GESj
Vol. 1, N° 1, 2019

Journal of Global Education Sciences

A publication of
CINCADER
Centre of Research and Training for Regional Development
Online at www.journals.cincader.org

ISSN 2663-3787
DOI: https://doi.org/10.32829/ges.v1i1.76

Didactic Technology in Training Researchers

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Received: 05 March 2019; Accepted: 19 March 2019; Published: 27 March 2019

Resumen

La tecnología didáctica es una hibridación necesaria para la formación de investigadores. Por un lado, la didáctica aporta los procesos validados para el proceso de enseñanza y aprendizaje de la investigación a partir de la presencia, experiencia y experticia del investigador; y por otro lado, la tecnología aporta las herramientas estadísticas en línea, los programas para análisis de datos cualitativos, que son los elementos esenciales de los que deben disponer los nuevos investigadores de la ciencia. Este artículo reflexiona en torno a la incorporación de la tecnología didáctica como una rama del saber para afrontar la investigación científica, cuya responsabilidad es la generación y aplicación del conocimiento desde el ámbito universitario. Se concluye en la necesidad de formar investigadores capaces del dominio de investigativo y competentes para desenvolverse en cualquier parte del mundo.

Palabras clave: Tecnología; Didáctica; formación de investigadores; epistemología.

Abstract

The didactic technology is a necessary hybridization for the training of researchers. On the one hand, the didactic provides the validated processes for the teaching and learning process of the research based on the presence, experience and expertise of the researcher; and on the other hand, technology provides online statistical tools, programs for the analysis of qualitative data, which are the essential elements that new researchers of science should have. This article reflects on the incorporation of didactic technology as a branch of knowledge to face scientific research, whose responsibility is the generation and application of knowledge from the university environment. It concludes in the need to train researchers capable of the domain of investigative and competent to operate in any part of the world.

Keywords: Technology; didactics; training of researchers; epistemology.

1. Introduction

The training of researchers in a challenge that reaches all higher education centers, especially universities, which must generate and apply knowledge about various voids or problems facing science and technology. In Peru, there is a lack of research or systematic studies that account for the state of overlap of didactic technology in the development of educational research, much less in the training of researchers; However, there is evidence of the articulation of didactics and technology in the countries that promote the development of science and technology.

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The substantial relevance of education in the contemporary world, becomes a common feature that does not allow discussion. The information age in which abundant information is available also has its counterpart which is uncertainty, and for the face of both, citizens are required capable of understanding the complexity of situations, assimilating the exponential increase in information, as well as as his creative adaptation to both the speed of change and the uncertainty that accompanies it. In this state of affairs, the didactic technology will be the branch of knowledge that allows to manage information and solve situations of uncertainty.

Pérez (2010, p.38) maintained that "the generalized perception of dissatisfaction with the quality of the teaching-learning processes that take place in the contemporary school has become a common element". Students and parents perceive that the teaching of blackboard, reprints, tasks to be solved in notebooks, worksheets and flipcharts, are meaningless, in a world where the campaign for saving paper through avoidance of its use is consistent with the teaching practices; The same activities can be done with the use of ICT tools and offer students the possibilities of using the media they use on a regular basis. This fact demonstrates that traditional didactics must give way to didactic technology. The dissatisfaction of the students and their parents with the traditional forms of teaching that survive, is reasonable because while teaching in this part of the world clings to printed texts, printed sheets and other commercial printed materials, teaching has seen a lot most favored in developed countries, given the advance of its technological platform.

The research involves two complementary actions, on the one hand, the field work to collect the empirical evidence and on the other, the availability of technological resources for processing. Research counseling for the training of researchers, also has two ways to become effective, the first through the presence of the teacher in the field, to guide the collection of information and data or for experimentation, variable control, measurement of behaviors; and on the other, the availability of the advisor through the networks to inform and consult him on the advances, setbacks, serendipity or other problems related to the execution of the research or with adverse results to those expected. If these conditions are not met, the training of researchers will be a good intention, but without the possibility of becoming a reality.

The universities of the world facilitate the training of researchers with the incorporation of automated systems of project management; programs to monitor research subjects, online statistical programs for quantitative research, as well as the use of CAQDAS that help to synthesize, organize and organize qualitative research information; programs that become effective support for the training of professionals in scientific research.

2. Literature Review

The didactic technology in the training of researchers

The vertiginous growth of resources offered by the Internet along with the boom in the supply of free publications, as maintain Romero et al. (2016) constitutes a challenge for universities, for which the underlying importance in digital literacy has been recognized, reorienting training in competencies for information processing. This supposes the prevailing necessity of gestating from the heart of the universities, the formalization of a digital culture, capable of guaranteeing technological appropriation, accentuating critical research, with adequate guidance for the use of available technologies in the construction of knowledge, connoting itself, the imperative need to train the trainers in this knowledge, so that their management continues to contribute to the establishment of that digital culture.

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In this line of ideas and based on the recognition of the importance and advantages of virtual learning environments as an educational platform, didactic technology becomes a strategic tool for the continuous learning of researchers, offering them the possibility of creating, manage and use multiple virtual spaces for the learning of scientific research. The didactic technology facilitates the interaction of the advisors with the researchers in training and of these with their peers, giving rise to spaces of effective communication since the interactions take place around the subjects that interest them.

From the perspective of the training of researchers, a variety of programs have been created that have nuanced the emergence of courses that provide specialized training to those who are already researchers. Some of these programs are framed in the training of quantitative researchers, others in qualitative and a few in sociocritical and dialectical research, but most have been concerned with the dissemination of statistical programs with a predominant tendency to the hypothetico-deductive approach. Online training programs for researchers are useful, but it is insufficient to explain the complex process that takes place in the fields of research both undergraduate and postgraduate. Therefore, the training of researchers must be carried out by researchers (advisors) with mastery of didactic technology, in which didactics is the science of teaching and learning of research and technology becomes an auxiliary tool that facilitates the training of researchers.

The training of researchers requires the presence of the experienced researcher, as it is a complex process in which experience, experience, expertise and creativity are essential components and can only be taught from presence. The training of the researcher requires accompanying him until his development and performance with cognitive independence, the same that can not be taught only in the classrooms or only with the technologies, because the first centers the activity of the professor in the transmission of the investigative knowledge and in his apprehension and the second in the management of computer resources. The universities invest in experienced researchers, in laboratories, in reagents and, in addition, they have tools that allow them to narrow distances and exchange knowledge from their work in research, these have been favored by the interactive world that contributes from the internet in its process of knowledge construction. In this process of approach, the opening to scientific production has been relevant when Web 2.0 understand and appreciate the agreements between different houses of study, as well as the cluster design for research and development, among other possibilities.

Consequently, as Velandria (2013) argues, it is necessary to emphasize: (a) preparation of a diagnostic study that verifies the current conditions in the communication networks against the culture of technological innovation in universities, (b) description of the desired situation on the availability of networks that support technological innovations in virtual learning environments (teaching and research), (c) implementation of high-capacity networks, and (d) incorporation of computer and information skills in the study centers of the institutions university academics.

Didactic technology tools in the training of researchers

The development of learning environments mediated by didactic technologies (DT), as affirmed by Hernández & Andrade, (2011) "has been constituted as an alternative that enriches the praxis, and it is possible to document favorable experiences of integration of the computer as a didactic tool in the teaching-learning process ". The efforts to create computer systems for learning have followed different directions, it is common the design of statistical software, CAQDAS for

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qualitative research and spaces for debates that promote the production and reflection on knowledge and the questioning of the status quo of current knowledge.

In regular basic education, didactic technology is also used, but its objectives are curricular compliance and not training of researchers, as an example, it will suffice to point out the educational computing project Enciclomedia, the same as according to Silva (2005) , provides a pedagogical tool that links the contents of free textbooks with the official program of primary and secondary studies and various technological resources, such as audio and video, through hypermedia links that lead the student and the teacher in a attractive, collaborative and organized environment by topics and concepts that serve as a reference to pedagogical resources related to the basic education curriculum inside and outside the classroom.

Rincón (2016) argued that, in the conventional model for training researchers, based on postgraduate studies, inter and multidisciplinary intervention should favor the integration of didactic technology as an interdisciplinary field that contributes to researchers' research training. Likewise, theoretical courses, methodological seminars and technical workshops, which are part of a comprehensive strategy for the acquisition of skills and theoretical, methodological and technical skills, should not interfere with digital technology that operates in real time.

In this same line of ideas, but applied to regular basic education, Jimenez, Mora & Cuadros (2016) argued that, it should not be forgotten that, like any other teaching tool, teaching technologies have great advantages. Among the main ones, they highlighted:

- Increased student interest in learning second languages, which contributes to their motivation and creativity.
- Promoting autonomous learning, through which the student has the ability to choose and is granted autonomy in the learning process.
- Non-linear access to information and the role of the student in the acquisition of new languages.
- However, the resources of didactic technology present some drawbacks:
- The lack of quality control, since the world of the Internet is so wide that it can not be verified whether the sources consulted are reliable or not.
- The lack of computers in most schools.
- Intellectual property rights.
- The lack of training of some professors in this field, among others.

Main didactic technologies that contribute in the training of researchers

Jiménez, Mora & Cuadros (2016) stated that of the many didactic technologies that exist in the academic world, the most common and that contribute in the training of researchers can be:

- The electronic mail. As is known, it is an asynchronous service that allows the sending and receiving of messages, in addition you can attach all kinds of files. In teaching, it allows the organization of exchanges of correspondence between students (Pastor, 1999).
- Website It offers the student many possibilities to practice [...] through various exercises, interesting links, games, etc.
- Facebook. With the social network created by Mark Zuckerberg in 2004 and since mid-2007 available in French, German and Spanish, students can be in contact with teachers and other colleagues, raise questions and provide solutions. This task can be carried out by creating a group on Facebook, in which members receive notifications and can share files of different

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lengths. This resource encourages the motivation and creativity of the students, and, consequently, a more spontaneous and fun learning (Fernández, 2012).

- Youtube It allows users to share and view tutorials and videos that offer endless information applicable to the field of. knowledge.
- Twitter. The social network of communication through messages of up to 140 characters or tweets created in English in 2006 and in Spanish version from 2009, has great didactic possibilities and the creation of a label to disseminate information and events related to research (Varo & Cuadros, 2013).
- Windows Movie Maker. Program of digital edition of videos through the use of images, audios and clips of videos that, in addition, allows to add titles, subtitles and different transitions.
- Kahoot. This free online questionnaire tool encourages the active participation of the subjects under study by answering the items related to the research. One of the advantages offered by this resource is the obtaining of immediate feedback (feedback), once the questions have been answered.
- Audacity. Free access audio recording and editing program.

Binding competences for the training of researchers

Carrasco et al. (2016) state that during the training of researchers it is important to develop the following competences:

- To set up research teams (networks of researchers).
- To construct objects (particularities of the discovery context).
- To formulate theoretical frameworks, and state of the art: (managers of scientific information, open access, etc.).
- To collect information (digital instruments, registration systems, etc.).
- To analyze the information (specialized softwares).
- To discuss the results (specialized networks and softwares).
- To communicate science (spaces, means and available resources).
- To guarantee the quality of research (networks, spaces, media and resources), among others

The universities of the world as a whole need to broaden their focus on the training of researchers, which has its own way of revolutionizing scientific research in its own reality and then expanding it in a holistic way. Universities must be generators of disciplinary scientific knowledge, however, there are few universities that have hospitals, clinics, farms, experimentation centers, learning centers, application centers. The research must be permanent in the universities and this involves having prestigious research advisors, with publications and with the necessary infrastructure and equipment for the generation and application of knowledge in the universities where they work. For this, it is fundamental to train researchers whose perspective transcends the moment, instant photography, and rather, project the results of their research towards a global society in which digital is a globalizing cultural element.

To train researchers in universities, you need to move towards an epistemology and therefore a language of the disciplines, to systematize the theoretical-disciplinary advance, consolidate the philosophical movements that accompany each discipline and above all be aware that knowledge is temporary and fallible. Finally, the trainers of the 21st century researchers have to redesign the training processes in the light of the analysis of experiences and continue in the search for new forms of research training articulating technology, didactics and research is real education spaces.

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3. Conclusions

- The research work among universities that invest to generate and apply knowledge are bibliographic without impact on the problems of science. The universities that produce new disciplinary knowledge have in their teaching staff of recognized researchers and also use as a tool the virtual education based on the platforms, training with digital tutorials, and among others, which are possibilities to complement the training of qualified professionals for the research, it is the inter and multidisciplinary integration of the different scientific fields that have generated important applied and technological research. The integration and collaboration of teams of researchers in multipurpose, multistage and multicenter studies is essential to contribute to the training of a researcher with ample possibilities and methodological, theoretical, pedagogical, psychological, philosophical and sociological capabilities capable of functioning in any part of the world. world.
- In the context of the immersion of didactic technology in universities, as affirm Romero et al. (2016) is of imperative need to manage the diverse processes of the universities and, especially, those inherent to scientific research, the development of the design of a logical technological architecture, according to the needs of each university and its functional unit involved, so it is imperative to timely update the management of teaching technologies through all its processes, exalting teaching, research and extension, as items that are more important from the perspective of its offer to the world global. That is why the training of researchers is still relevant, in the sense that they are appropriating the knowledge that guarantees them the proper use of technological resources, as well as their harmonious integration with platforms for virtual learning that, with its advantages, they maximize the benefits of didactic technologies at the service of society.
- To conclude, corroborating in Litwin's (1994) proposals, the development of didactic technology impacts society's way of life in such a way that higher education centers or other basic education levels can not remain on the sidelines. It is not simply about the creation of technology for education, critical reception or the incorporation of media information in the school. It is about understanding that new forms of communication have been created, new work styles, new ways of accessing and producing knowledge. Understanding them in all their dimension of the technologies, will allow us to generate good practices of the investigative teaching.

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