



Virtual learning environments and teachers' digital competencies in Peruvian education

 **Gustavo Adolfo Ventura Seclen¹⁺**

 **Victor Manuel Fernandez Lopez²**

 **Gavi Elita Carranza Medina³**

 **Oscar Ivan Alfaro Bustamante⁴**

 **Oscar Eden Guevara Musayon⁵**

^{1,2,3,4,5} Cesar Vallejo University, Peru.

¹Email: gaventurav@ucvvirtual.edu.pe

²Email: vfernandezlo01@ucvvirtual.edu.pe

³Email: gcarranzam@ucvvirtual.edu.pe

⁴Email: abustamanteoi@ucvvirtual.edu.pe

⁵Email: oscareden@ucvvirtual.edu.pe



(+ Corresponding author)

ABSTRACT

Article History

Received: 14 January 2026

Revised: 8 May 2026

Accepted: 6 July 2026

Published: 27 July 2026

Keywords

Digital competence

Educational technology

E-learning

Quality education

Virtual learning environments.

The present study aligns with the fourth Sustainable Development Goal (SDG), Quality Education, it highlights the importance of robust virtual learning environments as key enablers of interactive, adaptive, tech teaching methods and learning processes. Under a context of accelerated digital transformation, the research aimed to determine the relationship between virtual environments and teachers' digital competencies in an educational institution in Lambayeque, Peru, during 2024. A basic quantitative methodology was adopted, using a non-experimental, cross-sectional correlational design. The sample was composed of 51 teachers picked through non-probabilistic convenience sampling, and data were collected through the application of two structured questionnaires that assessed perceptions of virtual learning environments and levels of digital competencies. The results revealed a strong and statistically significant positive association between virtual environments and overall digital competencies (Spearman's $\rho = 0.800$; $p < 0.001$). The second variable was divided into three dimensions. Virtual environments showed a very strong association with technical competencies ($\rho = 0.901$), a moderate association with educational competencies ($\rho = 0.581$), and a weak association with programmatic competencies ($\rho = 0.120$). These differentiated relationships gave us empirical evidence that virtual environments do not influence all the competencies uniformly, underlining the need for targeted strategies and teacher training policies aligned with inclusive, equal and high-quality education goals.

Contribution/Originality: The study supplies actual knowledge by obtaining empirical evidence of differentiated relationships between virtual learning environments and the dimensions of digital teaching competencies in a Peruvian context, highlighting that virtual environments exert unequal effects on technical, educational, and programmatic competencies, thus informing specific strategies for educational innovation.

1. INTRODUCTION

1.1. Context and Relevance

The main topic relates to Sustainable Development Goal 4, which aims to ensure quality education. Currently, virtual environments offer digital strategies and platforms with the potential to improve the learning process by facilitating more interactive teaching methods tailored to the individual needs of each student. According to Brítez

(2020) various educational institutions around the world have demonstrated that their staff have low levels of competence in using ICT to carry out their educational work. The main cause of these situations has been the limited acceptance of these technologies, including the use of artificial intelligence, which has led to poor teaching performance, harming students' education, and causing delays in administrative tasks (Flores et al., 2024). With rapid technological advances in the field of education, teachers increasingly face the challenge of keeping up to date and being adequately prepared (Cañizares, 2024).

On the other hand, approximately 50% of the world's population, 1.65 billion people, still live without internet access. This lack of connectivity particularly affects teachers and students in communities with limited technological resources (UNESCO, 2023). During the pandemic, many of them, around 826 million students, were unable to continue their education remotely due to a lack of internet access and devices. This clearly highlights the urgent need to improve digital skills and provide more opportunities and resources to teachers and students, so that no one is left behind in the educational process.

In the Peruvian context, it is essential to adapt to the constant evolution of knowledge and the demographic profile of students, as well as to the rapid pace of social and technological transformations, such as the COVID-19 pandemic, which led to the adoption of online learning, accelerating the integration of technologies into educational methodology (Chilamá, 2024).

According to the Peruvian (Ministry of Education of Peru, 2020) nearly 70% of teachers have difficulty adapting their classes to virtual environments; many of them, around 35%, face challenges in delivering distance education and in lesson planning, both individually and collaboratively. These data indicate that, for many teachers, the use of technology remains at a basic level, as they have not yet fully developed their digital skills (Esparza, González, Martínez, Ramírez, & Hernández, 2024). In this regard, only 46% of teachers have been able to improve their digital competencies, which has considerably limited their ability to successfully adapt to teaching in virtual environments. This situation has caused a large number of teachers to face difficulties when attempting to integrate technological tools into their teaching methods, preventing them from taking advantage of the opportunities offered by technological platforms to improve the learning experience. In light of the above, at an educational institution located in the district of Lambayeque, it has been observed that many teachers have displayed negative attitudes toward the use of ICT to carry out their organizational tasks. The main cause has been a lack of training in virtual environments, which has led to negative perceptions among students when evaluating classes, describing them as outdated or overly technical. In addition, teachers have received complaints from their supervisors for failing to submit assigned tasks on time through technological platforms, which affects them both personally and professionally, as well as the entire educational community that expects better results in both the teaching-learning dynamic and administrative management. Therefore, the central research question was: What is the relationship between virtual environments and digital competencies among teachers at an educational institution in Lambayeque, 2024?

1.2. Objectives and Hypothesis

1.2.1. Objectives

General objective:

Determine the relationship between virtual environments and digital competencies in teachers at an educational institution in Lambayeque, 2024.

Specific objectives:

- (1) Measure the level of use of virtual environments.
- (2) Measure the level of teachers' digital competencies.
- (3) Determine the relationship between virtual environments and technical competence.
- (4) Determine the relationship between virtual environments and educational competence.
- (5) Determine the relationship between virtual environments and programmatic competence.

1.2.2. Hypothesis

There is a statistically significant relationship between virtual environments and teachers' digital competencies (and their dimensions) in the studied institution.

1.3. Theoretical Framework

1.3.1. Background of the Study

With regard to previous international inquiries, the study by Delgado, Martínez, and Tigrero (2022) was cited, in which technological skills among Ecuadorian teaching staff were evaluated. They used a quantitative method, based on a pre- and posttest design. They included a sample of 53 teachers. They proved that digital competence, measured across its dimensions, showed that 88.67% of participants experienced improvements in their ability to innovate in communication. In addition, an increase of 84.9% was observed in content creation skills and 83.02% in digital literacy compared to the initial levels identified.

The study by Ramírez, Arcos, and Lagunes Domínguez (2020) focused on how educational strategies influence the digital competencies of the students. A quantitative, non-experimental procedure was employed; they used questionnaires that reflected a negative progress of 13.5% in digital research skills, confirming a significant problem, especially in the repeated use of the same materials or strategies.

Solórzano-Arroyo and Parra-Ferrié (2020) investigated how technological school management influenced digital skills during the COVID-19 period in Latin America. They used a quantitative approach with a descriptive-explanatory scope. According to the results, a 56.56% level of compliance in administrative aspects was achieved due to technological skills; likewise, more than half of the teachers did not manage technological aspects adequately for their work in the formative and educational process.

Basantes-Andrade, Cabezas-González, and Casillas-Martín (2020) analyzed technological skills among educators in the Chilean context. They used qualitative and quantitative data. The results were that 87% of participants stated an improvement in their digital skills throughout their professional trajectory as a direct consequence of the COVID-19 pandemic. They conclude that it is essential for them to follow programs that include technological skills adapted in a timely manner, to any change or require on the educational context.

Alcívar and Barreiro (2022) evaluated digital skills among professors at a university in Ecuador. They conducted a quantitative study, including 60 teachers and 327 students. The findings were that educators have strong skills in the use of digital technologies, excelling in all the categories analyzed. Overall, the results were positive and higher than those obtained in other educational contexts, reflecting solid digital preparation among teachers.

Maquera (2020) examined how using digital technologies and resources influences the growth of technological training for educators during online teaching based in the Lima context. The study adopted a quantitative and correlational perspective, with a sample of 42 teachers. Revealing that the automation use of virtual tools and resources by educators in a distance education environment showed a moderate positive correlation with the development of competencies, with a correlation coefficient of $RS = 0.432$, and statistical significance at $p = 0.00$ ($p < 0.05$).

Also, Vera, Ramos, Fernández, and Valdivieso (2023) verified the association between virtual environments and ICT competencies among teachers in Nasca. They conducted a quantitative and non-experimental study. They identified a moderately positive relationship of 0.778, with a significance value of $p = 0.000$, suggesting that as teachers increase their adoption and use of virtual environments, they also experience improvements and consolidation of their digital skills.

Pereda-Loyola and Duran-Llano (2023) analyzed the educators' technological skills at a Peruvian university. They used an experimental methodology with a pre-experimental design, applying the intervention to a single group of teachers. Through analysis using the Student's *t*-test, the results showed that teachers improved their skills and

confirmed that virtual environments play a fundamental role in reinforcing these competencies. In conclusion, digital environments are crucial tools to support educators in their classroom performance and pedagogical practice.

Alcántara (2022) observed how educators' technological skills influence their performance, particularly on distance education. Based on a systematic review, the results showed that in Peru, approximately 60% of teachers face difficulties with digital skills, preventing them from fully taking advantage of ICT on the creation and use of educational resources. In summary, many teachers lack the necessary and actual technological skills, which clearly limits their ability to deliver high-quality online classes.

Finally, Rojas, Zeta, and Jiménez (2020) revealed the status of digital competencies among teaching staff and students at a public university in Peru. They applied a quantitative methodology. The results indicated that teachers still demonstrate a basic level of the application of digital competencies, with content creation skills standing out at this level.

1.3.2. Theoretical Bases

Regarding the theoretical base of the virtual environment's variable, supported by the theory of Educational Technology (Aguilar, Diaz, & Revelo, 2020), it maintains that the incorporation of Information and Communication Technologies (ICT) into the educational process can significantly enhance both education and training. From this perspective, virtual environments give opportunities to personalize learning, access to a wide range of learning tools, and promote collaborative work between teachers and students through digital tools (Zhang, 2020). In this way, this theory highlights how ICT has the potential to transform conventional pedagogical practices and improve so much better the learning in virtual contexts (Brítez, 2020).

Also, it is aligned with the theory of social constructivism, which states that education is an interactive and constructive process in which learners build their development by interacting with their environment and other individuals (Basantes-Andrade et al., 2020). In digital spaces, this interaction can be facilitated through both synchronous and asynchronous communication tools, as well as participation in discussions and collaborative online activities (Vargas & Rondero, 2020). This theory emphasizes the importance of designing virtual environments that foster collaboration between students and teachers, active discussion, and the construction of knowledge, applying constructivist principles adapted to the digital context (Tigua & Bracho, 2023).

Based on its conceptualization, Barreto (2017) affirms that virtual environments are technological systems created with the purpose of facilitating distance learning, enabling communication between teachers and students, and providing access to various educational resources and collaboration in virtual spaces.

Besides, according to Biletska, Paladieva, Avchinnikova, and Kazak (2021) these are digital platforms where educators can design, create, and deliver unique and interactive educational experiences through the implementation of technologies such as virtual learning platforms, educational management systems, and collaborative resources available on the web.

Along the same lines, Ramírez et al. (2020) indicate that a virtual educational environment is a digital platform that replicates elements of the conventional physical learning environment, which can facilitate better interaction and collaboration activities between students and educators through the use of digital technologies and resources.

With respect to this variable, it is divided into the following dimensions. The first one is flexibility, which includes all activities, techniques, and resources used to collect, organize, store, retrieve, and share relevant data within the educational field, pointing to adjust and adapt them to different situations, needs, and contexts in a digital environment or online platform, making these spaces more open and centered on user experience (Barreto, 2017). This also involves the management of academic information, learning resources, course communications, student assessments, and other essential data that enhance and facilitate adaptation (Martínez-Garcés & Garcés-Fuenmayor, 2020). So, flexibility is fundamental to improve the use of resources, as it optimizes administrative management and

promotes an effective and enriching educational environment oriented toward all participants in the educational process (Lovón & Sandra, 2020).

The second dimension is interaction, which refers to the digital communication between students and teachers, like online discussions and feedback on assignments, virtual tutoring sessions, and any form of direct collaboration that promotes both teaching and learning (Barreto, 2017). According to Sánchez-Cabrero, Costa-Román, Mañoso-Pacheco, Novillo-López, and Pericacho-Gómez (2020), it also refers to the way students use online educational resources, from exploring course modules and reading digital materials to participating in interactive activities such as simulations and educational games.

The third one is linkage, which can be explained as the adaptation of educational resources, tasks, and learning experiences depending on the personal requirements of each student (Barreto, 2017). This involves the learning rhythm, course content, and educational strategies to make them more relevant and effective for each learner, as well as integrating the use of technological learning resources such as recommended platforms or information assessment tools to offer resources and activities aligned with each student's individual preferences and learning styles (Manrique-Losada, Cárdenas, & Vásquez, 2020).

Regarding the second variable, digital competencies are established on the information and knowledge society theory, as it defines that this variable in the educational field is crucial not only for preparing students for the labor market, but also for shaping them as responsible and interactive members of a society that is continuously transforming toward the digital sphere (Oseda Gago, Mendedel Geronimo, & Angoma Astucuri, 2020).

Adding to the previous theory, educational environments should promote collaboration and the generation of knowledge using digital platforms and online team tools (Hernández, Muñoz, & González, 2023). This stance provides a guide for designing learning experiences that offer students the opportunity not only to acquire technical skills but also to develop interpersonal, communicative, and conflict-resolution competencies through participation in collaborative digital projects (Simelane-Mnisi & Mokgala-Fleischmann, 2021).

Based on its conceptualization, digital competencies include the ability to use digital technologies and computing tools effectively, from basic knowledge of computing and software to advanced skills in web navigation, digital application management, and programming (Callejas, Salido, & Jerez, 2016).

Digital competencies also imply the capacity to locate, analyze, and manage information effectively and critically on digital platforms. This requires the evaluation of the reliability of online sources, the data summary from various digital sources, and the digital use of repositories for research and learning processes (Solórzano-Arroyo & Parra-Ferrié, 2020).

So, it is determined that digital skills incorporate the ability to communicate effectively through digital platforms and to work collaboratively at a distance with individuals and teams (Horna & Seminario, 2023). This concept means the use of resources such as email, instant messaging, social networks, and videoconferencing, as well as the ability to participate in collaborative digital projects, lead virtual teams, and use online collaborative platforms to share resources and enhance cooperation (Tejedor, Cervi, Tusa, & Parola, 2020).

Now, considering its dimensions, the first one is technical competencies, which are associated with the technical and practical skills required to use digital tools and technologies effectively (Callejas et al., 2016). In other words, the mastery of specific software, applications, and digital devices, as well as their application in diverse educational and professional environments (Pozzo & Rosso, 2023).

The second one is educational competencies, which focus on how educators use digital tools to optimize teaching processes strategically (Callejas et al., 2016). This needs not only the technical domain of advanced digital tools, but also their integration into design and development for educational actions that encourage dynamic and cooperative student participation (Muñoz-Basols & Gutiérrez, 2024).

Finally, the third one is programmatic competence, which relies on the ability to write emails and instant messages clearly and professionally, participate in discussions in online forums and social networks actively, use

videoconferencing tools for real-time communication appropriately, and use search tools effectively (Callejas et al., 2016).

2. STUDY METHODS

2.1. Design and Approach

This basic quantitative study was conducted using a non-experimental, cross-sectional correlational design; variables were not manipulated, and only their relationship was measured.

2.2. Population and Sample

In this study, the population and sample consisted of 51 teachers at the primary and secondary levels who work in schools within the Peruvian education system. Participants were selected through non-probabilistic convenience sampling, and the study relied on the teachers' willingness and voluntary agreement to participate. Furthermore, data were collected at the I.E. Lambayeque School in Lambayeque, Peru, where teachers incorporate digital technologies and virtual learning environments into their teaching practices. The sample consisted of teachers with sufficient experience in the use of digital tools and educational platforms, thereby providing meaningful insights into the level of development of their digital competencies and their relationship with virtual learning environments. In addition, all participants were provided with information about the study's objectives and took part in the research voluntarily; they were assured that their information would remain confidential and that the data would be used solely for academic purposes.

2.3. Instruments and Data Collection

The research team selected the survey as the technique for collecting information based on teachers' opinions (Bernal, 2017). Two questionnaires were used, designed with structured questions to gather data on the variables of interest. They followed a Likert-type ordinal scale with values from 1 to 5, indicating: (1) never, (2) almost never, (3) sometimes, (4) almost always, and (5) always. After their creation, they were validated by three specialists in the field, and their reliability was based on Cronbach's alpha coefficient.

2.4. Statistical Analysis

To quantify the relationship between two variables in this study, the process began by defining the variables and how they could be measured. Subsequently, data collection instruments such as questionnaires were developed and applied to a representative sample to verify reliability using Cronbach's alpha. After data collection, the information was organized in an appropriate format, in this case, using the Microsoft Excel software. The most appropriate correlation method was selected according to the nature of the data, and statistical software was used to calculate and analyze the correlation coefficient. Finally, the findings were contextualized in relation to the study objectives, and the results were presented using tables.

Table 1. Spearman correlation between variables.

Variables	Spearman's rho	Sig. (bilateral)	N
Virtual environments ↔ Digital competencies	0.800	0.000	51

Table 1 presents the Spearman correlation between the variables virtual environments and digital competencies. The results show a strong positive correlation ($\rho = 0.800$) with a bilateral significance value of 0.000, indicating a statistically significant relationship between both variables in the sample of 51 participants.

3. STUDY FINDINGS

3.1. Relationship Between Virtual Environments and Digital Competencies

This indicates a strong, statistically significant positive relationship: as the quality/use of virtual environments improves, teachers' digital competencies also increase.

3.2. Relationships by Competency Dimension

This section analyzes the relationships between virtual environments and each dimension of digital competencies. The purpose is to identify the degree and significance of the association between the study variables according to the different competency dimensions evaluated in the research sample.

Table 2. Virtual environments ↔ Technical competence.

Spearman's rho	Sig. (bilateral)
0.901	0.000

Table 2 presents the relationship between virtual environments and technical competence. The results indicate a very strong positive correlation ($\rho = 0.901$) with a bilateral significance value of 0.000, demonstrating a statistically significant association between both variables.

Table 3. Virtual environments ↔ Educational competence.

Spearman's rho	Sig. (bilateral)
0.581	0.000

Table 3 presents the relationship between virtual environments and educational competence. The results show a moderate positive correlation ($\rho = 0.581$) with a bilateral significance value of 0.000, indicating a statistically significant relationship between the variables.

Table 4. Virtual environments ↔ Programmatic competence.

Spearman's rho	Sig. (bilateral)
0.120	0.000

Table 4 presents the relationship between virtual environments and programmatic competence. The results indicate a weak positive correlation ($\rho = 0.120$) with a bilateral significance value of 0.000, suggesting a statistically significant but low association between the variables.

4. DISCUSSION

The general objective of the study was to determine the relationship between virtual environments and teachers' digital competencies in an educational institution in Lambayeque. The results revealed a strong positive association ($r = 0.800$, $p = 0.000$), showing that as teachers' use of virtual environments increases, their digital competencies also increase. This discovery supports the idea that technology should be integrated not merely as a supplementary resource, but as a core component to improve educators' technological skills.

These findings are very similar to previous studies, although variations in correlation strength. For example, Maquera (2020), in a study conducted in Lima, identified a moderate positive correlation ($r = 0.432$) between the use of digital technologies and teachers' digital skills in a remote education context. The weaker association compared to the present study may be attributed to the specific challenges and limitations of fully distance-based teaching.

Closer to the results, Vera et al. (2023) found a significant relationship between virtual environments and digital competencies among teachers in Nasca, with a correlation of 0.778. Although this value is slightly lower than that

found in the current study, it reinforces that virtual learning environments play a key role in the development of teachers' technological skills as a reality, with differences influenced by contextual and institutional factors.

From an abstract perspective, the results can be explained through Educational Technology and Social Constructivism Theories. The first one emphasizes the integration of ICT into educational processes to boost teaching and learning advantages. Meanwhile, the other one highlights learning as an interactive and collaborative process, which can be facilitated through synchronous and asynchronous communication tools in virtual environments.

Concerning the first specific objective, the results showed that 92% of teachers have an intermediate level of virtual environments' use, while only 8% reached a high level. This suggests that even if most teachers possess functional skills in digital platforms, there is considerable room for improvement toward more advanced and innovative use.

These findings connect with Solórzano-Arroyo and Parra-Ferrié (2020) who reported that a significant proportion of teachers in Latin America lack advanced technological skills. However, studies such as Delgado et al. (2022) indicate that targeted training programs can improve teachers' technological competencies substantially, supporting the need for systematic professional development initiatives.

With respect to the second specific objective, 90% of teachers displayed a medium level of digital competencies, while 10% stuck at a low level. This indicates a generally solid baseline of digital skills among educators, but also proves a gap that requires intervention to prevent exclusion and inequality in digital teaching practices.

Previous research holds up this interpretation. Delgado et al. (2022) demonstrated that digital literacy and content creation skills can improve significantly after structured training, while Ramírez et al. (2020) made a point to the persistence of weaknesses in certain digital competencies, marking the importance of differentiated support strategies.

In the matter of the third specific objective, a very strong relationship was found between virtual environments and teachers' technical competencies ($r = 0.901$, $p = 0.000$). This outcome confirms that digital platforms not only upgrade overall digital competence but are especially crucial for stimulating the technical skills necessary for effective ICT use in the classroom.

At last, the relationship between virtual environments and educational competencies was moderate and positive ($r = 0.581$), while the association with programmatic competencies was positive but weak ($r = 0.120$), though statistically significant. These findings suggest that while virtual environments support pedagogical and technical development, teachers may not be fully leveraging their potential to elevate programmatic skills. From the perspective of Educational Technology and Connectivism theories, this highlights the need to cultivate deeper engagement with digital tools and networks to maximize learning and professional growth in interconnected digital ecosystems.

5. CONCLUSIONS

1. Teachers' use of virtual environments is mostly medium (92.0%), compared to a smaller high-use group (8.0%).
2. Also, digital competencies of professors are mainly medium (90.0%), and the rest remain at a low level (10.0%), which needs to be prioritized for building capacity.
3. There is a strong and statistically significant relationship between virtual environments and teachers' digital competencies ($\rho = 0.800$; $p = 0.000$).
4. The relationship is very strong with technical competence ($\rho = 0.901$), moderate with educational competence ($\rho = 0.581$), and weak with programmatic competence ($\rho = 0.120$), demonstrating a differentiated strength by dimensions.

6. IMPLICATIONS

The evidence made up a decisive message for institutional policy and teacher development: virtual environments improvement is not merely a technological upgrade, it is a strategic lever to reinforce teachers' digital competencies, especially technical and pedagogical components, with direct implications on learning quality and institutional productivity.

Funding: This study received no specific financial support.

Institutional Review Board Statement: The ethical approval at César Vallejo University, Peru is governed by the Research Ethics Code, PP-DG-02.01, version 02, issued on 08-29-2024 and approved through University Council Resolution No. 0659-2024/UCV. The Institutional Ethics Committee, chaired by the Vice-Rector of Research, evaluates projects and ensures scientific integrity, with members appointed annually, while program-level ethics committees follow internal procedures for approval.

Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.

Competing Interests: The authors declare that they have no competing interests.

Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

REFERENCES

- Aguilar, W. O., Diaz, S. L. B., & Revelo, E. R. (2020). Didactic strategies in virtual university teaching-learning environments. *Opuntia Brava*, 12(4), 68–83.
- Alcántara, R. A. D. I. S. (2022). Digital skills and teacher performance in Latin American schools. *Desafíos*, 13(1), 25–36. <https://doi.org/10.37711/desafios.2022.13.1.367>
- Alcívar, Z. M. V., & Barreiro, R. M. P. (2022). Digital skills of teachers in online university degrees. *Chakiñan, Revista de Ciencias Sociales Humanidades*(19), 57–70.
- Barreto, C. R. (2017). *Virtual learning environments: Challenges for training and intercultural dialogue*. Colombia: University of the North.
- Basantes-Andrade, A. V., Cabezas-González, M., & Casillas-Martín, S. (2020). Digital competencies in the training of virtual tutors at the technical University of the North, Ibarra-Ecuador. *Formación Universitaria*, 13(5), 269–282. <https://doi.org/10.4067/S0718-50062020000500269>
- Bernal, C. A. (2017). *Research methodology: Administration, economics, humanities, and social sciences* (4th ed.). Colombia: Pearson Education.
- Biletska, I. O., Paladieva, A. F., Avchinnikova, H. D., & Kazak, Y. Y. (2021). The use of modern technologies by foreign language teachers: Developing digital skills. *Linguistics and Culture Review*, 5(S2), 16–27.
- Brítez, M. (2020). *Education in the face of the advance of COVID-19 in Paraguay: A comparison with countries of the Triple Frontier*. São Paulo, Brazil: SciELO Preprints.
- Callejas, A. A. I., Salido, L. J. V., & Jerez, G. Ó. (2016). *Digital competence and information processing: Learning in the 21st century*. Spain: University of Castilla-La Mancha Press.
- Cañizares, G. N. R. (2024). The role of AI in mathematics teaching in virtual environments. *Reincisol*, 3(6), 2111–2133.
- Chilamá, P. A. A. (2024). Assessment tools in virtual environments for feedback on computer teaching in elementary basic education. *Sathiri*, 19(2), 76–87.
- Delgado, T. D. S., Martínez, C. T. M., & Tigrero, V. J. W. (2022). Development of digital skills in teachers using virtual learning environments. *Revista Latinoamericana de Estudios Educativos*, 52(3), 291–310.
- Esparza, C. D. M., González, R. J. A., Martínez, L. R. E., Ramírez, G. M. T., & Hernández, S. D. C. (2024). Development of teachers' digital competencies through virtual environments: A systematic review. *Apertura*, 16(1), 142–161.
- Flores, K., Cáne, R., Vilcapoma, C., Barrientos, P., Vallina, A., Nieto, E., . . . Gómez, S. L. G. (2024). Evaluation of the challenges and opportunities of artificial intelligence applied in current Latin American education using neutrosophic SWOT and neutrosophic cognitive maps. *Neutrosophic Sets and Systems*, 69(1), 1–14.
- Hernández, S. N., Muñoz, C. P. C., & González, S. M. (2023). Roles of university teachers in collaborative learning processes in virtual environments. *Revista Iberoamericana de Educación a Distancia*, 26(1), 197–218.

- Horna, L. L. E., & Seminario, U. R. J. (2023). Academic performance in virtual learning environments: A systematic review. *Conrado*, 19(91), 171-178.
- Lovón, C. M. A., & Sandra, T. A. C. (2020). Impact of virtual classes on university students in the context of the COVID-19 quarantine: The case of PUCP. *Propósitos Representaciones*, 8(3), 1-28.
- Manrique-Losada, B., Cárdenas, Z. M. I., & Vásquez, A. S. I. (2020). Virtual environment for co-creating digital educational resources in higher education. *Campus Virtuales*, 9(1), 101-112.
- Maquera, B. P. (2020). *Digital tools and resources for achieving competencies in remote education among teachers of I.E.S. San Martín Juliaca – Puno 2020*. Los Angeles: Catholic University of Los Angeles of Chimbote.
- Martínez-Garcés, J., & Garcés-Fuenmayor, J. (2020). Digital teaching skills and the challenge of virtual education resulting from COVID-19. *Educación Humanismo*, 22(39), 1-16.
- Ministry of Education of Peru. (2020). *National survey on the teaching profile: Valuation of the teaching profession and perceptions of the social value of teaching during the pandemic*. Peru: Ministry of Education of Peru.
- Muñoz-Basols, J., & Gutiérrez, M. F. (2024). Interaction in virtual learning environments. In Technology-mediated Spanish language teaching. In (pp. 186-217). United Kingdom: Routledge.
- Oseña Gago, D., Mendiola Geronimo, R. K., & Angoma Astucuri, M. (2020). Didactic strategies for the development of competences and complex thinking in university students. *Sophia, Colección de Filosofía de la Educación*(29), 235-259. <https://doi.org/10.17163/soph.n29.2020.08>
- Pereda-Loyola, R. A., & Duran-Llano, K. L. (2023). Teacher digital competence as a challenge in virtual learning environments. *Revista Arbitrada Interdisciplinaria Koinonía*, 8, 467-484.
- Pozzo, M. I., & Rosso, F. (2023). Teaching academic writing in virtual environments: Challenges of the pandemic in postgraduate education. *Folios*(58), 56-74.
- Ramírez, P. D., Arcos, M. G. D. L., & Lagunes Domínguez, A. (2020). Development of research skills for university students through the use of instructional strategies in virtual learning environments. *Apertura*, 12(1), 6-21.
- Rojas, R., Zeta, A., & Jiménez, J. (2020). Digital competencies in a Peruvian public university. *Conrado*, 16(77), 376-383.
- Sánchez-Cabrero, R., Costa-Román, O., Mañoso-Pacheco, L., Novillo-López, M., & Pericacho-Gómez, F. (2020). Origins of connectivism as a new learning paradigm in the digital era. *Educación Humanismo*, 21(36), 120-142.
- Simelane-Mnisi, S., & Mokgala-Fleischmann, N. (2021). Training framework to enhance digital skills and pedagogy of chemistry teachers to use IMFUNDO. In E. Babulak (Ed.), *New updates in e-learning*. In (pp. 33-50). London, England: IntechOpen.
- Solórzano-Arroyo, M. J., & Parra-Ferrié, C. (2020). School management and educational quality in rural contexts: A challenge in times of COVID-19. *Polo Del Conocimiento*, 5(9), 969-981.
- Tejedor, S., Cervi, L., Tusa, F., & Parola, A. (2020). Education in times of pandemic: Reflections of students and teachers on virtual university education in Spain, Italy, and Ecuador. *Revista Latina de Comunicación Social*, 78(1), 1-21.
- Tigua, D. D. P., & Bracho, A. J. L. (2023). Virtual learning environments: A theoretical look at learning. *Ciencia Latina Revista Científica Multidisciplinar*, 7(1), 9262-9278.
- UNESCO. (2023). *Startling digital divides in distance learning emerge*. France: UNESCO.
- Vargas, L. R. I. A., & Rondero, E. O. O. (2020). Documentary analysis: Importance of virtual environments in educational processes at the higher education level. *Revista Tecnología, Ciencia Educación*(17), 57-77. <https://doi.org/10.51302/tce.2020.485>
- Vera, E. M., Ramos, Q. J. A., Fernández, E. G. W., & Valdivieso, P. M. A. (2023). Use of virtual environments and the development of digital competencies in teachers at an educational institution in Nasca. *Ciencia Latina Revista Científica Multidisciplinar*, 7(2), 10224-10242.
- Zhang, C. (2020). From face-to-face to screen-to-screen: CFL teachers' beliefs about digital teaching competence during the pandemic. *International Journal of Chinese Language Teaching*, 1(1), 35-52. <https://doi.org/10.46451/ijclt.2020.06.03>

Views and opinions expressed in this article are the views and opinions of the author(s), International Journal of Education and Practice shall not be responsible or answerable for any loss, damage or liability etc. caused in relation to/arising out of the use of the content.