



CAPÍTULO DE LIBRO - XXIX

Digital training in the master's programs in public universities of the Andean community¹

Formación digital en los programas de maestría en universidades públicas de la Comunidad Andina

Formação digital nos programas de mestrado nas universidades públicas da Comunidade Andina

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Abstract

The use of new technologies at the university level is essential for professional training in the XXI century, where the teacher is a key player. In this sense, the present research aims to analyze digital training in master's degree programs in public universities in the member countries of the Andean Community (CAN) in the areas of education, social sciences and humanities. For this purpose, master's degree programs were reviewed considering those with a published curriculum. The results show that 41.3% of the master's programs evaluated in the CAN offer training courses in digital skills, 15.4% offer training in specific programs and 43.2% do not offer training in digital competencies. It was concluded that the training in digital skills proposed by the master's programs in the CAN is still

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scarce; therefore, it is recommended to promote regional policies aimed at reducing the gaps in digital skills.

Keywords: digital training, programs, master's degree, postgraduate.

Resumen

El uso de nuevas tecnologías a nivel universitario es esencial para la formación profesional en el siglo XXI, donde el docente es un actor clave. En este sentido, la presente investigación tiene como objetivo analizar la formación digital en programas de maestría en universidades públicas de los países miembros de la Comunidad Andina (CAN) en las áreas de educación, ciencias sociales y humanidades. Con este fin, se revisaron los programas de maestría considerando aquellos con un plan de estudios publicado. Los resultados muestran que el 41.3% de los programas de maestría evaluados en la CAN ofrecen cursos de formación en habilidades digitales, el 15.4% ofrecen formación en programas específicos y el 43.2% no ofrecen formación en competencias digitales. Se concluyó que la formación en habilidades digitales propuesta por los programas de maestría en la CAN aún es escasa; por lo tanto, se recomienda promover políticas regionales destinadas a reducir las brechas en habilidades digitales.

Palabras clave: formación digital, programas, maestría, posgrado.

Resumo

O uso de novas tecnologias no nível universitário é essencial para a formação profissional no século XXI, onde o professor é um elemento chave. Neste sentido, a presente pesquisa tem como objetivo analisar a formação digital em programas de mestrado em universidades públicas dos países membros da Comunidade Andina (CAN) nas áreas de educação, ciências sociais e humanidades. Para este fim, foram revisados os programas de mestrado considerando aqueles com currículo publicado. Os resultados mostram que 41,3% dos programas de mestrado avaliados na CAN oferecem cursos de formação em habilidades digitais, 15,4% oferecem formação em programas específicos e 43,2% não oferecem formação em competências digitais. Concluiu-se que a formação em habilidades digitais proposta pelos programas de mestrado na CAN ainda é escassa; portanto, recomenda-se promover políticas regionais destinadas a reduzir as lacunas em habilidades digitais.

Palavras chave: treinamento digital, programas, mestrado, pós-graduação.

INTRODUCTION

Currently, the use of information and communication technologies (ICT) at the university level is a skill that allows students to navigate at will within a wide

universe of information (1), selecting data that allows them to achieve relevant learning according to their interests. In addition, the management of ICT allows them to identify their own level of ability in various areas and the possibility of increasing it, in line with their individual objectives (2).

It is important to emphasize that the mission of university teachers is to guide their students' learning towards knowledge that is useful and applicable to their daily practice, using attractive and updated didactic tools (3). Therefore, it is necessary for teachers to have digital competencies so that their students get the maximum benefit from the acquired knowledge.

This mission has been of common interest for different organizations around the world, due to teachers being the compass that guides the next generations of citizens; thus, it is extremely important that they are equipped with digital skills that allow them to form citizens adapted to contemporary demands (4). In this regard, different standards have been generated to measure the digital competencies of teachers, among which are those developed by the United Nations Educational, Scientific and Cultural Organization (Unesco) and the International Society for Technology in Education (ISTE). These standards agree on a series of topics that teachers must know in order to be considered competent in the management of digital tools (5).

In the dynamics of the 21st century, digitalization is part of people's lives, therefore, it is often assumed that digital versatility is developed by default when interacting daily with computers or smart devices, however, the reality is different, since to achieve uniformity in these skills requires formal training (6).

Different studies around the world have shown that there is not only a gap in access to equipment (PCs, laptops or smart devices), but that the problem is also the user's inability to use them for their own benefit (7). Likewise, in 1085 socioeconomic sectors with lower purchasing power, university students tend to use technology to socialize, play or entertain themselves, while their middle and high incomes peers also use it to do academic work, research, create content and participate in the globalized world (8).

In the course of training in undergraduate studies, it has been detected that the less advantaged prefer to avoid technology-intensive courses or content; on the contrary, those who had the privilege of becoming familiar with technological resources are able to take advantage of training programs and obtain the associated rewards, both academic, social economic (9).

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In the field of education, the pandemic highlighted the weaknesses of an educational system lacking teachers and students with the skills to use environments for the benefit of learning (10, 11, 12).

This situation has generated a greater demand for professionals competent in the use of information technologies, as well as a general distrust in virtual teaching-learning modalities (13). The myth of digital “natives” and “immigrants” loses support when the context demands digital competencies and these have not been acquired by belonging to a certain generation.

In the Andean region, the development of higher education is part of its integration axes (14); however, this mission is still far from being achieved, since the Andean Community has its own challenges in higher education, such as interculturality, indigenous participation in education poverty, the gaps in educational quality and digitalization to which the usually excluded ethnic groups are exposed (15).

This challenge falls more intensely on public universities, due to they, as a public service, have to reach remote places where private institutions do not have infrastructure, so that state organizations have the role of promoting and encouraging social transformation with the aim of closing gaps, increasing participation and providing opportunities to the most vulnerable sectors (16).

In the midst of this challenging context, the teacher's mission is to train professionals for the future (17), so he/she must be updated and prepared to face a new reality, where virtuality continues to expand its participation in educational spaces, using various digital media as part of daily tasks (18). However, the responsibility is not exclusive to the teacher, but it is in the interest of society to ensure their competence. For this reason, among the member countries of the Andean Community there are norms that regulate the teaching practice, which require a minimum level of master's degree to teach at the higher education level (19).

There is a legal regulatory framework on the subject, within the educational context: in Peru, the University Law No. 30220 of 2014; in Bolivia, the General Regulation and Specific Regulations for Private Universities of 2019; and in Ecuador, the Regulations for the Career and Grading of Academic Staff of the Higher Education System of 2020. This fragmented and heterogeneous development is a reflection of an attempt to import models that focus learning towards a productive objective, which they are developed (20). On the other hand, international organizations urge universities in developing countries to

play a more active role in the face of the demands of an increasingly competitive world (21).

Considering the importance for university teachers to have digital competencies (22), both in the use of technological tools for teaching and for transfer of knowledge to their students, and taking into account that in the region it is a requirement to have a master's degree for university teaching, the present research aims to determine the level of training in digital competencies existing in the master's degrees offered by public universities in the member countries of the Andean Community, in the areas of education, social sciences and humanities.

METHOD

The present research was framed within the qualitative approach (23), in basic research (24), through a documentary review (25) and descriptive scope (26). The object of research was the master's degree programs in education, social sciences and humanities in public universities belonging to the Andean Community of Nations comprising Colombia, Ecuador, Peru and Bolivia (27).

Selection criteria

Master's degree programs offered by state-administered universities in CAN member countries, authorized by national regulatory agencies, such as the National Superintendence of University Education (SUNEDU) (28), the University Education Council (CES) of Ecuador (29), the Executive Committee of the Bolivian University (CEUB) of Bolivia (30) and the Higher Education Information System (SNIES) of the Ministry of Education of Colombia (31) were selected. The master's degree programs associated with the faculties of social sciences, education and humanities offered in the year 2023 were chosen.

Information sources

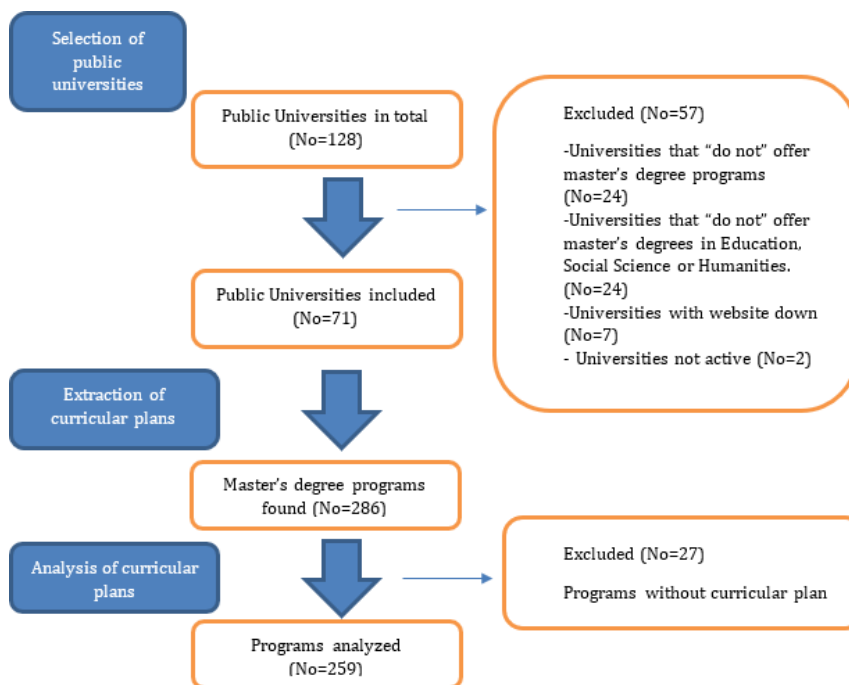
The institutional web pages of SUNEDU, CES, CEUB and SNIES were used to identify the universities administered by the State. After that, we proceeded to locate the master's degree programs offered by each university in the areas of social science, education and humanities. The data extracted were: country, university name, program name, subject area, courses of the curriculum aimed at digital competencies and specialized digital program management courses. To determine the presence of a course aimed at digital competencies, the keywords "e-learning", "digital", "virtual", "technological", "technologies", "ICT", "ITC", "internet", "online" were considered. In addition, specialized program courses were considered that include database management, data analysis (quantitative

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or quality), video or audio editing and multimedia content development, the process of which yielded the information shown in Figure 1.

Figure 1. Program selection diagram.



Procedures and data analysis

A review of the universities recognized in the web platforms of Sunedu, the CES, the CEUB and the SNIES was initiated. A total of 128 universities were located and this number was maintained throughout the extraction process carried out from April 12 to 17, 2023. Then the web pages of each university were explored to obtain the master's degree programs according to the inclusion criteria, so 57 universities were omitted according to the following criteria: web page down (7), the university does not offer master's degrees (24), the university offers master's degrees in areas other than education, social sciences or humanities (24), it is not in activity (2). In the remaining universities, a total of 286 master's degree programs were identified; from these programs, those that did not publish the curricular plan were eliminated (27), finally obtaining a total of 259 programs to be analyzed. The data were extracted using Excel and analyzed using SPSS version 21.

Ethical aspects

Open-access data was collected on master's degree programs offered by national universities in the four member countries of the Andean Community of Nations. No individual participation was required during the process, so there are no

ethical risks for the institutions or participants. Thus, the present research is aligned with the norms of the Helsinki declaration.

RESULTS

Characteristics of the master's degree in the CAN

The master's degree programs offered in the areas of education, social sciences and humanities in the CAN member countries were analyzed and included several programs located in Bolivia, Colombia, Ecuador and Peru. However, in Bolivia only one program with a published curriculum was located, as shown in Table 1.

Table 1. Number of master's degree programs detected by country.

Country	No.	%
Bolivia	1	0.4
Colombia	82	31.7
Ecuador	81	31.3
Peru	95	36.7
Total	259	100.0

The programs included were evaluated, according to the area of study, it was observed that the vast majority of plans are in the area of education (78%). On the other hand, the programs of social science and humanities areas, together account for only 22% (Table 2).

Table 2. Number of master's degree programs by areas.

Areas	No.	%
Social Science	45	17.4
Education	202	78.0
Humanities	12	4.6
Total	259	100.0

In relation to training in digital competencies in the CAN, more than 50% offer type of training in digital competencies, either through general courses or through teaching in specific programs, such as statistical or qualitative data analysis packages, databases managers, audiovisual editing programs or

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management software. At the same time, 43.2% do not express ICT training in their curricula (Table 3).

Table 3. Training in digital competencies offered by master's degree programs

Digital competencies offered	No.	%
Does not offer ICT training courses	112	43.2
Offers training in specific computer programs	40	15.4
Offers a general ICT training course	107	41.3
Total	259	100.0

Characteristics of Colombia Master's degrees

It was possible to identify the public universities that offer master's degree programs when exploring by country. In the case of Colombia, although the 19 offering universities have a similar number of programs, the Universidad Pedagógica y Tecnológica de Colombia stands out with 10 programs. The summarized information can be seen in Table 4.

Table 4. Colombia master's degrees by universities

Universities in Colombia	No.	%
Antioquia University (2023)	5	6.1
Caldas University (2023)	2	2.4
Córdoba University (2023)	6	7.3
Amazonía University (2023)	4	4.9
Nariño University (2023)	7	8.5
Sucre University (2023)	1	1.2
Atlántico University (2023)	5	6.1
Cauca University (2023)	6	7.3
Magdalena University (2023)	4	4.9
Quindío University (2023)	1	1.2
Tolima University (2023)	3	3.7
Francisco de Paula Santander University (2023)	2	2.4
Universidad Industrial de Santander (2023)	6	7.3
Universidad Militar-Nueva Granada (2023)	1	1.2
Universidad Nacional Abierta y a Distancia (2023)	3	3.7
Universidad Pedagógica Nacional (2023)	3	3.7
Universidad Pedagógica y Tecnológica de Colombia (2023)	10	12.2
Universidad Surcolombiana (2023)	4	4.9

Pereira Technical University (2023)	9	11.0
Total	82	100.0

Regarding the distribution of programs by area of study, 75.6% were in the area of education (No.=62). followed by 15.9% in social science (No.=13) and finally 8.5% in humanities (No.=7). Likewise, teaching in some type of training in digital competencies is observed in 48.8%, while the majority of the programs do not offer training courses focused on ICT management (Table 5).

Table 5. Training in digital competencies in Colombian master's degree programs

Digital competencies	No.	%
Does not offer ICT training courses	42	51.2
Offers a general ICT training course	34	41.5
Offers training in specific computer programs	6	7.3
Total	82	100.0

Characteristics of Ecuador master's degrees

In the case of Ecuador, 81 programs were offered by 18 public universities, of which the Manabi Technical University offered the largest number with 17 programs, representing 21% of the total (Table 6).

Table 6. Ecuador master's degrees by universities

University of origin	No.	%
Manabi Technical University (2023)	17	21.0
Chimborazo National University (2023)	12	14.8
Loja National University (2023)	8	9.9
Central University of Ecuador (2023)	7	8.6
Universidad Estatal de Milagro (2023)	5	6.2
National University of Education (2023)	5	6.2
Escuela Superior Politécnica del Litoral (2023)	4	4.9
Universidad Politécnica Estatal del Carchi (2023)	4	4.9
Universidad Técnica del Norte (2023)	4	4.9
Universidad Estatal Península de Santa Elena (2023)	3	3.7
Babahoyo Technical University (2023)	2	2.5
Cotopaxi Technical University (2023)	2	2.5
Machala Technical University (2023)	2	2.5
Universidad Técnica Estatal de Quevedo (2023)	2	2.5
Cuenca University (2023)	1	1.2

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Guayaquil University (2023)	1	1.2
Universidad Estatal de Bolívar (2023)	1	1.2
Universidad Estatal del Sur de Manabí (2023)	1	1.2
Total	81	100.0

It is observed that they are concentrated almost entirely in the area of education when exploring the areas of study of the programs, grouping 92.6% of the evaluated offer (No.= 75), while social science has the remaining 7.4% (No.=6). Exploring the digital competencies in the master's degrees, it is observed that most of them offer some type of ICT training (65.4%), while only 34% do not offer any training course in ICT management (Table 7).

Table 7. Training in digital competencies in the master's programs in Ecuador.

Digital competencies	No.	%
Offers a general ICT training course	47	58.0
Does not offer ICT training courses	28	34.6
Offers training in specific computer programs	6	7.4
Total	81	100.0

Characteristics of Peru Master's degrees

In Peru, 17 universities offer the 95 master's degrees evaluated. The largest number of offerings is at the Universidad Nacional de Educación Enrique Guzmán y Valle with 13.7% as shown in Table 8.

Table 8. Peru Master's degrees by universities

Origin	No.	%
Universidad Nacional de Educación Enrique Guzmán y Valle (2023)	13	13.7
Universidad Nacional Mayor de San Marcos (2023)	11	11.6
Universidad Nacional de San Agustín de Arequipa (2023)	9	9.5
Universidad Nacional José Faustino Sánchez Carrion (2023)	8	8.4
Universidad Nacional Hermilio Valdizán de Huánuco (2023)	7	7.4
Cajamarca National University (2023)	6	6.3
Ucayali National University (2023)	6	6.3
Huancavelica National University (2023)	5	5.3
Piura National University (2023)	5	5.3
Federico Villarreal National University (2023)	5	5.3
Amazonia Peruana National University (2023)	4	4.2
Universidad Nacional de San Antonio Abad del Cusco (2023)	4	4.2
Universidad Nacional Santiago Antúnez de Mayolo (2023)	4	4.2
San Martín National University (2023)	3	3.2
Jorge Basadre Grohmann National University (2023)	2	2.1
Santa National University (2023)	1	1.1
Universidad Nacional Micaela Bastidas de Apurímac (2023)	1	1.1

Universidad Nacional Toribio Rodríguez de Mendoza de Amazonas (2023)	1	1.1
Total	95	100.0

The exploration of the programs in Peru by area of study shows that the majority are concentrated in the field of education with 67.4% of master's programs (No.=64), while 27% are in the field of social science (No.=26) and 5.3% belong to the field of humanities (No.=5). About these programs, training in some digital competency reaches 55.8%; likewise, 44.2% do not offer ICT training courses (Table 9).

Table 9. ICT training

Training	No.	%
Does not offer ICT training courses	42	44.2
Offers training in specific computer programs	28	29.5
Offers a general ICT training course	25	26.3
Total	95	100.0

Characteristics Bolivia Master's degrees

In case of Bolivia, only one Master's degree that met the criteria of this research could be located; it was at the Universidad Mayor Real y Pontificia de San Francisco Xavier de Chuquisaca, in the area of education and offered a general ICT training course.

DISCUSSION

An evaluation of the thematic characteristics of master's degree programs in social science, education and humanities in de Andean Region shows that the vast majority are in the field of education (78%), while 17.4% are in social science and 4.6% are in the humanities. Regarding ICT training, 43.2% of the programs studied do not offer ICT courses in their curriculum, while 15.4% offer training in specific programs and 41.3% of the programs analyzed do offer at least one general ICT training course. Regarding the geographic location of the programs considered, similar numbers of programs were found in Colombia (82), Ecuador (81) and Peru (95); however, in Bolivia only 1 program with a published curriculum was found. Training in digital competencies in digital competencies in developing countries is particularly relevant, since it provides an opportunity to solve problems such as scarcity of resources, the high demand for training and the limited availability of teachers (United Nations Children's Fund (Unicef), 2021) (32).

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In that aspect, in order to find solutions, it is important to close digital gaps, both in the acquisition and management by country, 82 master's programs analyzed in Colombia were offered by a total of 19 universities; within these, 62 programs are located in education, reaching 15.6%, while 13 are located in social science and 7 in humanities, reaching between the latter 20% of the programs. Finally, in relation to ICT skills, 51% of programs do not offer ICT courses, while 41% at least one general ICT training course. In Ecuador, 18 universities group 81 master's degree programs; of these, the largest number belong to the area of education with 92.6% (75 programs), while the remaining percentage belongs to social science. Most of the programs offer general ICT training (58%) and 34.6% do not offer ICT training courses. Likewise, in Peru, the offer of the 95 programs evaluated is distributed among 18 universities; 67.4% of the master's programs are in the area of education, 27.4% in social science and 5.3% in humanities.

Regarding ICT training, 26.3% of the programs offer comprehensive ICT training, while 29.5% offer training in specific programs and 44.2% of the programs do not offer ICT training courses. Finally, in Bolivia, only one program belonging to the education area met the inclusion criteria and it did offer an ICT training course. In this sense, teachers with a postgraduate degree in education prefer to learn about teaching theories and strategies (34) while other studies show a resistance on the part of teacher to adopt new technologies or handle new digital devices (35, 36), which places them in a vulnerable position compared to other teachers who have the skills and interest to perform in diverse virtual environments (37, 38, 39, 40), especially in the post-pandemic era. Digital competency training for university teachers is essential for students to be able to take advantage of ICT facilities in their professional development (41, 42, 40, 43, 44) and thus provide competent graduates to developing nations, contributing to both national and regional growth.

The initial limitation of this research was that it did not include programs whose curricula were not available in open access or whose web pages were down at the time of collection; in spite of this, it was possible to find information on the majority of master's degrees offered by public universities in the CAN in the areas of education, social sciences and humanities.

CONCLUSIONS

Based on the results of the study, it was observed that both at the CAN level in each country, it is more frequent to find master's degrees in education; however, the presence of training courses in digital skills or ICT management is still scarce. Given the challenges facing higher education in the region, it is important to

reduce these gaps in order to increase the impact of universities on national and regional economic, scientific and technological development. Aligning regional higher education policies and increasing transparency in the contents of the educational offer will allow a better evaluation of progress in relation to the training of postgraduates in digital competencies, thus ensuring a human capital competent in the transfer of knowledge according to the tools of today's world.

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CAPÍTULO XXIX

DIGITAL TRAINING IN THE MASTER'S PROGRAMS IN PUBLIC UNIVERSITIES OF THE ANDEAN COMMUNITY

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