

Habilitación tecnológica de profesores universitarios y docentes de educación básica

Basic and Higher Education Teachers' Technological Enablement

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The core content of any learning experience
is the process by which one learns.
POSTMAN Y WEINGARTNER, 1969

Palabras clave

Educación virtual,
ambientes virtuales de
aprendizaje, capacitación,
TIC, saberes digitales,
profesores

RESUMEN

En este artículo se presenta una revisión de las tendencias e implicaciones generales de la educación superior y educación continua de profesores y docentes en modalidad no presencial en México –de inicio– y en el estado de Veracruz –en un segundo lugar–, estado donde la educación a distancia con mediación digital ha sido una opción de formación de estudiantes y profesores de alcance considerable. La habilitación tecnológica de docentes y profesores a través de medios digitales es cada vez más necesaria y para atender las necesidades actuales se requiere de una ruptura del paradigma imperante de saber computación ligado usualmente a la ofimática. Como propuesta de cambio a la estructura de formación docente construimos dos diplomados virtuales de habilitación tecnológica que tienen como base la teoría de los saberes digitales. Los diplomados diseñados en 2017 y 2018, hoy se ofertan por la Asociación Nacional de Universidades e Instituciones de Educación Superior y por el Sistema Nacional de Educación a Distancia; además de la teoría de los saberes digitales, los programas consideran el nivel educativo de los docentes de educación básica y el campo disciplinario en el que se desempeñan los profesores universitarios como ejes de articulación de una formación pertinente de los profesionales de la educación.

ABSTRACT

In this article we present the revision of trends and general implications of Higher education and continuous education of educators in distance mode in México –in the first place– and in the State of Veracruz –in the second place–, Mexican State where distance education enhanced with digital mediation has been a clear option of student and educator's formation with a considerable reach. Technology enablement of educators with digital means is every time more necessary and to be coherent with the signs of the times, it requires breaking the prevailing paradigm of what it is understood by computational competence. As a response to a change of an educator's enablement structure, we built two virtual diplomas for in service educators that have, as a funding base, the theory of the Digital Knowledge Set. The courses that were designed in 2017 and 2018, are today offered by the National Association of Universities and Higher Education Institutions of Mexico and its National System of Distance Education; and besides resorting to the afore mentioned theory, the programs considered the level educators are working on and their disciplinary orientation as articulation axis of a relevant bildung.

Keywords

Virtual education, virtual
learning environments,
training, ICT, digital
knowledge set, educators

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INTRODUCTION

Teaching updating through virtual strategies is recent in Mexico. However, the efforts made have paved the way and opened a gap in the old format of face-to-face or blended refresher courses. There have been many experiences but, without trying to be exhaustive, we can identify some of the characteristics of this type of courses. In general, the technological training received by teachers focuses on the Microsoft Office suite (Word, PowerPoint and Excel) and its general, homogeneous and repeated management.

Likewise, it is common to find courses for the management of Adobe products (Photoshop for graphic design, Dreamweaver for web design or InDesign for editorial design) or for more complex topics, such as R programming, Geographic Information Systems (GIS) or video production with Final Cut, for example.

Along these lines, Cassany (2014) has identified the development of "good practices" of continuous training mediated by technology. It is obvious that, by having access to the Internet, teachers use printed textbooks less frequently for teaching, and this in turn, enhances the search for information on the Internet, as well as collaborative work.

Private institutions and civil organizations together with public education institutions offer a wide variety of courses on the management of computer equipment, with uneven contents and quality, focused on the use of computer programs that promise enabling their participants in designing learning objects, using databases and even managing social networks.

The existence of a huge offer of technological updating face-to-face, blended or virtual modalities courses, with or without teacher mediation, is undeniable. An increasingly popular option is to do so through mass open online courses (MOOCs). However, in this and other cases, the offer is often disconnected from the specific needs of teachers of all the educational levels of the Mexican system, the requirements of the curriculum and the teaching practices.

On the other hand, it is important to mention the criticism directed to MOOCs, since at the beginning, the training was supposedly free given the meaning of second vowel of its name, *Open*. The access to this training is free; however, the certification is not. The cost of the certification is determined by the institution that offers the training (Scopeo, 2013).

With a few exceptions, teachers' technological literacy has been detached from both educational projects and pedagogical considerations. The commercial trends of the positioning of products such as those of Microsoft or Adobe have served as guiding principles to steer the direction the teacher training should take. This dynamic was justified in the first years of the existence of the information and communication technologies

(ICTs) and their incorporation into education, when a basic knowledge was essential for the general use of computers, but at present, it is inadmissible to continue with such practice.

Three main causes are at the root of the current conformation of the offer of virtual education courses. The first is the absence of a national educational project that establishes the digital knowledge that should be incorporated into the curriculum of each educational level. The second is the predominance of a bureaucratic vision that administers in a homogenous way the educational diversity and its updating options. The third is the homogeneous treatment, at university level, given to teachers from all fields of knowledge and the academic disciplines that are completely ignored as the fundamental axis of the definition of a technological development project with an academic basis (Casillas and Ramírez, no date). A similar situation occurs in basic education, the treatment of pre-school, primary or high school teachers is often disconnected from the needs of each level of education (Ramírez and Casillas, 2017).

DISTANCE EDUCATION IN MEXICO

Article 46 of Agreement 445 of Mexico's General Law on Education published in the Official Journal of the Federation (Vázquez Mota, 2008) recognizes schooling, non-schooling and mixed educational modalities as viable social dynamics in our country. This school-based dynamics differentiates the educational modalities, explains them from the planning and self-regulation of the learning of the students who access the information and interact with peers and teachers who are detached from the geographical and temporal reality.

The out-of-school modality (open, distance or virtual) can stick to school calendars typical of the onsite classroom to determine both, the beginning and the end of courses that comprise an educational program, or the delivery of tasks and learning evidence within the course. Without a classroom, a school or face-to-face interaction between students and teachers, various methodological and technological resources are used in distance higher education to overcome the spatial, temporal and learning pace that distances university stakeholders from educational services (Pérez and Moreno, 2015). In distance higher education, a dialogue is established aiming at achieving objectives and competences, regardless of the geographical location of the educational stakeholders.

It is important to highlight that distance education is an educational option for mature students, usually used for on-the-job training, knowledge professionalization, postgraduate studies, undergraduate and senior high school studies. The maturity of the student, his planning and learning strategy abilities are conditions necessary for achieving academic success in this modality. Hence, the students' participation in the

teaching-learning processes cannot be dealt with in the same way as with other educational levels and modalities.

Virtual education is a flexible educational option that consists of an interaction dynamics enabled and mediated by the network. As in distance higher education, participants in virtual training are mature students who usually enroll in courses convinced that the training experience in this modality is appropriate for them. Hence, the pedagogical model of work in virtual education cannot be the result of an interpolation of the dynamics and interactions typical of face-to-face models, but rather the result of the high degree of commitment and motivation of mature students to learn the topics of the courses, to access information in different ways, carry out their work and deliver it. However, the replication of strategies and methodologies that only make sense in the classroom and the programming of rigid virtual learning platforms have served as a standard for the development of courses in non-conventional modalities.

Over the years, distance higher education with digital mediation has established itself as an educational option through which mature students have access to higher education. The diagnosis presented by the National System of Distance Education (Hernández, 2017) of the National Association of Institutions of Higher Education (ANUIES), refers to the considerable growth of the number of university students enrolling in non-schooled models in public higher education institutions (51%) and private (49%) which went from 125 thousand registered in the 1997-1998 school year to 517 thousand undergraduate and university higher technical students in 2014-2015.

In the last school year accounted for, the National Institute of Statistics and Geography (INEGI) -ANUIES has seen an increasing enrollment of students in the areas of the Social Sciences, Administration and Law (58%); followed by Education, with 16%; Engineering, Manufacturing and Construction, with 11%; Health, with 6%; and 3% in areas such as Services, Arts and Humanities, as well as Agronomy and Veterinary Medicine. In the case of postgraduate studies, the distance higher education enrolment growth was greater than that of the undergraduate studies: of 4 560 students registered in 1997-1998, in 2014-2015, the enrolment had reached 440 584 students, with an enrollment distribution in the last school cycle in two major areas of both public and private higher education institutions: Social Sciences, Administration and Law, with 49%, and Education, with 44% (Hernández, 2017).

In Mexico, the offer for virtual education is vast and the educational institutions (public and private) that seek implementing it, have access to various funds to support the project and its geographical location. The National Open and Distance University of Mexico is a federal project which educational offer is entirely virtual and has an enrollment close to 90,000 students (SEP, 2015).

On the other hand, the SINED (Hernández, 2017), identified 27 institutions of 130 higher education institutions that participated in the diagnosis of distance higher education, with alternate headquarters dedicated to this educational offer; these are: Universidad Digital del Estado de México [Digital University of the State of Mexico], Universidad de Guadalajara [University of Guadalajara], Universidad del Valle de México [University of the Valley of Mexico], Enseñanza e Investigación Superior, AC (Tecnológico) [Teaching and Higher Research, A.C. (Tecnológico)]; Instituto Tecnológico y de Estudios Superiores de Monterrey, [The Institute of Higher Education and Technology of Monterrey], Universidad La Salle, AC [La Salle University, A.C.]; Instituto Politécnico Nacional [National Polytechnic Institute], Universidad Juárez del Estado de Durango [Juarez University of the State of Durango], Instituto Tecnológico de Querétaro [Technological Institute of Querétaro], Universidad Autónoma de Tamaulipas [Tamaulipas Autonomous University], Universidad Anáhuac [Anáhuac University], Universidad Michoacana de San Nicolás de Hidalgo [Michoacán University of San Nicolás de Hidalgo], Instituto Tecnológico de Ciudad Victoria [Ciudad Victoria Technological Institute], Universidad Tecnológica de México [Technological University of Mexico], Universidad Autónoma del Estado de Morelos [Autonomous University of the State of Morelos], Universidad Autónoma Metropolitana [Autonomous Metropolitan University, Universidad Veracruzana [Veracruzana University, Universidad Metropolitana, [Metropolitan University, Universidad Autónoma de Chihuahua [Chihuahua Autonomous University], Instituto Tecnológico de Tuxtla Gutiérrez [Tuxtla Gutiérrez Technological Institute], Universidad Autónoma del Carmen [Del Carmen Autonomous University], Instituto Tecnológico de San Luis Potosí [San Luis Potosí Technological Institute], Universidad Juárez Autónoma de Tabasco [Tabasco Juarez Autonomous University], Universidad Autónoma de Guerrero [Guerrero Autonomous University], Instituto Tecnológico de Aguascalientes [Aguascalientes Technological Institute], Centro de Estudios Universitarios de Monterrey e Instituto Latinoamericano de la Comunicación Educativa [Monterrey University Studies Center and the Latin American Institute of Educational Communication].

To finish categorizing the distance education options in Mexico, it is worth reviewing the consultation system of the Padrón Nacional de Posgrado de Calidad (PNPC, Spanish acronym for The National Graduate Quality Register) of the Consejo Nacional de Ciencia y Tecnología (CONACYT [Spanish acronym for The National Council of Science and Technology]), in which we find 17 current postgraduate studies programs (16 masters' and one doctorate degrees) offered at six Mexican educational institutions: Facultad Latinoamericana de Ciencias Sociales [Latin American Faculty of Social Sciences] (Mexico campus), Instituto Politécnico Nacional [National Polytechnic Institute], Tecnológico y de Estudios Superiores de Monterrey [The Institute of Higher Education and Technology of Monterrey], Universidad Autónoma de Querétaro [Querétaro

Autonomous University], Universidad Da Vinci, A.C. [Da Vinci University, A.C.]; and Universidad de Guadalajara [University of Guadalajara].

There is an important tradition of virtual education in the state of Veracruz. The Clavijero Consortium, established in 2005, in its beginning, convened the most important institutions of higher education in the state to share human, technological and thematic resources.

Currently, the Consorcio Clavijero Institute [The Clavijero Consortium Institute] has a multiple online offer, from online senior high school, higher university technician, Bachelor's degrees, Masters in Education and Administration, as well as online education courses for teachers on learning facilitation, school management, mathematics teaching, critical thinking, ICTs didactical use and development of multimedia educational material.

The Universidad Veracruzana [Veracruzana University] has made different efforts and projects to offer virtual education. It began with the installation of videoconferencing systems in the nineties, the certificate course in Didactics of Teaching on the Internet (1999), which evolved quickly into the specialty in Virtual Education (2002) which later became the Master's degree in Virtual Education (2005).

In the first half of the century, there was an attempt to establish a virtual university model that would offer Bachelor's and higher university technician degrees; however, after a short term, the project failed to meet its objectives and was abandoned. In 2012, the Master's in Virtual Education was restructured, with the recognition of the PNPC, to attend a generation of face-to-face students based on a research-oriented approach. Educational programs and addresses such as the Open Teaching System and the Academic Development and Educational Innovation have a constant, although incipient, virtual offer.

The National Laboratory of Advanced Computing is another educational institution in the state of Veracruz that offers virtual courses and certificate courses on the production of educational materials with mobiles, software applied to teaching, integral evaluation with mobiles, mathematical thinking and mobile technology. Lastly, it is worth mentioning that the state tradition of offering virtual education is not typical of institutions and teachers, since in the diagnosis of distance higher education (Hernández, 2017, p.21), Veracruz stands out - after the Mexico City, with 41% - as the state with the highest proportion of student participation in this modality, with 21%.

INNOVARION IN DISTANCE EDUCATION WITH DIGITAL MEDIATION

Innovation in out-of-school models with digital mediation has recently emerged in three ways; more than giving rise to the prevailing model of

virtual education, these models have facilitated the creation of new educational options with improvements in access to the course, changes in its duration, certification and recreational orientation of the training.

As a result of the improvements in the access to educational content, MOOCs were created, remote courses accessible via the Internet governed by the principle of open and mass education, to which anyone interested in the topic of the course can register. MOOCs are offered on mass education virtual platforms such as Coursera, MéxicoX or Miriada X [1].

The flexibility of the duration of the courses has opened the way to designing and offering short educational options. This is the case of EduLills of educaLAB. EducaLAB educational pills are educational micro-contents aligned with the areas of the Common Framework of Digital Teacher Competence 2017 of the National Institute of Educational Technologies and Teacher Training of the Spanish Ministry of Education, Culture and Sports. Other educational options of short duration are the Nano MOOC or NOOC, courses that aim at developing micro-competences in a timely and efficient manner; the applications for the learning of languages in free time such as DuoLingo, are also notable examples of short courses in which the time of access to information is one of the main considerations of innovative developments.

The OpenCourseWare movement of the Massachusetts Institute of Technology, as well as most MOOCs that can be found on the commercial course platforms, offer open and free access to its educational contents and the option of obtaining a certificate issued by the institution that operates the course by paying a certification fee. For some students, the contents of the online course are sufficient; however, for others, the certification is of greater importance, since it institutionalizes the effort and gives institutional prestige to what has been learned.

The ludic orientation of the training, also referred to as *ludification* or *gamification*, gives the courses specific elements of a serious game, such as facing challenges, meeting goals and obtaining distinctions. Through *gamification*, the course can provide the participant with levels to overcome and badges to earn in a spirit to face challenges and obtain personal achievements. According to Marín (2015, quoted by Díaz and Díaz, 2018), through *gamification*, "the development of effective teaching-learning processes, which facilitate cohesion, integration, motivation for content and empowerment of the creativity of the individuals" is achieved.

Design of two virtual diplomas in digital knowledge for teachers of higher education and teachers of basic education

In the absence of a national educational project that gradually and progressively establishes the set of knowledge and technological skills of educators and learners, and to avoid going back to the simplifying vision of digital literacy linked to the basic management of the suite of Microsoft

Office, some authors propose a methodology for incorporating ICTs into the curriculum (Ramírez and Casillas, 2016) that has been used with teachers at both the higher (Casillas and Ramírez, no date) and basic education levels (Ramírez and Casillas, 2017).

The methodology aforementioned consists of an inclusive, reflective and legitimate work, with teachers of academic communities who, through their vision and experience, define the degree of ideal technological appropriation they need in their field of action, which helps them establishing an *ad hoc* formative proposal aligned with the technological needs identified as belonging to their teaching practice. This proposal (Ramírez and Casillas, 2016) has been applied to hundreds of teachers of basic and higher education, and it differentiates the technological appropriation according to the needs of the fields of knowledge, as well as of the different levels in basic education (www.uv.mx/blogs/brechadigital).

PURPOSE

The purpose of the project was twofold: to design a technological empowerment strategy for virtual education professionals, and put it into practice and develop two certificate courses, one for university professors (SINED, 2017) and one for basic education teachers (ANUIES, 2018).

THEORETICAL SUPPORT AND CONTENTS GUIDE OF THE CERTIFICATE COURSES

The common basis of the certificate courses is the theory of digital knowledge (Casillas, Ramírez and Ortega, 2016, Casillas, Ramírez and Ortiz, 2014, Ramírez, 2012, Ramírez and Casillas, 2015, 2016, 2017, Ramírez, Casillas, Morales and Olguín, 2014; Ramírez, Morales and Olguín, 2015), which synthesizes ten technological knowledge that group, in a graduated structure, the theoretical and instrumental skills and knowledge of computer information that education stakeholders must possess depending on of their academic discipline or the educational level in which they operate.

The virtual certificate courses analyzed in this text are different from other types of distance training offers because they are the result of a long research process in which we have used the theory of digital knowledge to measure the degree of technological appropriation of the educational agents. Their scope and learning objectives derive from practical work with university scholars and basic education teachers who, through their contributions and needs, have determined the objectives of a relevant training program in technology.

Likewise, certificate courses aim at the development of activities proper to teaching in the case of basic education and, in a supplementary way, to research, management and cultural diffusion mediated by the ICTs for

university professors. Both certificate courses were made possible thanks to the contribution of content experts, graphic designers, instructional designers and programmers who integrated an interdisciplinary production team from the Universidad Veracruzana, and who have been involved in conducting research on educational innovation issues and using their findings to improve processes for the benefit of society.

The virtual certificate courses on digital knowledge for teachers and professors intend to organize digital teaching literacy into two categories. On the one hand, by segmenting the notion of computing knowledge in ten areas, it will be possible to progress thematically and gradually in ICTs issues without depending on specific software for free or commercial licensing. On the other hand, the disciplinary and relative approach to the different educational levels encourages that the units of the certificate courses not be only accessible, but also pertinent, relevant and useful for the everyday academic tasks performed by the participants of the course.

In these courses we seek teaching computing, but we must mention the fact that we have reoriented the notion of computer knowledge - normally linked to the teaching of Microsoft Word, Excel and PowerPoint, as well as to information searches on the Internet - to the development of a series of graduated digital knowledge, discipline-orientation, with a professionalizing approach and immediate impact for university professors and teachers of basic education context (See Figure).

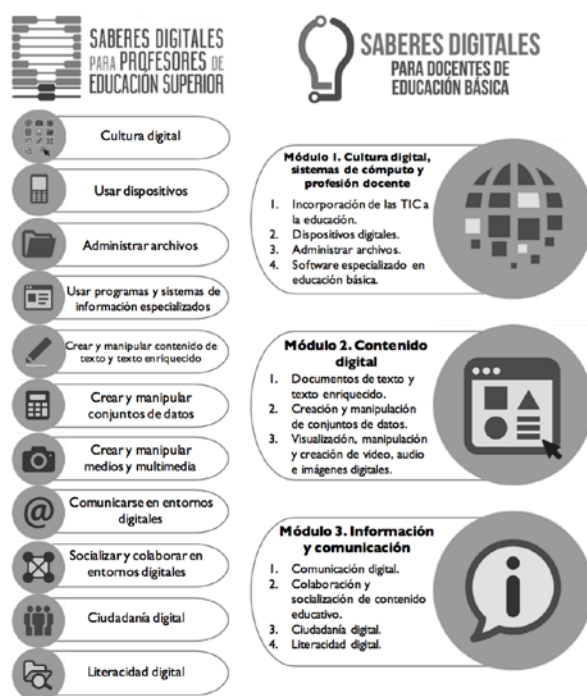


Figure. Contents of the virtual certificate course in digital knowledge.
Source: Personal development.

We have used digital knowledge to direct the content of both certification courses and the type of recipient as the element that guided their gradual and disciplinary orientation. The virtual certificate course of digital knowledge for teachers of basic education differentiates them according to their affiliation, i.e., if they are preschool, primary and high school teachers, while the higher education certificate course has general contents for university professors -as a guild- and another one in which the exercises are relevant for seven of the areas of knowledge proposed by the INEGI-ANUIES in the Mexican Classification of Study Programs by fields of academic training.

In addition to the development of digital knowledge, in both courses there is a school application project of practical use and a series of didactic strategies in which ICT and resources are used (readings, animations and videos) that can be reused by the participants. The proposed readings are brief, with specific topics, contextualized in the school setting and written horizontally by teaching colleagues. The animations, produced by With a Smile Films, are agile, friendly and forceful. The introductory videos present four talking heads that explain, in no more than five minutes, the topics on digital culture and digital knowledge and humanize the course with the faces and voices of two female professors and two male professors. By having a *creative commons* license with BY NC and SA attributes (function, non-commercial and equal sharing), the course resources can be used by the participants to rethink, share or replicate elements of the course in their academic communities.

THE VIRTUAL LEARNING PLATFORM

The certificate courses were launched in a virtual training environment known as Moodle (English acronym), a modular environment of object-oriented dynamic learning. One of the great benefits of virtual education and the use of content distribution platforms is that participants can connect from any geographical location and at any time, as long as they have access to the Internet. Moodle satisfies this need of the modality, since it is a free license and open code software with a wide community of users and developers. Once installed, Moodle is permanently available to the course participants and, thanks to its intuitive and easy-to-browse graphical environment, the user's experience can be simple.

From the standpoint of computer usability, Moodle is a virtual learning platform of intuitive and simple use, but from the perspective of teaching, we cannot deny that Moodle is not very flexible, it promotes the rigidity of access to content and students have few opportunities to propose changes and updates to new content or topics. The software is designed for a computer user and not for an active, participative and student committed to his learning. Moodle, like other virtual learning platforms, is designed to set dates, control deliveries and quantify participation in spaces for interaction between participants.

Even if the virtual learning platform we use for the courses is flexible, we identified some limitations that could affect the interaction between users; hence, we configured a design that simplified navigating on the platform. Similarly, we sought to reduce the advisor's control over the delivery of projects and tasks, which tends to be a trend in virtual education, as well as to make the rigid control of deliveries, opening and closing of modules and units more flexible which, rather than helping the participants, limited their free access to information.

Certificate courses have a homogeneous structure throughout their modules. Initially, the frame is displayed and presents general information about the certificate, the expected learning, general content, work dynamics, agenda, accreditation and credits. The units maintain the following structure:

- Introduction. Space in which a conceptual approach that includes an animation with general ideas on the subject to be addressed, is offered.
- Purpose and expected learning. Space in which reference is made to the training goal that will be achieved while performing the activities.
- Content. Space in which a brief conceptual presentation is made about the topics to be addressed. In this section a video with talking heads is included.
- Generic activities. Interaction space for activities that are common to the guild.
- Disciplinary activities. Space with differentiated activities by disciplinary field or educational level in the case of basic education.

The assessment of the participants is continuous and contains a *gamification* element because at the end of the certificate course, and according to the score obtained, the participant may receive a digital badge as a reward for his achievements.

WORK DYNAMICS

The certificate courses use a series of virtual continuing education strategies that promote the construction of knowledge through the exchange and socialization of experiences. Therefore, the participation of teachers in forums and other spaces is important not only for their personal performance, but also for the good functioning of the group. The constant connection of the participants to the platform and its contents as well as the thematic and disciplinary discussion forums is desirable because that is where they establish communication and share their reflections and experiences through the mediation of the adviser.

Communication is central to distance education mediated by digital technology, so, in addition to the communication spaces associated with activities and practices, in both courses we offer the participants a forum of accumulated doubts, in which they can expose diverse concerns. Similarly, to start the exchange with colleagues, during the adjustment week, the exchange is generated in a socialization space where they share personal data, professional training, institution of origin, field of knowledge and expectations about the certificate course.

As a pedagogical strategy, the certificate courses present the design of a critical, ideally linear route, in which participants can explore each element of the structure. We recommend that at the beginning they review the introductory animation to the module, read the general instructions and watch the presentation video, and then start the reading that will prepare them to attend the generic and disciplinary activities. However, there is no restriction for participants to explore contents and activities randomly, since all the inputs are available so the participant can trace their own learning path and, even, their academic load. In the basic education certificate course, we have included a series of exercises or computer practices that the participant can perform as many times as he wishes to strengthen his knowledge on instrumental processes of digital knowledge without expecting to be graded.

In addition to performing the activities requested in any of the two certificate courses, the participants must prepare a cross-cutting project to which they integrate the digital resources generated in the different stages of the certificate course. In the case of basic education, participants must carry out a school application project and incorporate ICTs in the by-monthly didactic planning of their class, e.g., the computer products made or inspired by the computer activities carried out. On the other hand, in higher education, a class must be implemented in a virtual platform based on the digital resources developed throughout the course. The ultimate goal of both courses is to innovate the teaching practice in order to strengthen student learning.

THE ADVISOR OF THE VIRTUAL CERTIFICATE COURSE ADVISOR

In general, the role of the advisor in the virtual modality is limited to the timely registration of the products to be delivered by the participants or, where appropriate, to the authorization of extension of time to achieve it, in addition to the feedback of the student's participation in the discussion forums. Subject to a record vision of interventions in forums and the monitoring of the assignments deadlines, the participants focus on complying with the assignments, leaving aside what is really important: learning.

Even though the didactic package and content of the course can do without the guidance and advice of a teacher, the certificate courses have an

advisor who accompanies the participants in their digital, temporal and thematic journey, through the educational platform and the contents of the courses. A rigorous process of selecting the advisors has ensured that they are experts in the topics and very empathetic with the participants.

The advisor of the certificate courses has received the instruction of being akin to the participants and accompanying them in their process at a distance in a timely manner and with respect. Similarly, we seek that the certificate courses help virtual teachers to rethink the role of the online advisor and to raise awareness that, beyond monitoring delivery times, giving feedback on the forum responses and granting or denying extensions, teaching in line should be governed by accompanying the participants and showing empathy toward them.

CONCLUSIONS

With the twofold purpose of designing and implementing a strategy of technological empowerment of education professionals through virtual diploma courses based on digital knowledge, a team composed of researchers, professors, academic technicians, graduate students of the Universidad Veracruzana and SINED officials of the National Association of Universities and Institutions of Higher Education created a content structure, its respective access scheme and a virtual space for teachers of basic and higher education to reflect on the incorporation of ICTs into their teaching practice.

The designed certificate courses have operated regularly from the second semester of 2017 until mid 2018, when we wrote this paper. The perceptions of more than 100 students who have attended the courses so far, of both the perceptions resulting from the exit questionnaires and the testimonies and opinions we have been collecting, are flattering. The contents are relevant and appropriate to the teaching environment and the academic world, they generate attention and interest of the participants, they develop new skills and, and perhaps the most difficult to measure - but easy to identify - is that the participants gain confidence and they strengthen their willingness to interact with and through ICTs.

So far, the graduation rates in five groups exceed 70% and the satisfaction rate is high. The predominant opinion is that the contents, guides, tutorials and activities meet the expectations. The quality of the videos is valued both in the technical aspect of production as well as their background and relevance in relation to the contents. Advisors have been a decisive element in the daily operation since they are very dedicated and attentive in following up the participants' virtual school experience. Fortunately, the platforms (of ANUIES and SINED) where both certificate courses are given, are robust and have allowed an optimal functioning of the courses, they support a significant number of simultaneous users and offer a good technical support service.

In regard to the relevance of the theory of digital knowledge to conduct the professors' formative processes, both certificate courses are evidence of its didactic usefulness, above all in structuring contents for each knowledge in a pertinent manner, and also emphasizing the three dimensions: cognitive, instrumental and contextual, or relative to didactic or disciplinary use, that structure them. The didactic proposal is supplemented by the nature of the exercises and support resources.

In a deliberate way, so as not to get entangled in a false debate and to take critical distance in regard to instrumental visions that derive from the theory of human resources, we do not talk about competences and we propose digital knowledge as mastering contents, usage capabilities and sense of use at school. Digital knowledge is not a fixed content, but is rather dynamic; e.g., between one version and another of the certificate courses, we had to make multiple adjustments because a software has disappeared or a link is lost or an information portal is being updated. The digital knowledge serves to frame contents, but these change constantly.

Certificate courses are built with practical sense. Instrumental exercises are prioritized, in such a way that students learn by doing; in addition, these courses are associated with the interests and dynamics of teaching practices.

The continuous training of teachers cannot continue being the result of chance or simply be left to the free will of the people. It is a national priority in all respects, since it depends on the effective changes in teaching practices. In regard to digital literacy, it is expected that all teachers - from basic to higher education - have a high technological proficiency and a broad mastery of digital knowledge. Therefore, it is necessary to multiply efforts in order to expand the bases of teacher training and accelerate the processes for its updating. In this regard, the educational authorities must adjust the course; continuous training cannot continue to be considered an individual responsibility of teachers, much less envision it as a business that, at the expense of the teachers and professors of higher education, provide economic benefits to the agencies responsible of promoting continuous training.

Under the current social-historical conditions of Mexico, permanent training of teachers is essential. The certificate courses that we have analyzed represent an opportunity to expand the mastery of ICTs and, thus, provide teachers and professors with options by which they can modify their academic practices, enrich them and diversify the resources they use in their daily practice, so all this can have a positive effect on the education of students and on the improvement of the quality of education. A successful practice for the immediate future would undoubtedly be a MOOC of digital knowledge for teachers, which goes at the pace of the participant, with a high self-study component in which teachers and professors can mobilize their digital knowledge in the educational context.

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