

Development of digital competencies in teachers: An approach to 21st century education in the province of Santa Elena.

Roxana Asencio-Borbor¹, Marianela Silva-Sánchez²

1. Universidad Estatal Península de Santa Elena, Ecuador ORCID: 0000-0001-6436-9796

2. Universidad Estatal Península de Santa Elena, Ecuador ORCID: 0000-0002-0775-6826

Abstract

This study analyzes the level of digital competencies of educators working in an educational institution in Santa Elena. Using the quantitative method, the existing digital competencies and the areas of improvement needed in the teaching and learning processes were identified. The main findings showed the need for continuous training to nurture and strengthen the digital competencies of educators, suggesting a transition towards a teaching model integrated with technology in the classroom, thus equipping students with tools to meet modern demands. The study emphasizes the training of educators to adequately use technological resources, not only to enrich teaching practices, but also to equip students with competent skills in the digital age. It considers the need for continuous professional development and the adoption of innovative pedagogical approaches that integrate technology.

Keywords: Digital Competencies, Teacher Training, Educational Technologies, Pedagogical Innovation, Professional Development.

1. Introducción

The purpose of this article is to analyze the level of digital competencies of teachers in an educational center in the province of Santa Elena, in order to identify training needs to develop quality education in the context of the XXI century.

The teaching of the 21st century needs teachers who can develop their own digital competence, training students integrally in the use of these technologies and preparing them for a digital world (Rangel, 2015). According to UNESCO classifications (2019), these types of competencies are pedagogical, technical and communicational, in addition there are ethical or school management plots. Despite this, there are still differences in the degree of digital competencies presented by teachers with respect to their students (Salinas et al., 2020).

One of the fundamental digital competencies for teachers is to be able to bring ICT's to teaching practice using technological tools to support learning (Cerezo et al., 2021). This allows promoting active and constructivist methodologies, centered on the student, which have proven to be more effective in the current context. According to a study by Córdova (2020), teachers with greater competencies to integrate technologies in their class planning and activities achieve better learning results and greater student motivation.

Another relevant competence is communication and collaboration supported by digital media. As Martín and Tourón (2017) point out, ICTs open possibilities for interaction between teachers, students and parents, transcending physical and temporal barriers, which also contributes to educational management. E-mail, chats and virtual platforms have become allies for the exchange of information, materials and timely feedback on teaching-learning processes.

In Ecuador, a study conducted by Cazco et al. (2019) on digital competencies in basic education teachers reported that most of them have a basic or intermediate level in the use of ICT as a

teaching and learning resource. This represents a limitation to implement didactic methodologies according to the current context. Likewise, Gómez (2020) points out that deficient initial teacher training in technology, coupled with limited opportunities for continuous professional development, perpetuate the digital divide.

In the coastal province of Santa Elena, where the school is located, educational indicators lag behind the national average and could be linked to insufficient digital competencies of teachers (Zambrano et al., 2021). Hence, the relevance of analyzing the current competencies of teachers in the use of ICT applied to pedagogy, in order to design continuous training programs relevant to this local reality.

1.1 State of the art

In recent times, digital competencies have become a crucial part of teacher training programs. Several studies focused on analyzing the levels of development of these competencies in educators at different educational levels.

At the Latin American level, research by Tourón et al. (2018), which covered five nations found, "Despite advances in the integration of digital technology in educational systems, significant gaps persist with respect to teachers' digital competencies" (p. 105). Similarly, Castañeda et al. (2020) evaluated the situation in Ecuador, concluding that "greater efforts are required in the initial and continuous training of teachers to develop digital competencies that allow the effective use of ICT in pedagogical practice" (p. 12).

Regarding the pedagogical use of ICT, Hernández et al. (2019) highlight that "teachers tend to use digital technologies mainly for administrative or content presentation purposes, but their integration in active and collaborative learning activities is still limited" (p. 234). For their part, Lázaro-Carrascosa et al. (2020) emphasize the need to "train teachers in the design of innovative didactic strategies that take advantage of the potential of ICTs to promote 21st century skills" (p. 9).

Regarding digital assessment, Romero-Martín et al. (2017) point out that "despite the multiple tools available, teachers show shortcomings in the use of technologies for formative and summative assessment of students" (p. 78). In this line, Silva (2021) highlights the importance of "training teachers in the use of digital rubrics, electronic portfolios and other ICT-mediated authentic assessment techniques" (p. 12).

Cabero-Almenara and Palacios-Rodríguez (2020) indicate that "teachers must acquire competencies to communicate effectively in virtual environments, taking advantage of synchronous and asynchronous tools" (p. 9). Likewise, Rodríguez-Hoyos, et al (2021). emphasize the need to "develop digital communication skills that promote interaction and collaboration in online learning communities" (p. 6).

The studies agree on the need to strengthen teacher training in digital pedagogical, communicative and technical competencies in order to efficiently integrate ICT into the teaching-learning process. Continuous professional development is required to reduce the existing gaps.

2. Methodology

The present study adopts a quantitative approach to examine the level of digital competencies of teachers in an educational center in the province of Santa Elena. The methodology used in the development of the research is described below.

i. Definition of the Population and Sample:

The target population consists of the 26 teachers of an educational center in the province of Santa Elena. A sample of 18 teachers was selected through a non-probabilistic sampling by convenience, with the purpose of obtaining representativeness and depth in the data collection.

ii. Data Collection Instruments:

A structured questionnaire was designed with closed and open questions to assess various dimensions of digital competencies, such as familiarity with ICT, pedagogical use, digital communication skills and evaluation through technologies. The questionnaire allows a comprehensive assessment of teachers' competencies and training needs.

iii. Literature Search and Selection Strategy:

A comprehensive search for relevant literature was conducted using databases such as Scopus and Web of Science. Keywords used included "digital competencies", "teacher", and "21st century education". Articles, reviews, and studies from the last five years that directly addressed digital competencies in the educational context were selected. A total of 158 articles were initially selected, of which 18 were analyzed in depth to inform and compare the study findings.

iv. Selection Criteria:

The included articles were selected on the basis of relevance to the study objectives, their contribution to the understanding of ICT use in education, and their methodological rigor. Special attention was given to studies that provided insights on the effective integration of digital technologies in educational environments.

v. Data Organization and Analysis:

The information collected through questionnaires was analyzed using descriptive statistical techniques to identify general trends and inferential techniques to explore relationships between variables. For open-ended responses, thematic analysis was used to discern patterns and gain a deeper understanding of teachers' attitudes and perceptions.

vi. Results Report:

The results are presented in a structured manner following the aspects of title, objectives, methodology, results, discussion and conclusions. This facilitates a clear and concise understanding of how digital competencies are used and perceived by teachers in the current educational context.

This adapted version of the methodology integrates details on the selection and analysis of relevant literature, which helps to establish a solid foundation for the research, and refines the structure of the report of results for better coherence and understanding of the study.

Figure. 1 shows how the quantitative technical methodology for a comprehensive analysis of teachers' digital competencies.

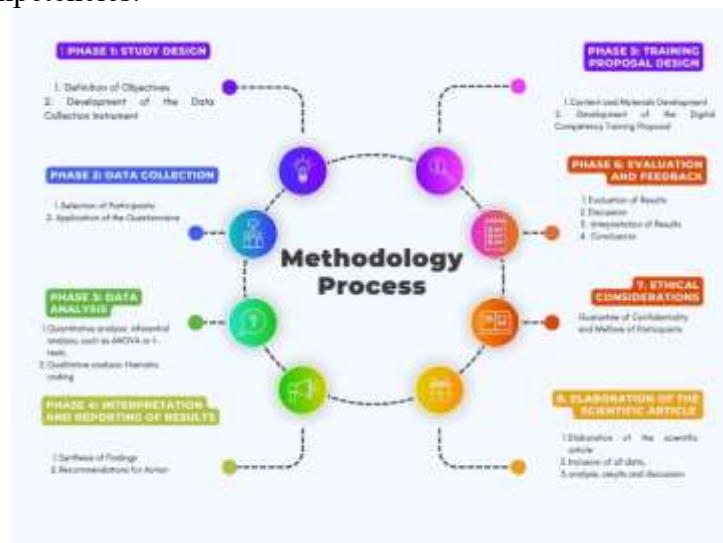


Figure 1. Methodological process. Adapted from Hernández Sampieri, R., et al. (2014). *Methodology of the research*

3. Development and Results

The following are the responses obtained from a sample of 18 teachers (out of a population of 26), who work in the educational center in the province of Santa Elena. This section presents the information collected through the 16 questions asked, which allowed to have a complete picture on various aspects related to the digital competencies of the participants.

The survey questions explored areas such as teachers' personal information, their educational level, their familiarity with the technology used for teaching, the digital tools used and their ability to interact with students online.

In addition, we inquired about digital learning platforms, reasons for using them, specific tools used, frequency of use of digital assessments, and teachers' confidence in administering those assessments.

An essential aspect addressed the need reported by teachers for training in areas such as technology integration for teaching, digital communication skills, technology-based assessment and technological literacy in general. Preferred training formats and willingness to participate in continuing education programs were probed.

Responses were organized while maintaining anonymity. This provides valuable information on the current situation regarding the digital competence development gaps of the teaching staff, laying the groundwork for tailoring training strategies to the specific contextual needs identified.

Question 1. Gender distribution of teachers

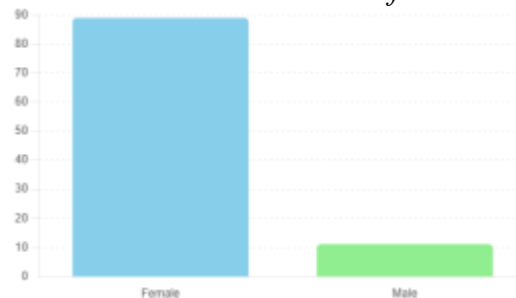


Figure 2. Gender distribution of teachers

Figure 2 shows that 88.9% of teachers are women and 11.1% are men. This reflects that teaching is a profession with more female representation; more women than men teach, especially at the lower levels.

Question 2. Distribution of age range of teachers

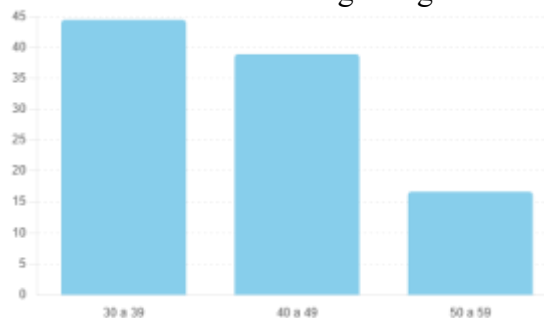


Figure 3. Distribution of age range of the teachers

The age distribution among the surveyed teachers reveals that 44.4% are in the 30 to 39 years old age range. 38.9% are in the 40-49 age range and 16.7% belong to the 50-59 age range. This indicates that the majority of teachers are relatively young, with a strong focus on the middle

age groups (30 to 49 years), suggesting a workforce with significant experience, but potentially still in the middle stages of their professional careers.

The lower presence of teachers in the 50 to 59 age range could reflect a transition to new generations of educators, with important implications for continuing education and professional development planning, especially with regard to digital competencies

Question 3: Years of Teaching Experience

The third question asks about the years of teaching experience of the participants.

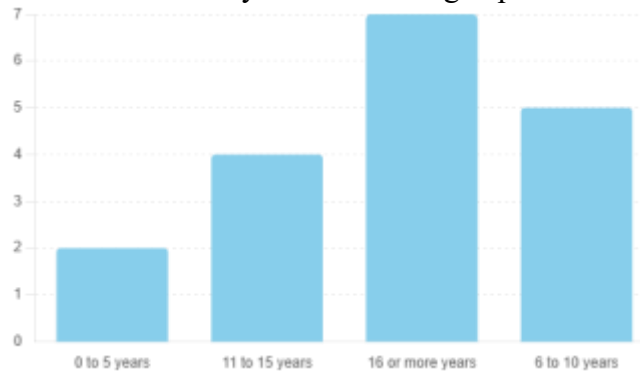


Figure 4. Years of Teaching Experience

These results reveal a teaching workforce with considerable experience in the field of education, where a significant proportion of respondents (38.9%) have an extensive teaching career of more than 16 years. On the other hand, the number of teachers in the 0 to 5 years of experience range is lower, which could indicate that there are professionals recently initiated to the educational field or simply reflects the specific composition of the sample.

The accumulated experience among teachers is a valuable asset, although it also underlines the importance of continuously updating digital competencies to adapt to changing educational needs.

Question 4. Highest level of education

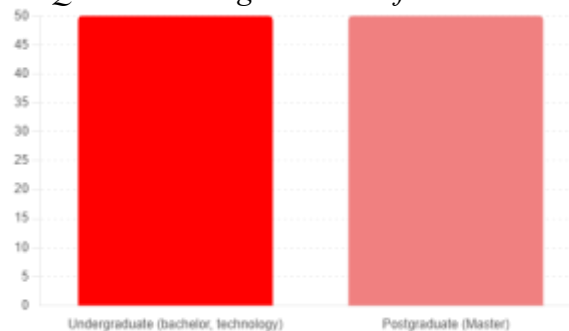


Figure 5. Maximum Level of Education

The distribution of the highest level of studies attained by the surveyed teachers shows that there is an even split: 50% have attained a bachelor's degree or technology. The other 50% have completed postgraduate studies (master's degree). This balance between teachers with undergraduate and graduate degrees highlights a high level of formal education within the surveyed teaching population.

The significant presence of teachers with postgraduate studies reflects a commitment to continuing education and professional development, crucial aspects to address the educational challenges of the 21st century, including the effective integration of ICTs in the teaching-learning process.

Question 5. Level of Familiarity with ICTs

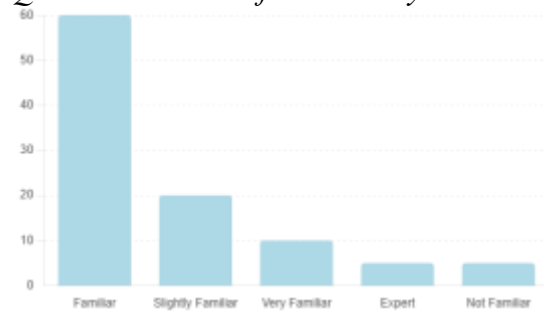


Figure 6. Level of Familiarity with ICTs

The figure 6 illustrates the familiarity of participants with the subject matter. The majority, 60% of participants, reported being "Familiar" with the topic. This is followed by 20% of participants who are "Slightly Familiar". A smaller percentage, 10%, consider themselves "Very Familiar", while 5% each identified as "Expert" and "Not Familiar". This distribution suggests that most participants have a moderate to high level of familiarity with the subject, with very few considering themselves as experts or completely unfamiliar.

Question 6: Frequency of Use of Digital Tools in Teaching Practice



Figure 7. Frequency of Use of Digital Tools in Teaching Practice

The frequency with which teachers use digital tools in their teaching practice is presented as follows: 44.4% of teachers use digital tools several times a week. 38.9% use them daily, 11.1% use them weekly. And only 5.6% use them rarely. These results reflect a positive integration of digital technologies in teaching practice, with a large majority of respondents using digital tools frequently (daily or several times a week).

The daily use of digital technologies by almost 40% of teachers underscores their central role in contemporary teaching. However, the small percentage that rarely use digital technologies points to opportunities to increase the adoption and effective use of these tools among all teachers, potentially through training and professional development programs.

Question 7: Ability to Communicate Using Digital Tools

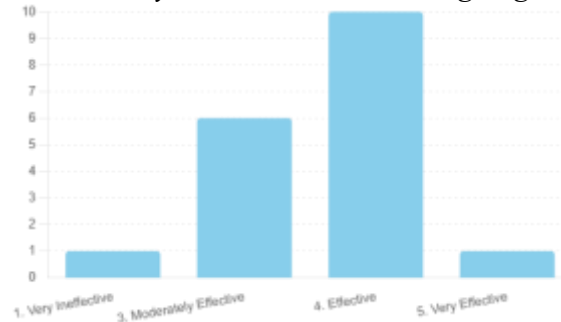


Figure 8. Ability to Communicate Using Digital Tools

Teachers' ability to communicate with students and colleagues using digital tools is distributed as follows: 55.6% consider themselves to be effective in digital communication. 33.3% see themselves as moderately effective. 5.6% rate their ability as very ineffective, and another 5.6% as very effective. These results indicate that the majority of teachers feel competent in their ability to communicate using digital tools, with more than half rating themselves as effective. The presence of a small percentage of teachers who consider themselves very effective highlights the existence of educators who are highly skilled and confident in the use of digital technologies for communication.

However, the fact that a small fraction still consider themselves very ineffective suggests the need for targeted strategies to improve digital competencies in communication, ensuring that all teachers can effectively leverage ICTs to enrich their interaction with students and colleagues..

Question 8: Use of Digital Educational Platforms

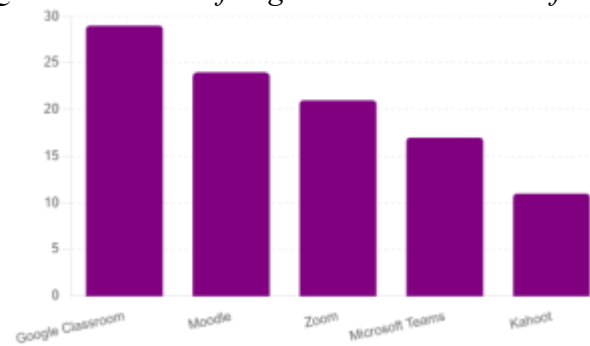


Figure 9. Use of Digital Educational Platforms

These results indicate that 44% of teachers use educational platforms such as Moodle and Google Classroom at least once a week, which suggests a relatively high level of technological integration in their pedagogical routines. However, it also stands out that 28% of teachers use them infrequently (monthly or rarely), which may point to barriers in technological adoption or the need for more training in the use of such platforms. Kahoot is a game-based learning platform that allows educators and students to create and participate in quiz-type activities, discussions and surveys that is not considered one of the most widely used..

Question 9. Purposes of use of digital educational platforms

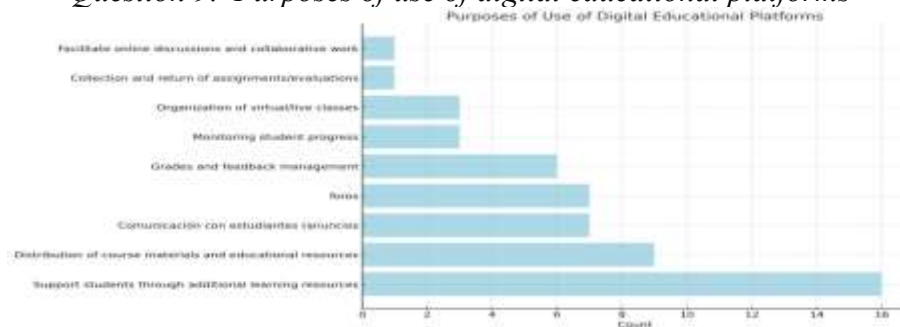


Figure 10. Purposes of use of digital educational platforms

The diversity in the use of digital educational platforms among teachers highlights their multifunctionality: support for students with learning resources used by 16 teachers. Distribution of educational material and resources, mentioned in combination with other uses by 9 teachers. Communication with students, applied together with other purposes by 7 teachers. Grading management and organization of virtual/live classes, included in various combinations, 6 teachers.

This picture suggests that platforms serve not only to manage content, but also for communication and evaluation, reflecting a broad technological integration in pedagogical practices. These data underscore the importance of platforms as versatile tools in modern education.

Question 10. Most used educational platforms

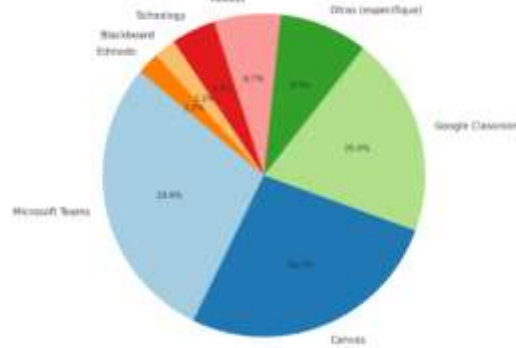


Figure 11. Most used educational platforms

Figure 11 shows that Google Classroom is the most used platform, with 45% of mentions, followed by Moodle with 30%. These results underscore a strong preference for well-established platforms in the educational environment, reflecting their effectiveness and the familiarity teachers have with them.

These preferences indicate the importance of these tools in modern teaching practice and may guide future decisions regarding training and improvements in educational technology infrastructure.

Questions 11 and 12. Frequency of Use and Confidence about digital tools for assessments

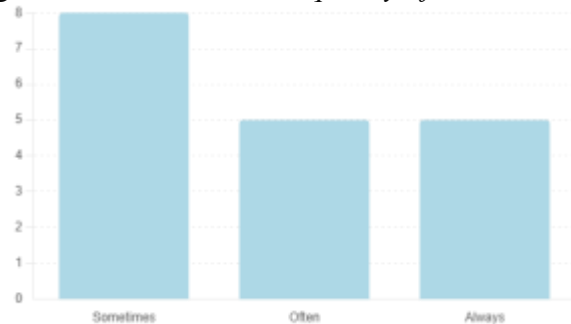


Fig. 12 Frequency of Use about digital tools usage Assessments

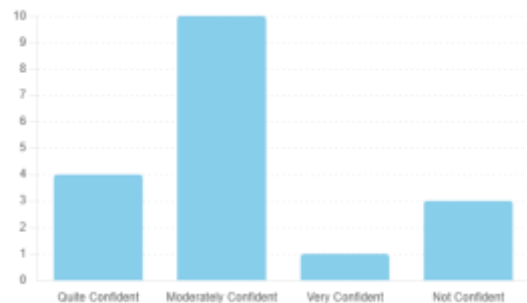


Fig. 13 Confidence in Online

Los resultados del análisis estadístico descriptivo para las preguntas 11 y 12 revelan aspectos importantes sobre el uso y la confianza en herramientas digitales para evaluaciones por parte de los docentes.

Figure 12. Frequency of Use about digital tools usage

The data on "Frequency of Digital Tool Usage" indicates that 44.44% of respondents use digital tools several times a week, while 38.89% use them daily. Weekly usage is reported by 11.11% of respondents, and only 5.56% use digital tools rarely. This distribution suggests that the majority of educators incorporate digital tools into their teaching practices frequently, with a significant portion utilizing them on a near-daily basis

Figure 13. Confidence in Online Assessments

The data on "Confidence in Online Assessments" reveals that the majority of respondents are moderately confident in the reliability of online assessments, with 55.56% of the total

participants falling into this category. 22.22% of respondents are quite confident, while 16.67% express low confidence. Only 5.56% of respondents feel very confident in the reliability of these assessments. This distribution indicates a general moderate level of trust among the educators surveyed, highlighting areas for potential improvement to increase confidence in online evaluation methods.

Questions 13 and 14. Areas of training need and perceived need for continuous training

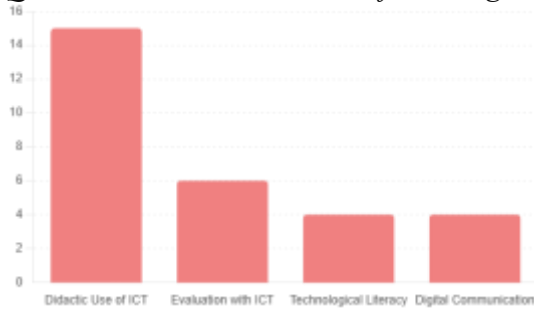


Figure 14. Areas of training needs

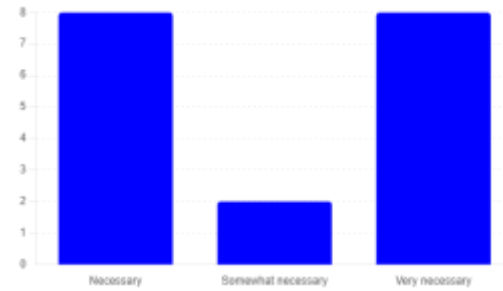


Figure 15. Perceived need for continuous training

Figure 14. Areas of training needs

In question 14 of the survey, teachers indicated the areas where they feel they need more training. The three main areas highlighted were: didactic use of ICT, mentioned by 15 teachers. Digital assessment, mentioned by 7 teachers. Technological literacy 4 teachers and Digital communication, mentioned by 4 teachers. Figure 14 highlights that "Didactic use of ICT" remains the main area of interest for professional development, indicating the importance of training teachers to effectively integrate technology into their teaching methods.

Figure 15: Perceived need for continuous training

The perception of the need for continuous training, represented in question 14, shows a clear recognition of the importance of constant updating in digital competencies. 88% of teachers indicate a positive perception of the need for continuous training, which indicates an awareness of the constant evolution of digital technologies and their impact on education.

Questions 15 and 16. Preferred format for training and Willingness to participate in ongoing training



Figure 16. Preferred format for training in ongoing training

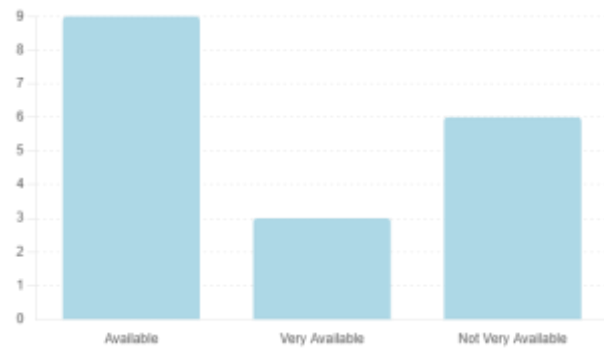


Figure 17. Willingness to participate

Figura 16: Preferred format for training

Figure 16 on format preferences for digital competencies training reveals that most teachers (50.0%) prefer face-to-face workshops, valuing direct and personal interaction during their training. However, 38.9% also show inclination towards online courses, highlighting the importance of flexibility and remote access in today's education. A small fraction (5.6%) opt for a

combination of both methods, while another 5.6% prefer to participate in webinars, suggesting a variety of needs and preferences in learning methods among educators.

Figura 17: Disponibilidad para participar en formación continua

The data on "Willingness to Participate in Ongoing Training" reveals that 44.44% of respondents are available to participate in such programs, while 33.33% are not very available. Only 22.22% of the respondents consider themselves very available for continuous training. This distribution suggests that while a significant portion of educators are open to ongoing professional development, a notable percentage face challenges in committing to such programs, indicating a potential need for more flexible training options.

3.1 Summary of the quantitative results of the Teacher Survey

Table 1 presents a summary of the results of the survey conducted in an educational institution in the province of Santa Elena. These data are crucial to understand their digital competencies and identify training needs. The table consolidates relevant details in several categories, such as teacher profile, familiarity with digital technologies, use of educational platforms, application of digital assessment tools, confidence in online assessments, areas of training requirement from their perspective, preferred training formats and willingness to participate in programs.

These objective and well-organized data lay the groundwork for the subsequent analysis of results, conclusions and recommendations aimed at enhancing the digital skills of teachers in line with the educational demands of the 21st century.

The results of this study are presented in the form of a scorecard.

Table 1

Quantitative Results of the Teacher Survey

No	Aspect	Result	Interpretation
1	Gender	16 women, 2 men	Predominance of female teachers in the sample
2	Age	7 aged 30-39, 7 aged 40-49, 4 aged 50-59	Balanced age distribution
3	Teaching Experience	3 with 0-5 years, 5 with 6-10 years, 4 with 11-15 years, 6 with 16+ years	Variety of experience levels, with more highly experienced teachers
4	Level of Education	6 with undergraduate degree, 12 with postgraduate degree	Majority have postgraduate degrees
5	Familiarity with ICT	2 not familiar, 4 slightly familiar, 8 familiar, 3 very familiar, 1 expert	Varied familiarity levels, with most familiar but some lagging
6	Frequency of Digital Tool Usage	8 daily, 6 several times a week, 2 weekly, 2 rarely	High frequency of use for most
7	Digital Communication Skills	1 very ineffective, 5 moderately effective, 6 effective, 1 very effective	Mostly effective digital communication skills
8	Frequency of Educational Platform Usage	4 daily, 5 weekly, 4 monthly, 4 rarely	Regular use but with variability

9	Purposes of Platforms	Material distribution (13), Communication (11), Progress monitoring (5), Resource support (12)	Diverse uses, with emphasis on material distribution and resource support
10	Most Used Educational Platforms	Microsoft Teams (28.9%), Canvas (26.7%), Google Classroom (20%)	Microsoft Teams and Canvas are the most popular platforms, showing a clear preference for tools that facilitate collaboration and online course management
11	Most Used Platforms	Google Classroom (9), Microsoft Teams (10), Canvas (9), Moodle (3)	Predominance of certain popular platforms
12	Frequency of Digital Assessments	3 always, 6 often, 8 sometimes, 1 never	Moderate use, with some lagging
13	Confidence in Online Assessments	1 very confident, 5 quite confident, 9 moderately confident, 3 not very confident	Moderate to high confidence for most
14	Training Needs	Didactic use of ICT (13 very necessary, 5 necessary), Digital communication (4), Evaluation with ICT (5), Technological literacy (3)	High perceived need for didactic use of ICT
15	Preferred Training Format	9 online courses, 9 in-person workshops, 1 webinar	Divided preferences between online and in-person
16	Availability for Training Programs	6 very available, 8 available, 4 not very available	Moderate to high availability for most

4. Proposal for a Teacher Training Plan in Digital Competencies: "Strengthening 21st Century Skills".

Introduction

In the era of digital transformation, it is crucial that teacher training encompasses advanced digital competencies, aligned with contemporary pedagogical demands and the diverse needs of the student body (Rodríguez-García et al., 2016). This program seeks not only to improve technical skills, but also pedagogical skills, adapting teaching practices to an inclusive and technologically enriched educational environment.

Objectives

Professional Development: Train teachers in the advanced and pedagogical use of ICTs.

Digital Inclusion: Implement technologies to support diversity in the classroom.

Educational Innovation: Encourage the adoption of new technologies to improve teaching and learning processes.

Theoretical framework

Digital competence is recognized as fundamental for effective participation in a knowledge-based society and economy (INTEF, 2017). This approach is vital to ensure that all students can fully participate in the educational process, regardless of their individual abilities.

Methodology

The program methodology combines theoretical and practical sessions, with reflective and collaborative activities. The integration of theory and practice is essential for the development of effective competencies in real contexts (Moreno, 2007).

Program Content

Module	Content	Learning Objectives
Fundamentals of Digital Competence	Digital security, online ethics, and information management.	Develop skills for the ethical and safe use of ICT.
Digital Tools in Education	Learning platforms, collaborative tools, educational software.	Apply digital tools in the planning and execution of inclusive lessons.
Digital Innovation and Creativity	Augmented reality, gamification, project-based learning.	Integrate emerging technologies to enrich learning and increase student engagement.

Target Population

The training is aimed at all active teachers at the institution, encompassing both those with limited experience in technology and those with an advanced level of digital competence. This inclusive approach ensures that the program has a broad reach, benefiting 26 educators representing diverse academic disciplines.

Resources Needed

- Technology: Equipment with high-speed Internet access, up-to-date software and educational platforms.
- Staff: Instructors specialized in educational technology, technical assistants for support during sessions.
- Materials: User guides, digital course materials, access to virtual libraries and subscriptions to relevant online services.

Schedule of Activities

The program will be developed over one academic semester with the following structure:
 Month 1-2: Modules on digital fundamentals and tools.
 Month 3-4: Digital Tools in Education
 Month 5: Innovation and creativity in the use of new technologies.

Dissemination Methods

The program will be promoted through:

- Institutional e-mail: sending invitations and reminders.
- Institutional intranet: publication of news and program updates.
- Department meetings: presentations to inform and motivate participation.

Evaluation and Follow-up

Program evaluation will include teacher self-evaluation, classroom observations and student feedback analysis to measure the effectiveness of integrated pedagogical practices (Gisbert, Espuny & Gonzalez, 2011).

Conclusion of the plan

This plan is designed so that teachers not only acquire digital competencies, but also learn to apply them in an educational context that is increasingly diverse and technologically advanced. This approach ensures that education is relevant, inclusive and prepared for the future.

5. Conclusions

This research fulfilled the basic objective of analyzing the level of digital competencies of teachers at the educational center in the province of Santa Elena, in the face of the demands of 21st century education. The research question sought to identify the training gaps detected that require attention for the development of a high quality educational model that adequately responds to current demands.

The results made it possible to achieve the general objective. It was determined that, although teachers frequently use digital tools and communicate through technology, there are evident training needs, mainly in the didactic integration of ICT for innovative learning, according to the demands of the 21st century. Other areas requiring reinforcement are digital assessment, virtual communication and basic technological literacy.

Regarding the research question, significant gaps were identified between the current digital competencies of teachers and what is required to foster critical thinking, collaboration and personalized growth of students through the effective use of technologies in the educational process.

The conclusions highlight the need to implement a continuous training program focused on strengthening teachers' digital competencies, covering the key aspects detected as deficient. This will allow progress towards a quality education that responds adequately to the digital context of the 21st century in the educational institution that was the subject of the research.

6. References

- Basantes, A. et al. (2020). Competencias digitales docentes: Nivel de dominio en docentes de Ecuador. *Propósitos y Representaciones*, 8(3).
- Boholano, H. B. (2017). Smart social networking: 21st century teaching and learning skills. *Research in Pedagogy*, 7(1), 21-29. <https://doi.org/10.17810/2015.45>
- Cabero, J. & Barroso, J. (2018). Los escenarios tecnológicos en Realidad Aumentada (RA): posibilidades educativas en estudios universitarios. *Aula Abierta*, 47(3), 327-336.
- Cabero-Almenara, J., & Palacios-Rodríguez, A. (2019). Marco Europeo de Competencia Digital Docente «DigCompEdu». Traducción y adaptación del cuestionario «DigCompEdu Check-In».
- Cabero-Almenara, J., & Palacios-Rodríguez, A. (2020). Marco European Digital Competence 2.2 for Teachers: A Proposal for Its Introduction in Evaluating Teacher Digital Competence in Andalusia. *IJTES*, 6(1), 1-16. <https://doi.org/10.18844/ijtes.v6i1.4534>
- Cabezas, M. et al. (2018). Formación docente en competencias digitales para la educación media en Colombia. *EDUTEC, Revista Electrónica de Tecnología Educativa*, 63, 55-67.
- Cazco, D., Marcillo, G., & Vizueta, J. (2019). Nivel de competencias digitales de los docentes de educación básica. *Polo del Conocimiento*, 4(9), 455-466.
- Cela-Ranilla, J. M., Esteve-Mon, F. M., Esteve-González, V., & Gisbert-Cervera, M. (2017). El docente en la sociedad digital: una propuesta basada en la pedagogía transformadora y en la tecnología avanzada. *Profesorado*, 21(1), 403-422.
- Cerezo, R., Bernardo, A., Esteban, M., Sánchez, M., & Tuero, E. (2021). Programas y aplicaciones para favorecer el aprendizaje del alumnado en educación primaria. *EduTEC. Revista Electrónica De Tecnología Educativa*, 75, 1-15.
- Córdova, F. (2020). Competencias digitales y resultados de aprendizaje en estudiantes de una universidad privada. *Campus Virtuales*, 9(2), 79-90.
- Gisbert, M., Espuny, C., & González, J. (2011). "Evaluación de la competencia digital."
- Gómez, M. (2020). Competencias digitales docentes y estrategias didácticas con TIC en el aula. *Educatio Siglo XXI*, 38(3), 211-234.

- Hernández Sampieri, R., Fernández Collado, C., & Baptista Lucio, P. (2014). Metodología de la investigación. Sexta Edición. McGraw Hill España.
- Hernández, R. M., Orrego, R., & Quiñones, S. (2019). Nuevas formas de aprender: La formación docente frente al uso de las TIC. *Propósitos y Representaciones*, 6(2), 671-701. <http://dx.doi.org/10.20511/pyr2018.v6n2.248>
- INTEF. (2017). "Marco Común de Competencia Digital Docente."
- Lázaro, J. & Gisbert, M. (2015). Elaboración de una rúbrica para evaluar la competencia digital del docente. UOC.
- Lázaro-Cantabrana, J. L., Gisbert-Cervera, M., & Silva-Quiroz, J. E. (2021). Exploring the digital competence of university teachers: A quantitative approach through data analysis and nesting of models with equations. *Revista Ibérica de Sistemas e Tecnologias de Informação*, (E38), 1-15.
- Lázaro-Carrascosa, C., Usart-Rodríguez, M., & Gisbert-Cervera, M. (2020). Competencia digital de futuros docentes para efectuar un proceso de enseñanza y aprendizaje mediante realidad aumentada en educación primaria. *Pixel-Bit, Revista de Medios y Educación*, 58, 167-186.
- Martín, D., & Tourón, J. (2017). El enfoque flipped learning en estudios de magisterio: percepción de los alumnos. *RIED: revista iberoamericana de educación a distancia*, 20(2), 187-211.
- Moreno Peña, B. (2007). "Dimensiones europeas de la educación."
- Rangel, A. (2015). Competencias docentes digitales: propuesta de un perfil. *Pixel-Bit. Revista de Medios y Educación*, 46, 235-248.
- RED. *Revista de Educación a Distancia*. Núm. 56, Artíc. 6, 31-01-2018 DOI: <http://dx.doi.org/10.6018/red/56/6> http://www.um.es/ead/red/56/castaneda_et_al.pdf
- Redecker, C. (2017). European Framework for the Digital Competence of Educators: DigCompEdu. Publications Office of the European Union. <https://doi.org/10.2760/159770>
- Redecker, C., & Punie, Y. (2017). European Framework for the Digital Competence of Educators: DigCompEdu. Publications Office of the European Union. <https://doi.org/10.2760/178382>
- Rodríguez-García, A. M., et al. (2016). "Formación del profesorado en competencias digitales."
- Rodríguez-Hoyos, C., Fueyo Gutiérrez, A., & Hevia Artime. I. (2021). Competencias digitales del profesorado para innovar en la docencia universitaria. Analizando el uso de los dispositivos móviles [The digital skills of teachers for innovating in university teaching]. *Pixel-Bit. Revista de Medios y Educación*, 61, 71-97. <https://doi.org/10.12795/pixelbit.86305>
- Romero-Martín, R., Castejón-Oliva, F. J., López-Pastor, V. M., & Fraile-Aranda, A. (2017). Evaluación formativa, competencias comunicativas y TIC en la formación del profesorado. *Comunicar*, 25(52), 73-82.
- Salinas, M. et al. (2020). Competencia digital: una necesidad del profesorado universitario en el contexto de la educación virtual derivada de la COVID-19. *Revista de Educación a Distancia*, 20(64).
- Silva, J. (2021). Rúbricas digitales para la evaluación auténtica en la educación superior. *Revista Iberoamericana de Educación*, 85(2), 9-26.
- Tourón, J., Martín, D., Navarro, E., Pradas, S., & Íñigo, V. (2018). Validación de constructo de un instrumento para medir la competencia digital docente de los profesores (CDD). *Revista Española de Pedagogía*, 76(269), 25-54. <https://doi.org/10.22550/REP76-1-2018-02>
- UNESCO (2019). Marco de competencias de los docentes en materia de TIC. UNESCO. <https://unesdoc.unesco.org/ark:/48223/pf0000371024>
- Zambrano, W. et al. (2021). Competencias digitales como factor asociado al rendimiento escolar en Ecuador. *Alteridad*, 16(2), 210-225.