos, e teve como objetivo identificar a metodologia de ensino adotada pelos docentes em suas práticas pedagógicas, e se investem em sua formação continuada, tendo em vista os desafios educacionais postos para os profissionais que trabalham com a docência neste novo século. O processo investigativo considerou nas discussões os desafios demandados pela adoção de um fazer educacional inovador, dialógico e cooperativo que, de maneira participativa e crítica, precisa da adoção de estratégias que estimulem a criatividade, a construção e a reconstrução de saberes significativos. Nesse contexto inovador, o docente precisa levar em conta a prática social, política e econômica. Assim, o professor precisa adotar um novo paradigma da complexidade (MORIN, 2000, 2001, 2009), no qual o processo educativo e metodológico exige a postura proativa no sentido de investir em seu desenvolvimento profissional contínuo, em especial, os relacionados às práticas pedagógicas, usando os*

*recursos tecnológicos em benefício de uma ação docente mediadora e colaborativa, consolidando seu papel de professor transformador, construtor e agente de mudanças.*

**Palavras-chave:** *Docência universitária. Prática pedagógica. Metodologia de ensino. Tecnologia. Formação continuada.*

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## Introduction

The present article depicts the need of teachers' investment in their continuing education, taking in consideration both the pedagogical and technical aspects focusing on the students profile and the urge in a pedagogical practice that meet the challenges posed by the information and communication technologies that require the composition of a knowledge network that benefits the construction of an equal and fair society.

The innovative or emerging paradigm, also referred as a theory of complexity (MORIN, 2000, 2001, 2009), which challenges universities and professors to adopt an innovative methodology, taking in consideration the previous knowledge of students, their social, political, Professional and cultural reality, specially through project methodologies that stimulate the research resulting in discoveries that are significant and applicable to reality of each student.

In order to do that, it is essential the proposition of new educational models that study the complex phenomena that predominates today, as well as they meet the human needs in dialogical and collaborative forms.

In that sense, the considerations on this article report how the new paradigms of Science contribute to the concretion of a more dynamic and integrated educational reality, by adopting a pedagogical methodology that stimulates students and professors to build collective knowledges on behalf of an inclusive and democratic society.

We also deal with how technologies as educational strategies benefit the construction of knowledges and propitiate a greater interaction

between educational and social agents, connecting knowledges and doubts and also promotion the transformation and construction of new information and reflections.

The research presents the professors considerations that are involved with the teaching to learn, understand and invest in their continuing formation, contributing that way to extend the interactions among their students and knowledges.

The expansion of the investigative process created the discovery of new educational ways and the educators involved in research, since during the journey together, they realized that in order to meet the new educational demands, it is necessary to seek for methodologies that allow innovative achievements. So, the teacher needs to use new teaching procedures and learning to serve the needs in contemporaneity.

### **The new paradigm of science contributing for the adoption of an innovative educational methodology**

The new paradigm of science called theory of complexity, or the holistic paradigm presents new considerations, among them the proposal of reconnecting knowledge from an interdisciplinary and multidisciplinary junction of knowledges that lead to transdisciplinarity, according to Zabala (2002, p.33-34):

The transdisciplinarity is the maximum level of relations among disciplines, in a way that it is almost a global integration inside a totalizer system. That system enables an interpretative unit with the goal of building a science that explains reality without fragmentations [...].

That proposition has led educational institutions, researchers and professors to seek a more detailed understanding regarding those proposals, focusing on its applicability in the teaching and learning context, aiming the transformation of today's methodology still connected to the traditional teaching paradigm, which adopts educational of

teaching in a fragmented, reductionist and reproductive way, serving to Newtonian and Cartesian concepts inserted by science in last century.

That fragmentation view can be understood in the words of Behrens (2006, p. 25), “The fragmentation of knowledge has been focused as the greater challenge to be overcome in order to follow the complexity paradigm and the challenges imposed by the Society of Knowledge”.

Although, it is necessary to be considered that the current educational, social, political and economical moment do not correspond to the linear phenomenon from the past, and demands emerging transformations that require people in order to work in society in a cooperative way with a holistic view adopting new cognitive practices, highlighting the personal aspects permeated by multiple individual intelligences that in an integrated form which may serve to a greater good that is the social.

In that sense, we understand that the university has a fundamental role in this process, since in the educational environment it's possible to promote and fortify the social bonds, but also contribute to stimulate the construction of knowledges that lead us to a greater critical and reflexive reconnection, related to civilization as a whole, which is the university, the work world, the community, the family and ecological environment, according to the considerations by Moraes (2004, p. 32):

The culture of reconnection would be that capable of understanding the human being in its multi-dimensionality, of recognizing the university as an harmonious organizational model, with no rifts or gaps, a model united by interdependency of several processes. It is also the culture of love, fraternity and solidarity, of generous love and friend. It is the culture that recognizes that the strength of life is in bonding, in the interconnection and in the several dialogues of life.

That way, it is essential to highlight that for that form of acting and being, it becomes clear that the university needs to adopt in its pedagogical practice methodologies that enables the construction of knowledges that promotes in the agents involved with education, new forms of understanding and picturing the world in order to materialize the social democracy.

It is up to the university environment promoting the understanding of the systematized knowledge, adopting innovative methodologies of projects that in a problematized way construct and reconstruct knowledges, of an individual and collective way seek more elaborated and significant learnings, aiming to form competent and responsible citizens for an effective social practice.

The methodology of work by projects enables that the teacher as a mediator of the teaching and learning process, create environments that break with the traditional view of seeing and understand things. In that methodology of working by projects, according to the words of Behrens (2006, p. 35):

The Project has the goal of circumscribe the view of the whole involving the investigative process resulting of the problematization. That methodology needs to emphasize the need of proposing the transdisciplinary attitude. After all, the project has the goal of channeling energies to investigate possible answers for a particular problem and that problem is not isolated in a single view or in a single discipline.

Therefore, adopting the methodology of work by projects will contribute for the construction of a more consistent knowledge, since it enables the student to bring real situations for the educational world and to solve problems that result in significant changes in its social, professional, political and economical context.

That form of acting requires that the teacher adopts a more active attitude related to the research and the collaborator attitude, ceasing to be a pedagogical authority as the single knowledge holder, but mediating the situations of teaching and learning taking the student to the construction of knowledge that are relevant in the structuring of competencies that extending his cognitive and emotional development.

In that sense, it is understood that the teaching methodology to be adopted by the teacher exalt in the students and the appreciation for study and research, encouraging him to invest in new searches and discoveries, promoting a greater interactivity between students and teachers,

preparing them to adapt to a new reality of flexible, creative and participative way, specially transforming the knowledges in collective intelligence, according to Lévy (2007, p. 30):

The ideal of collective intelligence results in technical, economical, legal and human improvement of intelligence distributed everywhere, in order to unchain a positive dynamic of recognizing and mobilization of competencies. [...] The collective intelligence, we should remember, is a distributed intelligence everywhere, constantly valued, coordinated and mobilized in real time.

So, it is necessary that the professor adopts an attitude of respect and understanding of the multiplicity culture and students knowledges, understanding that this student looks for educational constructions that take in consideration their previous knowledges and its social and cultural reality, so the student needs to work um the new educational context stimulating the student's autonomy in a dialogic and cooperative form, mediating the knowledges through methodologies that enables the understanding of students of its existence in the world and its role to transform it.

That way, we are able to highlight the reflections of Freire (2007, p. 81):

As an educator, I need to "read" better and better the reading of the world that the popular groups which I work with makes of its immediate context and of the big part that his is part of. What I mean to say the following: I cannot, anyway, in my political-pedagogical relations with the popular groups, disregarding its knowledge experience. Its explanation of the world is part the understanding of its own presence in the world.

The teaching conception focused on the innovative paradigm or theory of complexity needs to take in consideration the diversity of competencies and cultural realities of the students, conciliating the contents worked, connecting them with multiple possibilities of learning.



All this context requires that the teacher adopts as a professional strategy, the investment in his continuing formation, since the demands of a qualification that guides to a didactic action that prepares the teacher for the group work, thinking and acting through the interconnected systems that go from problematic complex situations of teaching and that can consolidate a significant learning, according to Imbernón's approach (2010, p. 55):

The continuing formation of professors in the analysis of complexity of those problematic situations, necessarily require to give the word to the protagonists of action, make them responsible for their own formation and development inside the educational institution when making projects of change.

Therefore, the student needs to continuously prepare not only in the deepening of his theoretical knowledges, but specially in his didactic and pedagogic formation that considers the relevance of research and the adoption of innovative educational methodologies, among them there is the use of those technologies as tools to stimulate students to sail in the sea of information in order to make them transform themselves in significant and applicable knowledges in the educational, social and professional journey.

### **Using the technologies to benefit the adoption of an innovative methodology**

The technology phenomenon brought some amount of information and challenges to the contemporary world, specially to the educational context, point the need to innovate in methodological processes, focusing on the diversity of technological artefacts typical from the current social, economical and political culture that instigate new possibilities of use of the digital means to give opportunity of access from everybody to knowledge.

That way, it is important to point out the importance of technology use at schools, aiming to support the teaching and learning process since they allow to establish and enable a greater interaction between teachers and students that inserted in several digital supports, benefits the construction of significant knowledge and make opportunities to create new social networks that stimulate the creation of new social and educational narratives, leaving the classroom environment for the strengthening and achievement of new knowledge, according to what Moran informs (1995, p. 6):

The Technologies allow a new delight at school, the opening of walls and enable the students to talk and research with other students from the same town, country or abroad or in his own rhythm. The same happens with the teachers. The research work can be shared from other students and instantaneously promoted on line

Therefore, it is necessary to acknowledge the professor's need to use the Technologies during the teaching and learning processes in order to enable the building of knowledges that Interact in a multidimensional way, which is by taking in consideration the plurality of information and contexts found by the students.

The main goal of teaching by using the technologies is to extend the cognitive senses and perceptions, favoring the student to discover new forms of learning and researching, aiming to create opportunities of new experiments, explorations and exchanges that turn significant knowledges into a citizen practice.

That teaching perspective opens new opportunities to the teacher, since it favors the interaction among students and enables the Discovery of new knowledges in both individual and collective ways, because the university today is challenged to change its teaching and learning methodology and logic which has been centered in reproducing and memorizing knowledge. Nowadays, it is necessary an educational mediator action which gives the student the opportunity to develop his autonomy as a researcher and citizen, promoting, according to Zabala (2002,

p. 58), “some knowledge that is global, integrator, contextualized, systemic, capable of facing the issues and problems, both open and diffuse that realities brings”.

It is understood that it is essential to have learning for life, which requires some guidance that allows the construction and reconstruction of useful knowledges and prepare the student to learn and reinvent the thinking, as well as develop the ethical, aesthetic, senses, the personal responsibility, autonomy and the critical reflection.

Nowadays, the required competences to act in the Professional, political and economical contexts demand logical, analytical, conceptual, creative, emotional and spiritual knowledges, which combined are able to reflect in a more social and communicative social and professional action, the capability of working in a team, thinking and acting collectively. Therefore, it is necessary to take in consideration Moran’s ponderings (2006, p. 61): “It is important to always connect teaching and the student’s life, to come closer to the student in every possible way: through experience, image, sound, representation (role playing and simulations), multimedia, online and offline interactions”.

It is understood then, that the new century teacher with technical and political competences acts as a social subject full of innovative knowledges, and searches to offer a work to prepare his committed and engaged students to transform and intervene in their social contexts, overcoming uncertainties and visualizing the future as an opportunity to articulate and solve complex problems that are presented in society.

According to Zabala (2002, p. 23),

[...] if teaching wants to succeed, it should promote the students’ interests. Even though that empirical verification is well known for all the educators, and since the beginning of the history of education as well as the great pedagogues have mentioned the need to motivate in order to promote the learning, it is after that verification that the ways of teaching start to be spread, in which the contents organization do not come from a strictly disciplinary structure, but tries to encourage the students’ motivation through planning lessons and units whose

starting point, which is what should be done, is something that interests the students.

That said, it is understandable and necessary the diversification of the teaching and learning sceneries, since the articulation between theory and practice assumes the use of methodological strategies that enable the students' insertion in concrete realities. That way, the construction of knowledges is kept close to the teaching world and social and Professional reality of students, making real the perspective of understanding of multiple possibilities to introduce more creative, critical and reflective people to society.

This possibility only becomes real after the involvement of the student as the subject of his process of learning how to learn with a systemic view, articulating his knowledges to a more citizen and innovative practice, according to what proposes Behrens (2006, p. 71):

[...] The innovative teacher needs to be creative, articulator and mainly a partner to his students in the learning process. In that new view, the teacher must change the focus from teaching to reproduce knowledge and start to worry about the leaning, mainly, the "learning how to learn", opening collective paths of search and investigation to the production of the students' and his own knowledge.

The new configurations demand from the university the adoption of dialogical and collaborative methodologies, as well as the establishment of educational strategies from the educational organization, and mainly, the teacher in the formatting of activities that face the challenges of using the technologies to benefit a learning that favors the information articulation with the imagination to the creation of the new and the significant.

## Considerations on the research

The qualitative research, such as case study, involved 15 professors that work in teaching of technological courses of a private college in the city

of Curitiba, whose formation is characterized mostly by graduates, among them, many do not have the pedagogical and didactics formation.

The research process allowed collecting the academic formation of the researched professionals and the way they deal with the pedagogical practice by taking in consideration the methodological, evaluative aspects and the use of technologies to support the educational process. Therefore, it was proposed a questionnaire with open and direct questions.

Among the 15 investigated professors, we were able to identify five from the administrative area, three economists, four area graduated in Law, one in Psychology and one from the human sciences area formation to teach Mathematics and one with graduation in Civil engineering. We identified that from the 15 only seven have pedagogical formation; the others have graduation courses and specialization courses, but in areas related to their formation.

We asked to the researched ones how they see their pedagogical practice and IF they use some methodology that meets the challenges of a dialogical and collective educational action.

We mention the following contributions:

*I understand that the professor's practice needs to follow the technologies and give opportunity to make the student express himself during the classes as a way to realize and better understand the social and Professional reality of this student, as a way to contribute with his learning. I have noticed that due to this globalized evolution, the professor needs to constantly improve; as a matter of fact, all professionals need to invest in continuous education nowadays (Professor 3).*

*The students are more critical and reflective today. When they are not able to understand, they ask, what requires that we as teachers are always updated and constant researchers. Due to this fact, I attended a post-graduation course in teaching and took part of an online tutoring class, otherwise I would be out of the classroom. The requirements related to a professor's knowledge is much more demanding, most universities is requiring a master degree (Professor 12).*

It can be observed that the professors realize the changes that have occurred, as well as understanding that it is essential to invest in continued education, especially regarding the aspects to teaching, which confirms Imbernón's considerations (2010, p. 48):

A new form of seeing education and teachers' formation goes through an understanding about what has occurred due to the specificities of some areas of the curriculum, of the vertiginous changes of context, of the fast implementation of new information technologies, of the way of organizing in educational institutions, of the school integration among different children, of the respect to the other, of everything that is around us and of the intercultural phenomenon.

Those considerations make us reflect about our role as change agents and that continued education is essential to our pedagogical path. In that sense, we ask the professors about the understanding on technologies and how they use it as tools of support to the educational process, having the following considerations:

*Today, when I am in the classroom, I realize that most students have their laptop computers open. At first, it bothered me, but I try to take advantage of it, and when I am preparing my classes, I suggest researches in class that may strengthen the contents I am working on, as well as make the student use the computer in a proper way in class. If there aren't some students that do not have a laptop computer, I suggest a group research, either about a law or a specific subject, aiming to make the students are more participative in class (Professor 5).*

*We can not work in teaching without using technology anymore. I've taken two teaching courses and one of them was about online tutoring, since I also work as a tutor in open courses. It was a fantastic experience and nowadays, I use that knowledge to suggest research and interact with my students of classroom courses, which has contributed to reinforce what I work on during the classes and to strengthen the bonds of teaching and learning (Professor 6).*

Those teachers' considerations were very relevant, since they show the need of an innovative approach and the receptivity to the use of technologies in a way to contribute in reinforcing the teaching and learning process.

The investigated professors showed that they realized that the educational universe is changing, that they have a significant role in helping to build a more collaborative university and that the teaching engagement requires an innovative and collaborative action.

Education demands the consolidation of a network of relations between students and professors aiming to favor the construction of a systemic model of information that focus on significant knowledges, which take in consideration the precious knowledges of students as well as their social and cultural reality, that promotes the construction of a more human, fair and innovative citizens.

## **Final considerations**

The research conducted with the professors that work with technological education offers relevant and significant considerations related to the aspects of investing in continued education and the need to adopt innovative methodological practices in order to promote a more dialogical and collaborative interaction between students and professors.

It is necessary to have strategies that allow to improve the teaching work through a methodology that offers the research on teaching projects, and use technologies as support tools in the construction of new knowledges contributing to expand the possibilities of reconfiguration of educational relations, creating collaborative and reflective communities.

The proposal of an innovative paradigm based on the complexity theory suggests that the pedagogical action considers the social and cultural relations of students as channels to construct a fairer society, and in the effective political, economical and educational participation of all, creating competences that have as a result, the equalization and social inclusion.

The investigated professors realize the need to promote a pedagogical practice that enables the students' interaction, that their demonstrations and considerations are relevant for the communities of information consolidate in integrated and connected knowledge societies, and that are turned into a critical, aesthetic, ethic, and inclusive development

With the adoption of a more participative, holistic and collaborative complex methodology, the involvement of all enables the construction of a new knowledge and learning culture, which results in growth, in the evolution for a democratic education, improving the learning and recognizing the student as a subject of knowledge and builder of his own history.

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Received: 08/15/2012

*Recebido*: 15/08/2012

Approved: 10/10/2012

*Aprovado*: 10/10/2012