

Digital skills among students of the master's program in Palliative Care and Pain Management

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ABSTRACT

Objective: To determine the digital skills among students of the master's program in Palliative Care and Pain Management at Universidad Nacional Mayor de San Marcos School of Medicine in 2022.

Materials and methods: A non-experimental, descriptive and cross-sectional research. The study population was comprised of students of the master's program in Palliative Care and Pain Management enrolled in the year 2022. A non-probability sample was used. Data were collected through the survey "Digital Skills in Higher Education Questionnaire" (CDES), consisting of 46 indicators distributed in five factors with a reliability of 0.96 according to Cronbach's alpha. Data confidentiality and participants' autonomy were respected.

Results: The final sample was made up of 59 students, the average age was 38.03 years and 76.3 % were women. All students had a personal computer and Internet access. The descriptive analysis showed that the "very important" rating prevailed: 49.2 % for the "digital citizenship" factor, 47.5 % for the "communication and collaboration" factor, 45.8 % for the "creativity and innovation" and the "access and use of information" factors, and 44.1 % for the "digital literacy" factor. According to the digital skills global analysis, 49.2 % and 42.4 % chose the "very important" and "important" ratings, respectively. There were no results for the "not at all important" rating.

Conclusions: All students had a personal computer and Internet access, which confirms the growing interest in including aspects related to digital skills in university education. The "digital literacy" and the "digital citizenship" factors had a lower and higher rating, respectively, compared to the other factors. A total of 91.6 % of the students considered that digital skills are important and very important, which could be considered as highly favorable.

Keywords: Computer Literacy; Information Technology; Universities; Students (Source: MeSH NLM).

INTRODUCTION

Society has undergone several cultural, social and economic changes in the last few years. Therefore, people have had to strengthen their training in order to face a new reality. Sánchez-Caballé et al. (2020, p. 64) state that "Information and communication technology (ICT) has impacted all areas of human activity" ⁽¹⁾. As the UNESCO stated in 2005 (p. 27), "The new information and communication technologies have created new conditions for the emergence of knowledge societies" ⁽²⁾; based on the foregoing, for some years, several countries have gradually added these technologies, thereby passing from the industrial age to the information age. Hence, as Zao et al. (2021, p. 1) state, "the acquisition, production, processing and utilization of knowledge all play increasingly important roles in boosting a country's economic growth and has gradually become essential" ⁽³⁾. People are currently surrounded by internet and many digital technologies; the development of social structure and trends in using technologies have produced changes in lifestyle and, definitely, in the way knowledge is gained ⁽⁴⁾.

The development of activities that allow acquiring digital skills keeps becoming more popular. The 21st century university students belong to a generation that grew up amidst an unprecedented boom of networks, which they experience through online media: internet, virtual reality and artificial intelligence. Moreover, in the last few years, the pandemic has increased the social attention towards the need to have digital skills ⁽⁵⁾.

The teaching process in higher education also undergoes constant social and cultural transformations. A new model frequently appears to face problems in this area, and it is received and included, and thereby added to students' and

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teachers' activities. Our time is characterized by rapid scientific, technological and societal advancements which demand high standards of knowledge and skills that must be acquired and shown in the performance of any profession ⁽⁶⁾.

It has been demonstrated worldwide that developing digital skills is valuable and useful for students and also very useful to solve problems. Nowadays, it is essential to teach or train students who manage knowledge, are competent, skilled, creative and critical as well as able to use their abilities and solve problems by using digital media, ITCs and digital literacy, without neglecting the ethical commitment that it involves ⁽⁷⁻⁹⁾.

However, as Cabezas et al. concluded, despite being members of a generation referred to as digital natives, "they are not highly digitally competent at all," which is confirmed by different research studies stating that students do not have the digital skills needed for higher education but, in contrast, have a low level of digital skills ⁽¹⁰⁾. In this regard, Gabarda et al. stated that despite studies showing "an extended use of ICTs, but this does not necessarily imply digital skills which support that they are used properly" ⁽¹¹⁾. The foregoing is seen when examining abilities, many of which are technical, a fact that evidences the need to improve information and multimedia skills ^(11,12). Furthermore, it is stated that most of the students have limitations in the use of specific software while they are trained: they frequently use multimedia applications but have a low knowledge regarding the related technology or theories ⁽¹³⁾.

It should be noted that it is important to include digital technologies in the educational process. These benefit the teaching-learning process since the basic training in digital skills is key for personal development in current society and may contribute to reduce the digital divide ^(14,15). In this regard, Ferrari defines digital competence as

"[...] the set of knowledge, skills, attitudes (thus including abilities, strategies, values and awareness) that are required when using ICT and digital media to perform tasks; solve problems; communicate; manage information; collaborate; create and share content; and build knowledge effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively for work, leisure, participation, learning, socialising, consuming, and empowerment" ⁽¹⁶⁾.

For some years now, training in palliative care and pain management have been included in the master's programs because they have become a continually growing area that requires attention, particularly in oncology and other chronic diseases. It should be noted that training in palliative care and pain management have become very necessary for all the physicians who treat patients suffering from an oncologic disease or from severe degenerative diseases.

According to the new needs, the prevalence of an approach oriented to the development of complex skills in a modern society is evident; therefore, young university students should be trained so that they may be competent in the development and application of thought by means of critical reasoning and the solution of health problems by using digital media and ICTs. In this setting, universities should restructure their pedagogical processes to respond to the impact of globalization and to determine the impact of their implementation and how it contributes to train students committed to their professional activity and also to train competent individual. In this context, the study sets the objective of determining digital skills among students of the master's program in Palliative Care and Pain Management at a Peruvian public university in 2022.

MATERIALS AND METHODS

Study design and population

The research had a non-experimental, descriptive and cross-sectional design. The study population included 91 students of the master's program in Palliative Care and Pain Management enrolled in 2022. Non-probability sampling was used, and those who decided not to participate were excluded. The final sample was made up of 59 students.

Variables and measurements

"Digital skills" was the study variable, which can be defined as the ability to efficiently use technological tools to improve different areas of people's life, taking into account the critical commitment and responsible use to learn, work and participate in society. Data were collected through the survey "Digital Skills in Higher Education Questionnaire" (CDES) ⁽¹⁷⁾, consisting of 46 indicators distributed in five factors: factor 1 "technological literacy," factor 2 "access and use of information," factor 3 "communication and collaboration," factor 4 "digital citizenship" and factor 5 "creativity and innovation". Indicators were measured by a 5-point Likert scale, where 1 means "not at all important" and 5 "very important." The reliability of this instrument reliability was 0.86 for factor 1, 0.89 for factor 2, 0.89 for factor 3, 0.87 for factor 4 and 0.92 for factor 5.4. A total reliability of 0.96 was obtained according to Cronbach's alpha.

Statistical analysis

A Microsoft Excel database and an IBM SPSS (Statistic Package for Social Sciences) database were used to process and analyze the information. Descriptive variables and measures of dispersion were then estimated: frequencies, average and standard deviation and the rating of scores for each factor and total score.

Ethical considerations

As to ethical considerations, data confidentiality and autonomy of participants' decisions were respected.

RESULTS

According to the records, 32 students were excluded; thus, this sample was made up of 59 students. The average age was $38.03 \pm SD 6.02$ years; 76.3 % were women, 47.5 % of which were studying the second semester of the program. All the students had a personal computer and internet access at home. A total of 59.3 % used the computer up to 20 hours per week; 39 % stated that they had basic computer skills, and 44.1 % used computer programs. The average number of years using the computer was 18.92. Out of them, 69.5 % totally agreed with the claim that using a computer helps to improve the quality of professionals. Concerning the training or experience in using ICTs, 33.9 % rated it as fair, and 30.5 % each learned to use a computer at school or an institute. Furthermore, 33.9 % stated they had an optimal training in the use of ICTs at the university; in addition, 39 %, followed training programs.

As to the results for factor 1 “digital literacy,” 15.3 % of the students considered that it was of low importance to have a good command of applications to process audio, image and digital video using programs such as Photoshop, Audacity, Movie Maker or others; 47.5 % stated that it was very important to hold online conversations by means of synchronous communication tools via web (chat, instant messaging services, Skype, videoconference tools, etc.); and 13.6 % considered of low importance to use e-learning or b-learning platforms for online training and collaboration (Dokeos, Moodle, ILias, etc.). According to the result weighting for the “digital literacy” factor, 44.1 % described it as very important and 39 % as important (Figure 1).

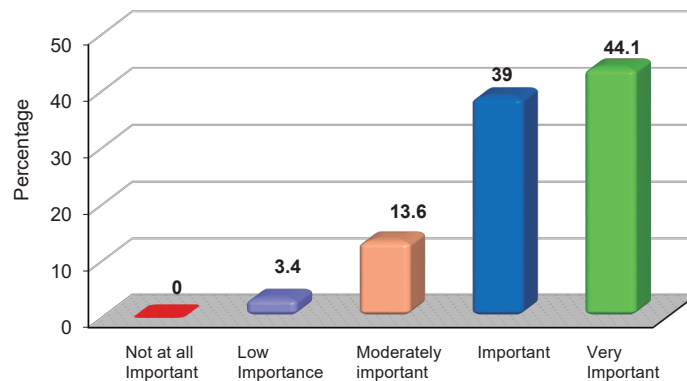


Figure 1. Results of factor 1: digital literacy among graduate students

Concerning the response about factor 2 “access and use of information,” 54.2 % considered that the use of applications and technological services was important since information could be retrieved, organized and managed; 44.1 % considered that those activities to collect, organize and use selected information properly and thus,

to build and grasp new knowledge, were very important. According to the result weighting for the “access and use of information” factor, 45.8 %, 42.4 % and 10.2 % considered it was very important, important and moderately important, respectively (Figure 2).

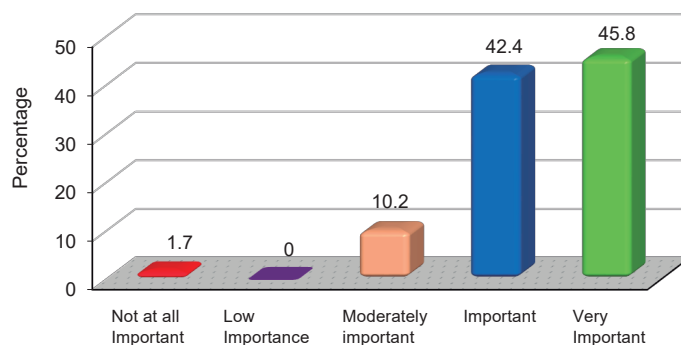


Figure 2. Results of factor 2: Access and use of information among graduate students

Concerning the results of factor 3 “communication and collaboration”, 49.2 % considered it was important to interact with experts or other people on social media and ITC-based communication channels. Moreover, that interaction allowed developing cultural understanding and global awareness by means of relationships with

professionals from other cultures. A total of 52.5 % considered it was important to share experiences on social media. According to the result weighting for the “communication and collaboration” factor, 47.5 % considered it was very important, 42.4 % important and 6.8 % moderately important (Figure 3).

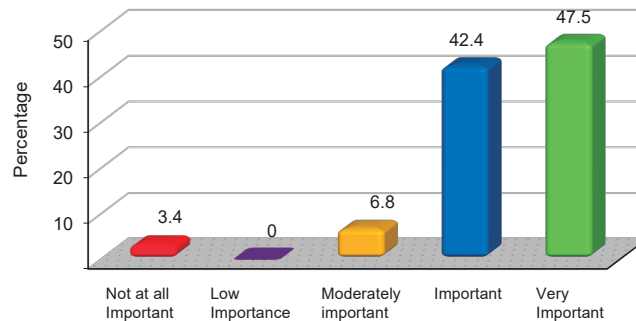


Figure 3. Results of factor 3: communication and collaboration among graduate students

As to the results for factor 4 “digital citizenship,” 54.2 % considered that it was very important to have an ethical conduct when using digital information and that from ITCs in order to respect copyrights, intellectual property and appropriate source documentation. A total of 52.5 % stated that it was important to demonstrate personal responsibility for lifelong learning in the use of ITCs as well

as developing cultural understanding and global awareness through relationships with professionals from other cultures by using communication and collaboration tools from the digital age. According to the result weighting for the “digital citizenship factor,” 49.2 %, 44.1% and 6.8 % considered it was very important, important and moderately important, respectively (Figure 4).

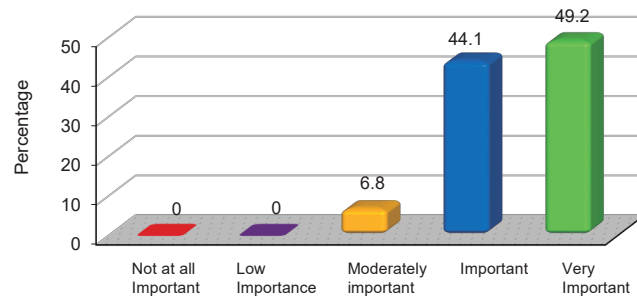


Figure 4. Results of factor 4: digital citizenship among graduate students

As to factor 5 “creativity and innovation,” 52.2 % of the students stated that it was very important to adapt to new situations and technological settings. Likewise, they considered it was important to use prior knowledge to create new ideas, products or processes by means of ICTs. It was also important to understand professional effectiveness and self-renovation by including ICTs in their work setting

and to create original works as personal or group means of expression by using ITCs as a part of their lifelong and reflective learning. According to the result weighting for the “creativity and innovation” factor, 45.8 % considered it was very important and important and 6.8 % moderately important (Figure 5).

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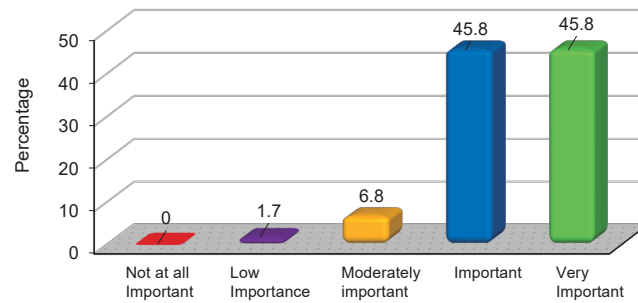


Figure 5. Results of factor 5: creativity and innovation among graduate students

The results of the global analysis of digital skills are detailed as follows: 49.2 % considered they were very important, 42.4 % important, 6.8 % moderately

important and 1.7 % of low importance. There were no results for not at all important.

DISCUSSION

The educational paradigm shift and the emergence of new teaching models due to the acceleration of digitalization process and the impact of COVID-19 pandemic, as well as the objectives of sustainable development, evidence that digital skills are essential for students who seek higher academic performance and improve their professional training. Therefore, they should be required to gain and develop such skills and also to meet the community demands and to face new challenges ⁽¹⁸⁻²⁰⁾.

Different research studies conducted in the educational environment show that graduate students are digital natives who use digital devices and tools daily. Nowadays, it is possible because internet access is more feasible and portable computing devices are more available. However, the foregoing does not mean that they have a high level of digital skills ⁽²¹⁾. In addition, it should be specified that there are other factors representing an obstacle to implement digitalization in higher education. In this regard, Palomé-Vega et al., in a research study carried out with nursing students at Universidad Autónoma de Querétaro, state that “only 9 % [...] use a computer and internet for academic purposes. On the other hand, only 20 % know how to use applications” ⁽²²⁾. These data are lower than our results due to the lack of digital skills in the educational environment. Furthermore, the findings of Paredes-Parada and Posey stated that 81 % had internet connection and 67 % had a portable device ^(23,24).

Concerning the training degree in ICTs and digital skills, less than 50 % of the students got them before entering university or by means of computer courses ⁽²⁵⁾. Also, training in digital skills and the use of ITCs have not been fully addressed during secondary education. On the other hand, its development in university study plans has not been implemented in all the professional careers ^(26,27). However,

it has been demonstrated that the acquisition of skills and knowledge in the use of technologies has a favorable influence on the level of self-perception concerning digital skills.

According to Sánchez-Caballé et al., digital literacy achieved an optimal result, which is quite logical since it includes data processing, hardware and software management and is influenced by the student's profile ⁽¹⁾. Nevertheless, it is stated that—when creating digital contents—students need to improve their level of skills well as their ability to solve technical problems and to understand technological trends. The results were similar in the research studies by Llorent-Vaquero et al. and Martzoukou et al. ^(28,29). Furthermore, the students gave an optimal or favorable rating to the “access and use of information” factor during their graduate studies. However, there are reports stating that university students do not have a good command of data retrieval, organization and management due to their lack of knowledge in the use of these tools. This fact sets forth the need to manage the use of digital resources to create contents, material access, sound and image editing as a pedagogical strategy that allows supporting students' learning and demanding teachers to take on their role of mediators ^(30,31).

Different studies, as DigCom adaptation carried out by REBIUM (2016), state that “communication and collaboration by means of digital environments, as sharing resources through online tools such as connecting and collaborating with others through digital tools, interacting and participating in communities” ⁽³²⁾ allow developing intercultural awareness. It should be pointed out that it is important to analyze collaboration and communication where findings are considered optimal as there are conflicting reports that show unfavorable levels in their development ⁽³³⁻³⁵⁾. Approximately 50 % of the students showed favorable results in the “digital citizenship” factor

because they are respectful and safe users, but the effort to improve digital education from a self-conception still persists because the results are confusing and continually evolving. At present, establishing the educational effort without developing an ethical component in the use of this technology has low acceptance because it is not enough to be technically efficient users but also to know how to act when technological power seeks to prevail ^(36,37).

It is important to point out that students assess indicators for the “creativity and innovation” factor in a positive way because they have professional training and are used to learning with ICTs and adapting to certain negative conditions. These results seem to have an explanation since the onset of the pandemic favored the use and application of multimedia technology in the educational sector ⁽³⁶⁾. Therefore, Ferrari et al. state that “digital competence is one of the eight key competences for lifelong learning” ⁽³⁸⁾. Moreover, Simovic et al. stated the following:

“Skills necessary to be digitally competent are related to the ability to manage information; the ability to distinguish the virtual and the real world; the ability to use Internet-based services and to use technologies to support critical thinking, creativity and innovation as well as the interest to participate in communities and online networks” ⁽³⁹⁾.

The “digital literacy” factor showed lower rating compared to the other factors in spite of having a favorable orientation; however, “access and use of information,” “communication and collaboration”, “digital citizenship” and “creativity and innovation” factors had better ratings, which were similar to those described in a research study conducted among Education students belonging to a high-performance group ⁽³⁶⁾ and in other experiences using b-learning ⁽⁴⁰⁻⁴²⁾. Therefore, it should be noted that it is important to develop these skills and achieve digital literacy, which requires a set of skills and attitudes of students in the educational process.

The research study is not exempted from limitations, e.g., the sample size, which was determined by the students of the same master’s program at a university. Also, it used a self-perception instrument and not an objective assessment of digital skills. Therefore, the results may not reflect the real level of digital skills among students.

In conclusion, this study focused particularly on the actual condition of digital skills among students of the master’s program in Palliative Care and Pain Management. All the students had a personal computer and Internet access; also, the increasing interest for including the aspects related to digital in university education was confirmed. The “digital literacy” factor had the lowest rating, while the “digital citizenship” factor had the highest rating. It showed that 91.6 % of the students rated digital skills as

very important and important, which could be considered as very favorable.

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BIBLIOGRAPHIC REFERENCES

1. Sánchez-Caballé A, Gisbert-Cervera M, Esteve-Mon F. The digital competence of university students: a systematic literature review. *Aloma* [Internet]. 2020;38(1):63-74.
2. Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura (UNESCO). *Hacia las sociedades del conocimiento* [Internet]. UNESCO; 2005. Available from: <https://unesdoc.unesco.org/ark:/48223/pf0000141908/PDF/141908spa.pdf.multi>
3. Zhao Y, Pinto Llorente AM, Sánchez Gómez MC. Digital competence in higher education research: A systematic literature review. *Comput Educ* [Internet]. 2021;168(104212):104212.
4. Schleicher A. The impact of COVID-19 on education - Insights from Education at a Glance 2020 [Internet]. OECD; 2020. Available from: <https://www.oecd.org/education/the-impact-of-covid-19-on-education-insights-education-at-a-glance-2020.pdf>
5. Iansiti M, Richards G. Coronavirus is widening the Corporate Digital Divide [Internet]. *Harvard Business Review*; 2020. Available from: <https://hbr.org/2020/03/coronavirus-is-widening-the-corporate-digital-divide>
6. Burgos-Videla CG, Castillo Rojas WA, López Meneses E, Martínez J. Digital competence analysis of university students using Latent Classes. *Educ Sci (Basel)* [Internet]. 2021;11(8):385.
7. Araneda-Guirriman C, Rodríguez-Ponce E, Pedraja-Rejas L, Baltazar-Martínez, C, Soria-Lazcano H. La gestión del conocimiento en instituciones de educación superior del norte de Chile. *Rev Pedagog* [Internet]. 2017;38(102):13-30.
8. Rafi M, JianMing Z, Ahmad K. Technology integration for students’ information and digital literacy education in academic libraries. *Inf Discov Deliv* [Internet]. 2019;47(4):203-17.
9. Hong AJ, Kim HJ. College students’ digital readiness for academic engagement (DRAE) scale: Scale development and validation. *Asia-Pac Educ Res* [Internet]. 2018;27(4):303-12.
10. Cabezas González M, Casillas Martín S. ¿Son los futuros educadores sociales residentes digitales? *Rev electrón investig educ* [Internet]. 2017;19(4):61-72.
11. Gabarda Méndez V, Rodríguez Martín A, Moreno Rodríguez MD. La competencia digital en estudiantes de magisterio. *Análisis competencial y percepción personal del futuro maestro. Educ Siglo XXI* [Internet]. 2017;35(2):253-74.
12. Ozdamar-Keskin N, Ozata FZ, Banar K, Royle K. Examining digital literacy competences and learning habits of open and distance learners. *Contemp Educ Technol* [Internet]. 2015;6(1):74-90.

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13. Roushan G, Holley D, Biggins D. The Kaleidoscope of voices: An action research approach to informing institutional eLearning Policy. *Electron* [Internet]. 2016;14(5):293-300.
14. Carretero S, Vuorikari R, Punie Y. DigComp 2.1: The digital competence framework for citizens with eight proficiency levels and examples of use [Internet]. Luxembourg: Publications Office of the European Union; 2017. Available from: <https://publications.jrc.ec.europa.eu/repository/handle/JRC106281>
15. Vuorikari R, Punie Y, Carretero S, Van den Brande G. DigComp 2.0: The digital competence framework for citizens. Update Phase 1: the Conceptual Reference Model. Luxembourg: Publications Office of the European Union; 2016. Available from: <https://publications.jrc.ec.europa.eu/repository/handle/JRC101254>
16. Ferrari A. Digital competence in practice: An analysis of frameworks [Internet]. Luxembourg: Publications Office of the European Union; 2012. Available from: <https://ifap.ru/library/book522.pdf>
17. Mengual-Andrés S, Roig-Vila R, Mira JB. Delphi study for the design and validation of a questionnaire about digital competences in higher education. *Int J Educ Technol High Educ* [Internet]. 2016;13(1):1-11.
18. López-Meneses E, Sirignano FM, Vásquez-Cano E, Ramírez-Hurtado JM. University students' digital competence in three areas of the DigCom 2.1 model: A comparative study at three European universities. *Australas J Educ Technol* [Internet]. 2020;36(3):69-88.
19. Guillén-Gámez FD, Mayorga-Fernández MJ, Álvarez-García FJ. A study on the actual use of digital competence in the practicum of education degree. *Technol Knowl Learn* [Internet]. 2020;25(3):667-84.
20. Ortega Sánchez D, Gómez Trigueros IM. Las WebQuests y los MOOCs en la enseñanza de las Ciencias Sociales y la formación del profesorado de Educación Primaria. *Rev electrón interuniv form profr* [Internet]. 2017;20(2):205-20.
21. Chiecher AC. Digital skills in middle and university students. Homogeneous or heterogeneous? *Prax Educ* [Internet]. 2020;24(2):1-14.
22. Palomé-Vega G, Escudero-Nahón A, Juárez-Lira A. Impacto de una estrategia b-learning en las competencias digitales y estilos de aprendizaje de estudiantes de enfermería. *RIDE Rev Iberoam Para Investig Desarro Educ* [Internet]. 2020;11(21):e022.
23. Paredes-Parada W. Brecha en el uso de tecnologías de la información y comunicación (TIC) básicas y modernas entre estudiantes y docentes en universidades ecuatorianas. *Rev Educ* [Internet]. 2018;43(1):134-51.
24. Posey L, Pintz C. Transitioning a bachelor of science in nursing program to blended learning: Successes, challenges & outcomes. *Nurse Educ Pract* [Internet]. 2017;26:126-33.
25. Girón Escudero V, Cózar Gutiérrez R, González-Calero Somoza JA. Análisis de la autopercepción sobre el nivel de competencia digital docente en la formación inicial de maestros/as. *Rev electrón interuniv form profr* [Internet]. 2019;22(3):193-218.
26. Romero-Tena R, Barragán-Sánchez R, Llorente-Cejudo C, Palacios-Rodríguez A. The challenge of initial training for early childhood teachers. A cross sectional study of their digital competences. *Sustainability* [Internet]. 2020;12(11):4782.
27. Pozo-Sánchez S, López-Belmonte J, Fernández-Cruz M, López-Núñez JA. Análisis correlacional de los factores incidentes en el nivel de competencia digital del profesorado. *Rev electrón interuniv form profr* [Internet]. 2020;23(1):143-59.
28. Llorent-Vaquero M, Tallón-Rosales S, de las Heras Monastero B. Use of Information and Communication Technologies (ICTs) in communication and collaboration: A comparative study between university students from Spain and Italy. *Sustainability* [Internet]. 2020;12(10):3969.
29. Martzoukou K, Fulton C, Kostagiolas P, Lavranos C. A study of higher education students' self-perceived digital competences for learning and everyday life online participation. *J Doc* [Internet]. 2020;76(6):1413-58.
30. Castellanos Sánchez A, Sánchez Romero C, Calderero Hernández JF. Nuevos modelos tecnopedagógicos. Competencia digital de los alumnos universitarios. *Rev electrón investig educ* [Internet]. 2017;19(1):1-9.
31. Matzumura JP, Gutiérrez H. Utilización de tecnología, información, comunicación y aula virtual en la enseñanza de la asignatura de Gerencia en Salud para los médicos residentes de la Facultad de Medicina de la Universidad Nacional Mayor de San Marcos, 2015. *An Fac Med* [Internet]. 2016;77(3):251-6.
32. REBIUN. Marco de competencia digital para estudiantes de grado: Adaptación de DIGCOMP [Internet]. REBIUN; 2016. Available from: https://repositoriorebiun.org/bitstream/handle/20.500.11967/65/IIPE_Linea2_2016_Marco_de_competencia_digital_para_estudiantes_de_grado_adaptacion_DIGCOMP_.pdf?sequence=4&isAllowed=y
33. Amhag L, Hellström, Stigmar M. Teacher educators' use of digital tools and needs for digital competence in higher education. *J Digit Learn Teach Educ* [Internet]. 2019;35(4):203-20.
34. Fuentes A, López J, Pozo S. Análisis de la competencia digital docente: Factor clave en el desempeño de pedagogías activas con realidad aumentada. *REICE Rev Iberoam Sobre Calid Efic Cambio Educ* [Internet]. 2019;17(2):27-42.
35. Del-Moral-Pérez ME, Villalustre-Martínez L, Neira-Piñero MDR. Teachers' perception about the contribution of collaborative creation of digital storytelling to the communicative and digital competence in primary education schoolchildren. *Comput Assist Lang Learn* [Internet]. 2019;32(4):342-65.
36. Suárez-Guerrero C, Revuelta Domínguez FI, Rivero Panaqué, C. Valoración de la competencia digital en alumnos con rendimiento alto en Perú. *Educ Policy Anal Arch* [Internet]. 2020;28(126):1-20.
37. Floridi L. The ethics of information. Oxford University Press; 2013.
38. Ferrari A, Punie Y, Brecko BN. DIGCOMP: A framework for developing and understanding digital competence in Europe [Internet]. Publications Office of the European Union; 2013. Available from: <https://publications.jrc.ec.europa.eu/repository/handle/JRC83167>
39. Simović VM, Domazet IS. An Overview of the frameworks for measuring the digital competencies of college students: A European perspective [Internet]. IGI Global; 2021. Available from: <https://www.igi-global.com/gateway/chapter/264081>
40. Balasubramaniam SM, Bhargava S, Agrawal N, Asif R, Chawngthu L, Sinha P, et al. Blending virtual with conventional learning to improve student midwifery skills in India. *Nurse Educ Pract* [Internet]. 2018;28:163-7.
41. Cerón M, Gómez MG y Ábrego RF. Implementación de B-learning en el Nivel Superior de Educación. *Campus virtuales* [Internet]. 2014;3(2):8-15.
42. Wikander L, Bouchoucha SL. Facilitating peer based learning through summative assessment - An adaptation of the Objective Structured Clinical Assessment tool for the blended learning environment. *Nurse Educ Pract* [Internet]. 2018;28:40-5.

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