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Technology Management for Digital Identity Optimization among College Professors

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ABSTRACT

Technology management allows for the development of adequate processes related to the fulfillment of college professors' fundamental functions. The main aim of this study was to interpret the management of technology for digital identity optimization based on the experience of a group of teachers. The study presents a qualitative approach by using the phenomenological interpretative method. The technique and instruments that were used were the semi-structured interview and a guide for interviews with teachers from the José María Arguedas National University in Perú. The information was organized by reading and analyzing the content; categories emerged and were validated by triangulation. Findings show that most university teachers have difficulties related to the use of technology for the optimization of digital identity because of a lack of training, incorporation to networks, and academic associations, as well as investigations, that limit teachers from building, maintaining, and updating their digital identity in the academic field. Academic programs for the enhancement of skills related to technological programs and devices that give teachers the possibility of storing, organizing, and developing information that supports their knowledge and allow for visibility of their digital identity on the web, are needed. In conclusion, adequate technology management of these aspects will allow for the increase of visibility in teachers' digital identity.

Keywords: digital competencies, technology management, training, social networks, digital identity

INTRODUCTION

The 21st century has evolved at a staggering rate in the field of education which is fueled by technological developments and globalization. For this reason, teachers and students must be prepared for the complex competitive scenarios that are characterized by the dynamic generation of knowledge and advances in science and technology. This demands the appropriation of digital and technological abilities for organizations to adequately manage the services and strategies related to societal needs (Muller & Peres, 2019; Rogers & Euchner, 2022).

Technology management has become the determining factor for competitiveness and production in college scenarios. In this space, the adequate training of teachers is relevant because it allows for the acquisition of

technological capabilities and the management needed for storing and processing which facilitates the evolution of learning based on innovation and investigation (Asim & Sorooshian, 2019; Infante-Moro, 2019).

The perspective of Zhang & Nesbit (2018) for the management of technology in educational environments promotes efficiency in actions with the objective of taking advantage of the opportunities and reaching superior performance in formative activities. Sure enough, considering this outlook of accelerated technological transformations, institutions of higher education have the tremendous challenge of developing competencies and strengthening the vision for change that gives importance to the value of learning and relevance to its applicability (Arciénaga et al., 2018; Toshtemirovich, 2019).

Technology management has appeared in Peruvian public education organizations in a fragmented form and not as a tool that can accompany theory and practice which allows the teacher to showcase actions and activities that are consistent with innovations related to organizations and education. In this sense, Abrahams et al. (2019) show that teachers disregard, in practice, how to create and manage their digital profiles where they can show their strides related to teaching, research, and social extension.

In this context, Rodríguez (2019) suggest that technology management in institutions of higher education is affected by diverse factors: lack of acquisition of technology, platform maintenance, scarce research activities, and training/development of human resources. Likewise, this must be directed toward achieving the integration of processes of change with operational and strategic aspects and decision-making in educational organizations in order to represent the competitive value that digital identity grants to the knowledge and performance of college professors in activities related to research and development (R+D), production, strategic administration, and innovation.

Strategic management facilitates the visibility of teachers' digital identity effectively reflecting the productive processes in their various fundamental functions. This way, an increase in the expectations of board members is achieved as well as more opportunities for professional growth. Teachers must face the challenges presented when using and managing technology in order to be agents of change in an atmosphere of uncertainty (Mena Guacas & Santoveña Casal, 2018; Nnebedum, 2019).

Teachers have a double task. First, they must acquire the necessary skills to manage technological knowledge. Second, they must ensure that students know their way around the theory and manage the practice of content presented in class. Adjusting to what European Commission (2013) presented, the good use of technology is a prerequisite for students of all ages to be able to take complete advantage of the possibilities that technology offers when including and boosting learning in an effective way.

The proposal of the European Commission regarding the development of technology for digital assignments in spaces of education is in direct conflict with Latin American reality because content related to tech management and digital identity is scarce in academic programs. In this regard, Aguilar Gavira (2015) mentions that academic programs for various university degrees have limited content, objectives, and courses that develop topics related to the management of technology, ignoring the potential it has for the visibility of performance and academic, as well as personal, achievements.

From another perspective, the society of today demands everybody's digitalization of identity. A digital identity must be constructed because most activities and processes are performed online (Valles-Coral, 2020). This means that each individual has to be registered online and professionals are not the exception; they must also recreate part of their life offline. Digital identity generates processes that aid in the administration of personal information and that are becoming more and more automated, intensive, demanding, and taking over our lives (Elmorshidy, 2018). It is important that today's professionals, by using their digital identity, generate credentials in social networks and digital spaces that reference their reputation and them as a person; they must play a double role as the protagonist and the user where they must shield their personal and work-related information (Alonso-García et al., 2019; Pérez, 2018).

Despite listening to, reading, and having a digital identity, most teachers still ignore the potential of registering valuable information regarding their performance and personal life. Mandatory teaching programs must integrate ways to manage information in a creative way that enhances the professional profile of an individual (Weiner & Torres, 2016).

In this field, teachers must be trained in the use of technological resources which can be achieved by implementing digital literacy that comprises the multimedia diversity that is present today (Gudanowska, 2017). In this sense, and in the words of Carretero et al. (2017), the role of teachers must be transformed for the use of communications technology that allows them to discriminate and estimate information found online and in the media. Managing digital identity adequately is important because it allows an individual to show part of their personal and professional life and this can bring various benefits. If an individual does not have what was mentioned, it affects by limiting the opportunity to create networks and relationships that promote valuable information (Vähäsantanen, 2015; Hatlevik, 2017).

Nonetheless, few studies have researched technology management and digital identity in teachers. This study aims to interpret the management of technology for the optimization of digital identity among college professors.

METHODOLOGY

The study was configured from a qualitative approach which is based on basic assumptions of the social world which is constructed from symbols and meanings that are observed by the investigator and the other individuals that are involved resulting in an intersubjective perspective charged with comprehension and contemplation. Hence, an interpretative phenomenological method with flexible and emergent traits based on recursion was used for this study. This hermeneutical method is based on the comprehension of a whole, it is not mere conceptual grasping but a reflection of a reality that has been manifested.

The sampling type was intentional and bound to the point of saturation which allowed for the determination of the total number of participants that were interviewed; male and female teachers with a minimum of 9 years of academic experience from the Departments of Engineering and Education of the José María Arguedas National University (Table 1), corresponding to 60% and 40%, respectively. Everyone accepted to participate voluntarily in this study. As selection criteria, informants must have: a) worked in the institution for four consecutive academic periods; b) imparted lessons through the online teaching modality. Every participant confirmed their intervention by expressing informed consent.

Table 1. Characteristics of the informants

Informant	Academic Department	Years of service	Academic degree
IC1	Education	10	Master's
IC2	Education	12	Doctorate
IC3	Engineering	9	Master's
IC4	Engineering	10	Master's
1C5	Engineering	11	Doctorate

Various interviews with the informants were planned by using a general guide with semi-structured questions based on aspects and variables that went beyond the questions, comprehending the topic of tech management and digital identity, and allowing the five interviewees to express themselves freely and discuss the topics of their own personal experiences and interests in depth. These sessions were conducted in person and audio-recorded for their transcription in a field notebook by a third party unrelated to the interviewee or the researcher. The interviewees were identified with different letters and numbers.

After recollecting the information, the first step was the analysis of the content which delivered results of an exploratory nature. The interviews were read several times to refine the transcriptions and a group of core themes and categories were associated with them. Next, there was a second refinement period for the interpretation of content which was based on the triangulation, contrast, and codification of information considering the theoretical references conjugating inductive and deductive reasoning and completing the hermeneutic circle derived from the phenomenological method. This method is used to provide answers related to the events that were experienced by the participants of the research (Fuster, 2019).

The information that was attained was the product of a complex process because the structuring and construction of units of significance were required. The compilation of discourse and narratives from the informants based on their interviews and the triangulation of texts that were deemed important resulted in the enrichment of the study and gave it scientific significance. The categories that emerged allowed for the codification of units of significance represented in three different categories: a) Technology training, b) Networks and associations in the network, and c) Research in digital environments.

RESULTS

The categories that emerged are the result of the interviews that were conducted and analyzed for their content. The categories and subcategories related to technology management and digital identity that emerged are presented in **Figure 1**.

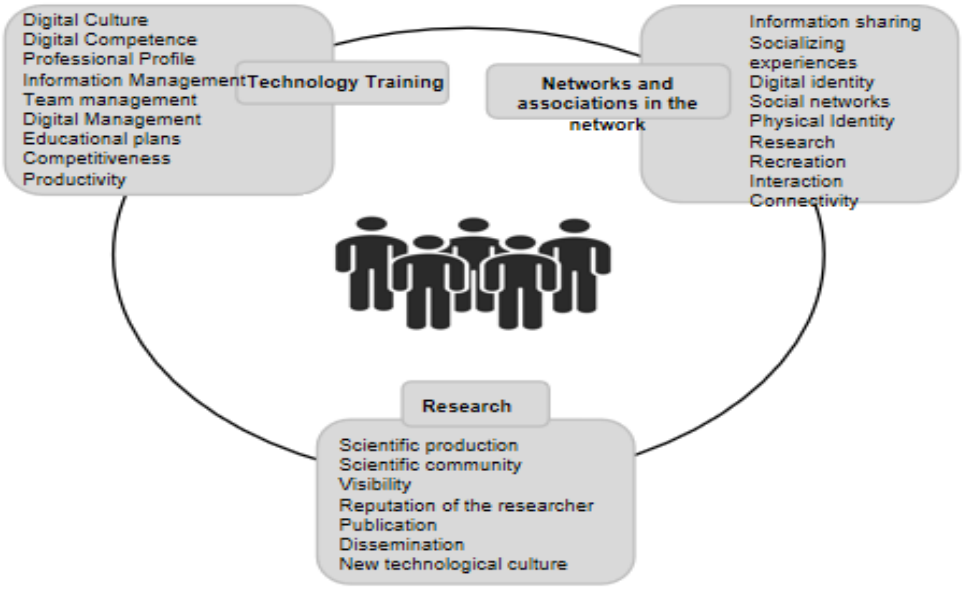

Figure 2. Structuring of Emergent Categories

DISCUSSION

After structuring the main emergent categories, the active discourse of the findings of this study is displayed below.

Technology training

Current scenarios reflect a society of knowledge that challenges the reframing of higher education. Professional training must rise above exclusion and contradictions related to digital culture so that individuals not only show their profiles but their capabilities and the professional duties they perform (Ruohotie-Lyhty & Moate, 2016; Tavares et al., 2016). In this regard, informant IC1 expressed *"…I feel excluded for not knowing how to properly manage technology; so, it is not easy for me to look for information on the web, teach online classes, build my professional profile, and completely adapt to this new modality that this job is requiring…"*. This reveals that technology training is needed for professionals to use and manage technology in a fast and easy way; nonetheless, the reality is completely different. For Müller & Wulf (2020), higher-level teaching and education still lack ways to get members of a university stratum, with no technological profiles, to acquire the basic tools and skills to be able to manage the new digital spaces.

This gets back to what informants IC2 and IC3 stated when they concurred that *"…until now, I have not registered in any social network that lets me post about my personal and professional life because I don´t know how to use it"*. On the other hand, informants IC4 and IC5 stated *"…yes, I am registered in social networks, and every now and then I use and update them because I am interested in learning and managing the tools that the internet provides so I can stay informed and up to date with the latest innovations…"*.

These new spaces that are presented by technology must be accompanied by teacher training projects that contribute to the acquisition of digital competencies with the aim to get professionals to uplift digital identity with the help of teachers that are skilled in ICT. Data presented by OECD (2016) has to be left behind considering that more than one-fourth of investigators lack basic notions regarding the management of computer-based resources and how to work with a computer because of insufficient resources for their professional duties.

It is important to notice that, as the years go by, these weak points restrict opportunities for growth in the work field due to the incapability of taking advantage of platforms that manage information and resources of great value to show achievements, as well as personal and professional strides (Brownsword, 2016). In this day and age, it is alarming when teachers are affected due to their limited use of digital tools and strategies because they can fall into obsolescence, lack of competitivity, and productivity in their field of work.

The current picture must be changed; higher-level education institutions should periodically impart technology literacy workshops to the teachers with the goal of providing them with the opportunity to develop theoretical and practical capabilities and skills that will allow them to effectively use the internet and its various

functions that are centered on teaching, research, extension, and management. Once professionals are qualified, they will be characterized by their advanced training skills because they will be capable of performing their duties and showcasing their products and competence through social media; this will uplift their professional identity and the institutions they work for Elstad & Christophersen (2017).

The preparation and training of teachers in the use of ICT allow them to face everyday work-life and boost their digital identity. This also aids in the acquisition of skills, knowledge, and attitudes toward technology. In this context, informants IC1, IC2, and IC3 pointed out *"…we qualify our digital competence as not so complete…it feels like technological and digital skills still need to be developed…"*. Nonetheless, another group of teachers rated their competence as *"…complete and very good because the management and use of tools and online information have been acquired bit by bit in informal (internet, friends, coworkers, and family members) and formal (workshops and courses that are promoted online by people with experience) ways…"* (IC4 and IC5). This represents the importance of detecting that some teachers have the competency to face technological transformations, and some do not. This requires two readings: first, the need to impulse the skills and capabilities of those who have the competency; and second, for those that do not have it, develop workshops that allow for those teachers to reach technological competency.

Considering this idea, Basilotta-Gómez-Pablos (2022) states that 21st-century teachers are ones that are trained in the use, management, and implementation of technological knowledge which identifies them as competent professionals that adapt to new scenarios where technology is present. Meanwhile, there are still teachers that have not effectively unraveled in front of a computer.

Networks and associations in the networks

Networks and the associations made in those networks are relevant for sharing information and collaborative work, and they are less difficult to achieve mostly because of digital identity. Every individual in their own geographical space, near or far away from each other, can contribute their part in answering complex topics and realities (Huang et al., 2018). Technology management for the optimization of digital identity facilitates the placement of professionals that are key for the success of certain projects that are grouped in networks and associations based on various goals (Miller et al., 2015).

In this sense, as voiced by informants IC1 and IC2 *"…we have observed that most of our colleagues are part of academic networks and associations for research and investigation, I consider that I must follow their example…"*. Accordingly, IC3 expressed *"…I think that by not having a digital identity and by not being registered in social networks for academia, I have ceased to be a part of networks and associations that go beyond just sharing pictures of family…"*.

To this effect, the experiences of these teachers are next to nothing in regard to networks and network associations related to academia and the development of research. Without online participation in networks and associations for academic, educational, and work-related purposes, digital identity is less visible or completely nonexistent (Sáez & Sancho, 2017). In this regard, Peña Hita (2016) points out that professors should understand that they not only have a physical identity, but they also must have a digital identity that promotes the readiness of their professional capabilities through collaborations that stride for the improvement of academia in every aspect.

Considering this reality, IC4 and IC5 mentioned having a different experience: *"…we are a part of networks and associations that are directed toward research and the development of the institution, and consequently, society; the social networks that we use the most are: academia.edu, Twitter, Google+, LinkedIn, Edmodo, YouTube; for social media related to personal information, we use: Instagram, Facebook, and WhatsApp, a side from our ORCID, which is our digital identifier as researchers"*. Networks and network associations not only facilitate setting up a public profile but also connecting with other users that are linked to people in your network or in the web. This will open up the opportunity of membership in other networks and associations related to education, research, and entertainment (Boyd & Ellison, 2007).

Productivity and competitiveness in the field of education is granted by upholding networks and associations through digital interaction which has the great advantage of not having limits related to borders for it to ensure integration (Yuan, 2016). Interviewees IC4 and IC5 stated that they *"participate in networks and associations for the development of academia and research; interaction is continuous for the development of projects…"*. Nonetheless, informants IC1, IC2, and IC3 stated that they *"are not a part of academic and research networks or associations because we do not have the technological skills that allow for the management of information, tasks, and projects that can link us to these types of groups"*.

In this context, two different realities are observed. A group of professors that successfully manage their digital identity through social networks and associations and another group that is unaware of how to manage their digital identity in networks and associations that have different goals and objectives (Çöteli, 2019). The unawareness and disparity between professors of different academic departments in the university is evident. This disparity may positively impact those who have digital abilities and know how to use information in the web to build networks and associations that enhance the visibility of their performance, but others seem to be in a

bubble that isolates them from the new paradigm in education that is based on interaction, dynamism, complexity, and connectivity (Morrison, 2013).

Networks and associations in the network are the foundation for the construction of knowledge and the production of information. Accordingly, this turns into a source of wealth and power for the nations. These networks and associations, represented by formal and informal education organizations, backup research and aid in the consolidation of regional, national, and international scientific communities. Building and developing networks and associations based on the exchange of information and experiences with the purpose of strengthening and boosting scientific communities is imperative (López De La Madrid, 2015; Cranefield, et al., 2020).

Research in digital environments

In the past and present, scientific research has been considered one of the fundamental productive forces for social development. In particular, this century is highly digitalized and computerized. Technology management pursued by college professors of today is the key to the development of technological capabilities related to information processing and knowledge. This also facilitates the evolution of organizational learning making it accessible through digital environments related to digital identity and not just in specialized environments for the publication of scientific findings such as journals, printed books, and in-person conferences (Valverde Berrocoso et al., 2020).

Confirming the aforementioned, interviewees IC4 and IC5 manifested that *"…before, research developed by academics was scarce because it depended on various visits to the library and buying books; it also depended on the scope of the institution and the community that the research professor was affiliated with. Currently, it is not like that; research can be done on the web, and it rapidly showcases the researcher's reputation…"*. This approach by Cohen (2015) emphasizes the importance of the internet and of creating a digital identity for the teacher because it allows for the creation of a term that gives evidence of the constant effort that researchers and institutions pour into scientific production. In this regard, it is important to create a digital identity (online) that is imposed upon the analog identity (offline).

The digital identity of a research professor can be looked up by using the identifier ORCID (Open Researcher and Contributor ID); this code is unique and universally accepted, it is of public access, and it distinguishes one researcher from another. Technology management can help in the construction of a digital identity that promotes scientific reputation. Informants IC4 and IC5 made it clear that *"…being a college professor involves a lot of responsibilities and obligations like carrying out projects that reflect results that must be published and distributed with the aim of being recognized by society in general and by the scientific community as well…"*.

Undoubtedly, digital identity is a new component of scientific activity that must be maintained and updated by ongoing research in institutions of education and by connecting networks and associations from different scientific communities in the world. However, some of the informants also expressed that *"…at this point, we do not know how to build our digital identity from an academic viewpoint, we lack scientific research papers, and we need to acquire specific digital skills and capabilities to be able to continue with scientific production and other productive activities with the goal of giving life to our digital identity…"* (IC1 and IC2). This shows that, for some research professors, this is an area that has not been explored or experienced by them; but technology management can optimize digital identity and generate a scientific reputation for the researcher and the institution.

For scientific productivity to thrive, it is imperative that digital competencies are developed. Without them, the professor would not be able to research in a digital scenario because it is a process that requires selection, analysis, comprehension, writing, and composition. In this respect, IC3 stated: *"…I am surprised. Managing technology is important to optimize digital identity, and not knowing this has created an obstacle in my performance as a research professor…"*.

Considering this reality, the deficiency of the academic staff that works in universities is uncovered, there is a lack of ability to adapt to new cultures of technology in order to interact and communicate between networks and academic associations which can provide effectivity to the organized activities and actions related to teaching, researching and social extension. College professors in public institutions cannot be excluded from the use of ICT; these must be taken into consideration in order to generate information and appropriate knowledge that benefits the fundamental functions of the professors.

CONCLUSIONS

The study aimed to interpret technology management for the optimization of digital identity based on the experiences of a group of college professors. Three substantial elements were presented based on technology training, networks and associations in the networks, and research in digital environments. Each element emerged as a product of the analysis of the interviews that were conducted with the informants.

Since their academic training, most college professors have difficulties in technology management for the optimization of their digital identity due to a lack of digital skills and capabilities. This restricts their ability to build and manage their digital identity which is why there is a need for training programs that aim to strengthen skills related to the management of technological devices and inform about all the possibilities that these provide for storing, organizing, and recollecting information in the pursuit of knowledge.

Most professors do not have their digital identity linked to academic networks or associations related to the production of science; their digital identity is mostly linked to their personal life. On the other hand, there is a group of professors which are able to manage and update their digital identity in an academic setting because they have digital skills and competence that allow for them to fulfill their professional role and duties as college professors, especially regarding their research.

In this sense, digital identity is a new component of scientific activity; the role of a research professor can be expressed through it. The trajectory of digital identity in the scientific community is shown in this study with only a small group of professors being visible on the web because of their digital identity and technology management skills that aid in their research activities and reports which enrich the pages of their lives. There is another group of professors that have a digital identity but do not know how or where to share their academic products.

To conclude, institutions for higher education, especially those which are related to the production and dissemination of scientific knowledge, should regularly orient their professors in training programs that help develop and strengthen digital competencies related to the pursuit of knowledge and scientific production that can be verified through their digital identity.

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