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ORIGINAL ARTICLE

Comparative analysis of b-learning and e-learning in ICT competencies for teaching in higher education

Análisis comparativo del b-learning y e-learning en competencias TIC para la docencia en educación superior

Análise comparativa de b-learning e e-learning em competências em TIC para o ensino no ensino superior

Luis Flores[1]
Universidad Técnica de Ambato, Ambato – Tungurahua, Ecuador
https://orcid.org/ 0000-0003-1301-6880
ldaniflores77@gmail.com

Carlos Meléndez
Universidad Técnica de Ambato, Ambato – Tungurahua, Ecuador
https://orcid.org/ 0000-0002-7990-4859
cmelendez@gmail.com

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KEYWORDS

teaching, learning method, teaching method, learning process, TIC's

ABSTRACT. Permanent technological training favors teaching and its importance in learning modalities. Therefore, it is proposed to analyze the academic performance of permanent training in ICT skills for teachers and compare the performance of digital learning modalities. The research was quantitative, descriptive, cross-sectional in a higher education institution with continuous training processes. Two editions of courses were considered in which online TIC tools were taught for teachers. The activity records made it possible to analyze the academic performance of permanent training in TIC skills for teachers and compare the learning modalities' performance through them. In this sense, the results of the teaching-learning process in TIC skills reflect that the evaluations of the first b-learning modality course with 44 participants present a 98% approval rate compared to the second e-learning modality course with 37 participants with an 86% pass rate. The results determine that the management of b-learning promotes a better academic performance of the participants and that the continuous evaluation processes benefit the development of creditable products.

PALABRAS CLAVE

RESUMEN. La formación tecnológica permanente favorece la enseñanza y su trascendencia en las modalidades de aprendizaje. Por lo que se propone analizar el rendimiento académico de la formación permanente en competencias TIC para docentes y comparar el desempeño de las

[1] Master Technical University of Ambato. **Correspondence:** ldaniflores77@gmail.com

enseñanza, método de aprendizaje, método de enseñanza, proceso de aprendizaje, TIC's

modalidades de aprendizaje digital. La investigación fue cuantitativa, descriptiva, transversal en una institución de educación superior con procesos de formación continua. Se consideraron dos ediciones de cursos en los que se impartieron herramientas TIC en línea para docentes. Los registros de actividades permitieron analizar el desempeño académico de la formación permanente en habilidades TIC para docentes y comparar el desempeño de las modalidades de aprendizaje mediante ellas. En este sentido, los resultados del proceso de enseñanza-aprendizaje en habilidades TIC reflejan que las evaluaciones del primer curso de modalidad b-learning con 44 participantes, presentan una tasa de aprobación del 98% en comparación con el segundo curso de modalidad e-learning con 37 participantes con una tasa de aprobación del 86%. Los resultados determinan que la gestión del b-learning fomenta un mejor desempeño académico de los participantes y que los procesos de evaluación continua benefician el desarrollo de productos acreditables.

PALAVRAS-CHAVE

ensino, método de aprendizagem, método de ensino, processo de aprendizagem, TIC's

RESUMO. A formação permanente favorece o ensino e sua importância nas modalidades de aprendizagem. Portanto, propõe-se analisar o desempenho acadêmico da formação permanente em competências em TIC para professores e comparar o desempenho das modalidades de aprendizagem digital. A pesquisa foi quantitativa, descritiva, transversal, em uma instituição de ensino superior com processos de formação continuada. Foram consideradas duas edições de cursos em que ferramentas de TIC online foram ensinadas para professores. Os registos de actividades permitiram analisar o desempenho escolar da formação permanente em competências TIC para professores e comparar o desempenho das modalidades de aprendizagem através das mesmas. Nesse sentido, os resultados do processo ensino-aprendizagem em competências TIC refletem que as avaliações do curso da primeira modalidade b-learning com 44 participantes apresentam 98% de aprovação em relação ao curso da segunda modalidade e-learning com 37 participantes com um Taxa de aprovação de 86%. Os resultados determinam que a gestão do b-learning promove um melhor desempenho acadêmico dos participantes e que os processos de avaliação contínua beneficiam o desenvolvimento de produtos credíveis.

1. INTRODUCTION

The academic context at all educational levels has changed. The most influential factor is technology, known as information and communication technologies (TIC), which directly influences the study modalities, methodologies, and teaching-learning processes (PEA). For its fulfillment, digital learning, at a continuous pace, is vital in optimizing the teacher's digital skills. Moreover, it allows managing technological resources, where the virtual learning environment (EVA) and the telepresence system (STP) stand out. Therefore, the learning modalities combined with EVA and STP can be disseminated more successfully to many people.

TIC competencies modernized the educational system. Therefore, academic training requires tools and technological resources integrated into the PEA to achieve competitive levels. Consider that evolution and innovation facilitate the achievement of meaningful learning through collaborative work (Aguilar et al., 2015).

The TIC skills of the teacher are being consolidated every day and being a fundamental part of the PEA. Furthermore, international organizations and institutions such as the United Nations (UN), the United Nations Educational, Scientific and Cultural Organization (UNESCO), the European Commission, among other prestigious entities, have created guidelines that promote the improvement and specialization of educational practices benefit the learner (R. García et al., 2014).

Under this context, aspects and guidelines of TIC competencies, the framework of teachers' competencies, study modalities, and TIC modalities are reviewed. Likewise, it seeks to analyze the academic performance of permanent training in TIC skills for teachers and compare the performance of digital learning modalities. The significance of the technological competencies in the teaching experience, the content design, the improvement

of EVA in PEA, the continuous evaluation process, the elaboration of creditable products, and the feedback of knowledge are determined.

TIC competence

Currently, they are essential resources in the teaching-learning process. In this sense, the teacher must have the knowledge and mastery to facilitate the integration of TIC into their academic practice to guarantee the quality and equity of learning. Likewise, they must socialize the application and use of TIC to their students so that they have a critical, reflective, and innovative look, with a collaborative, cooperative, and empathic aptitude to solve complex problems that are related to the information society and knowledge (UNESCO, 2019).

Permanent training in digital skills complemented with pedagogical knowledge is essential. The advancement of TIC in recent years further strengthens the relationship with various models, proposals, approaches, specifications, and experiences of institutions that regulate and prioritize digital teaching competence (Cabero et al., 2020; C. Hernández et al., 2016).

The 2030 Agenda for Sustainable Development highlights the crucial advancement of TIC, thus:

> UNESCO, in partnership with industry leaders and international experts in the field, has created an international framework that defines the competencies needed to effectively use TIC in teaching: the TIC competency framework for teachers (UNESCO, 2019, p. 5).

The framework is dynamic and periodically updated. It ensures relevance in the educational context and includes open educational resources, which are numerous and beneficial. Its adaptation is convenient for the professional development of teachers, which should be understood as a lifelong learning process and not as a specific fulfillment (UNESCO, 2019).

Integrating the framework suggests three phases of teacher professional development:

- Initial training: focused on initial preparation in pedagogy, knowledge of the subjects, management skills, and use of various pedagogical tools, including digital tools and resources.
- Permanent training: includes structured, face-to-face, and distance training. It is based on initial training programs directly relevant to teaching in and outside of the classroom.
- Ongoing formal and informal pedagogical and technical support, facilitated by TIC so that teachers can make innovative use of these technologies to address daily needs and promote higher-level learning by students (UNESCO, 2019, p. 6).

Teacher competency framework

The teaching competencies framework version 3 consists of 18 competencies organized in six aspects of teachers' professional practice and three levels of pedagogical use of TIC. The digital competencies will empower teachers to impart professional practices for quality education and efficiently guide their students' development of TIC competencies.

> The six aspects of teachers' professional practice are as follows:
>
> 1. understanding the role of ICT in educational policies,
> 2. curriculum and assessment,
> 3. pedagogy,
> 4. application of digital skill,
> 5. organization and administration, and

6. professional learning of teachers (UNESCO, 2019, p. 6).

The development in the pedagogical use of TIC is classified into three levels that are explained below.

First level acquisition of knowledge, where teachers can:

1. Determine if their pedagogical practices correspond to national or institutional policies and favor their achievement.
2. Analyze curricular norms and determine how TIC can be used pedagogically to respond to these norms.
3. Correctly choose TIC to support specific teaching-learning methodologies.
4. Define the functions of the components of computer science equipment and typical productivity applications, and be able to use them.
5. Organize the physical environment in such a way that technology inclusively serves different learning methodologies.
6. Use TIC for their professional development (UNESCO, 2019, p. 6)

Second level deepening of knowledge, where teachers can:

1. Devise, modify and apply teaching practices that support institutional or national policies, international commitments (for example, United Nations.
2. Integrate TIC transversally between subjects, teaching, assessment procedures and levels of each course, and create, thanks to the contribution of TIC, a conducive learning environment in which students demonstrate that they have reached the levels required by the curricula.
3. Devise project-based learning activities using TIC. These will help students create, apply, and follow project plans and solve complex problems.
4. Combine various digital resources and tools to create an integrated digital learning environment, to help students develop high-level problem-solving and reflection skills.
5. Use digital tools flexibly to facilitate collaborative learning, manage learners and other parties involved in learning, and manage the learning process.
6. Use technology to interact with professional networks with a view to their own professional development (UNESCO, 2019, p. 7)

Third level knowledge creation, where teachers can:

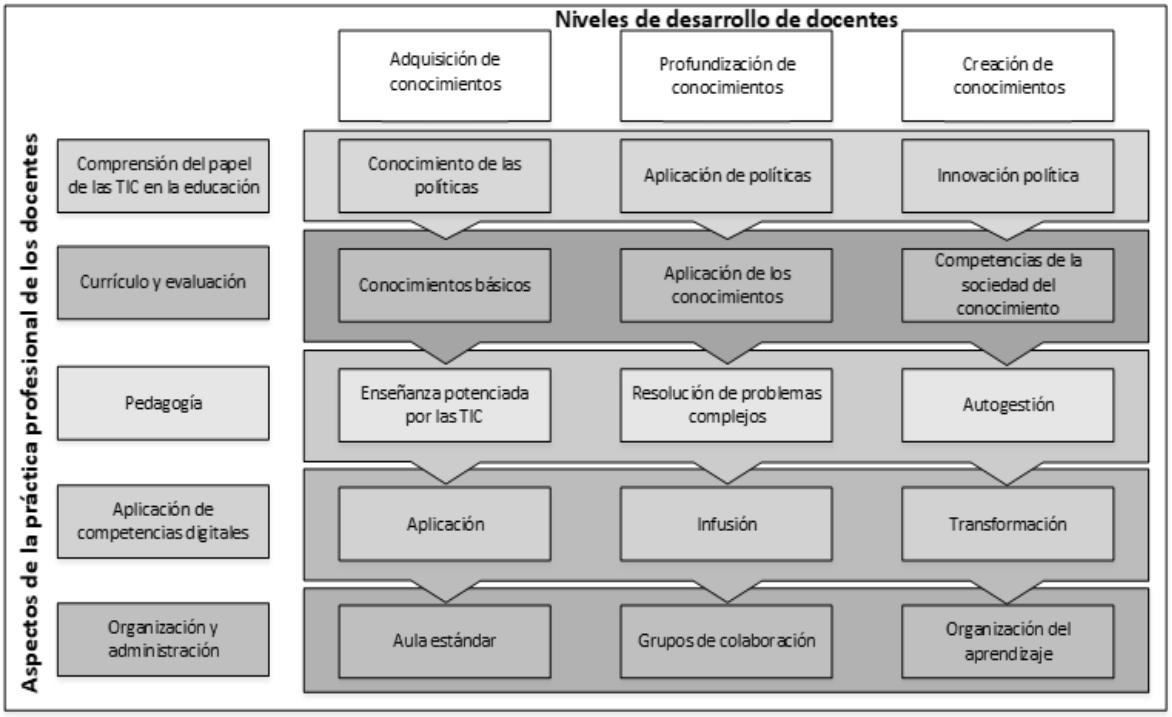
1. Carry out a critical reflection on both institutional and national educational policies, propose modifications, devise improvements, and anticipate the possible effects of said changes.
2. Determine the optimal modalities of collaborative learning centered on the learner, to reach the levels required by multidisciplinary curricula.
3. When determining the learning parameters, promote student self-management within the framework of collaborative learning centered on the learner.
4. Build knowledge communities and use digital tools to promote lifelong learning.
5. Lead the development of a technological strategy for the school to turn into an organization that permanently learns.
6. Continuously develop, experiment, train, innovate and share best practices to determine how technology can best serve the school (UNESCO, 2019, p. 7)

Figure 1 illustrates the three levels: acquisition, deepening, and creation of knowledge, as well as the six aspects of the professional practice of teachers: understanding the role of ICT in educational policies, curriculum and assessment, pedagogy, application of digital skills, organization and administration, and

professional learning of teachers. Their interrelation and correspondence are observed. The intersection of each level and aspect indicates the 18 competencies of teachers in the field of de TIC.

Figure 1

The competence framework version 3 of teachers in the field of TIC



Note. Reproduced from the framework of competences of teachers in ICT, from UNESCO year 2019.

Study modalities

Study modalities and PEAs have undergone essential transformations over time. However, the digital age and its technologies are the ones that currently involve the most significant change and impact on education. The contribution of the technological means is the efficiency-effectiveness to the academic educational processes, as well as learning factors with flexibility, own rhythm, and feedback (Flores & Meléndez, 2017).

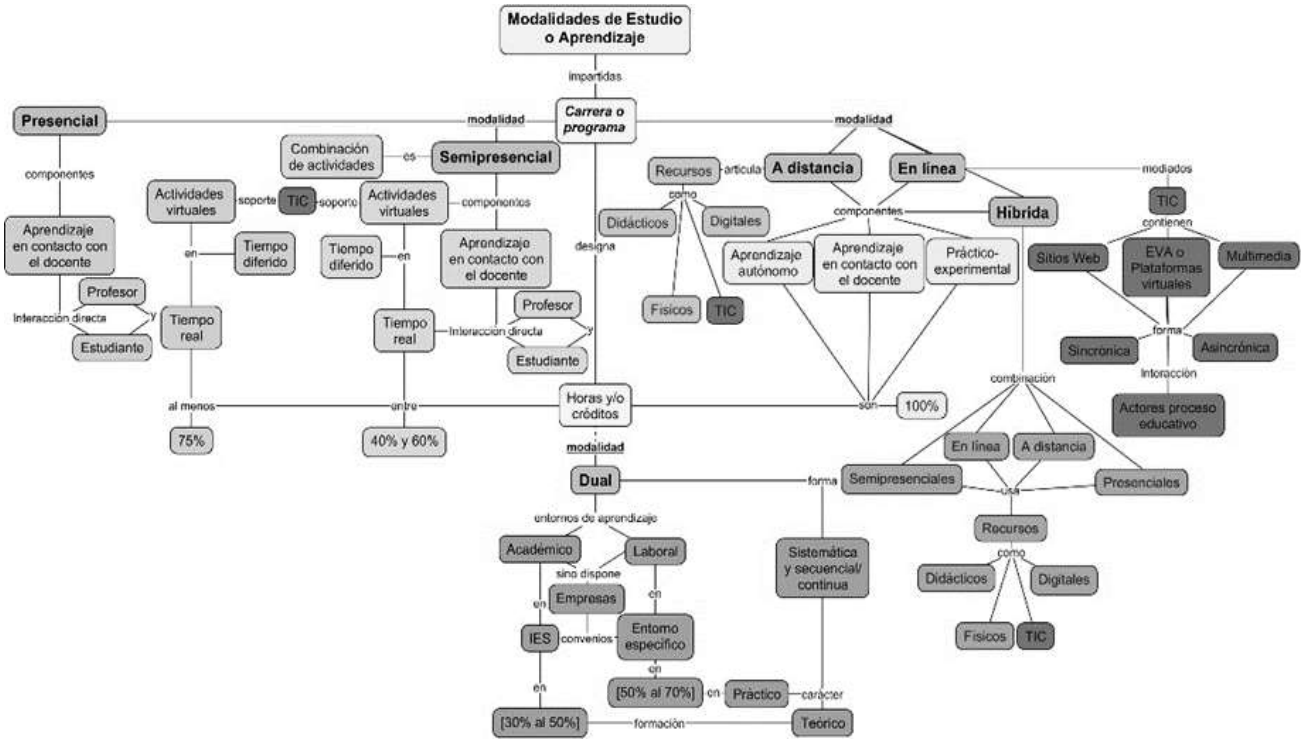
According to the Regulations of the Academic Regime, "the study or learning modalities are modes of learning management that determine differentiated educational environments, including the use of communication and information technologies" (Consejo de Educación Superior [CES], 2020, p. 31).

In Ecuador, Higher Education Institutions (IES) have different study or learning modalities for their careers and programs. The modalities are classified as face-to-face, blended, online, distance, dual and hybrid (CES, 2020).

The conceptual map in Figure 2 illustrates the study modalities.

Figure 2

Study or learning modalities



Note. Elaboration based on the regulation of the academic regime of the Republic of Ecuador, the official gazette of the CES, on August 25, 2020 (pp. 31-35).

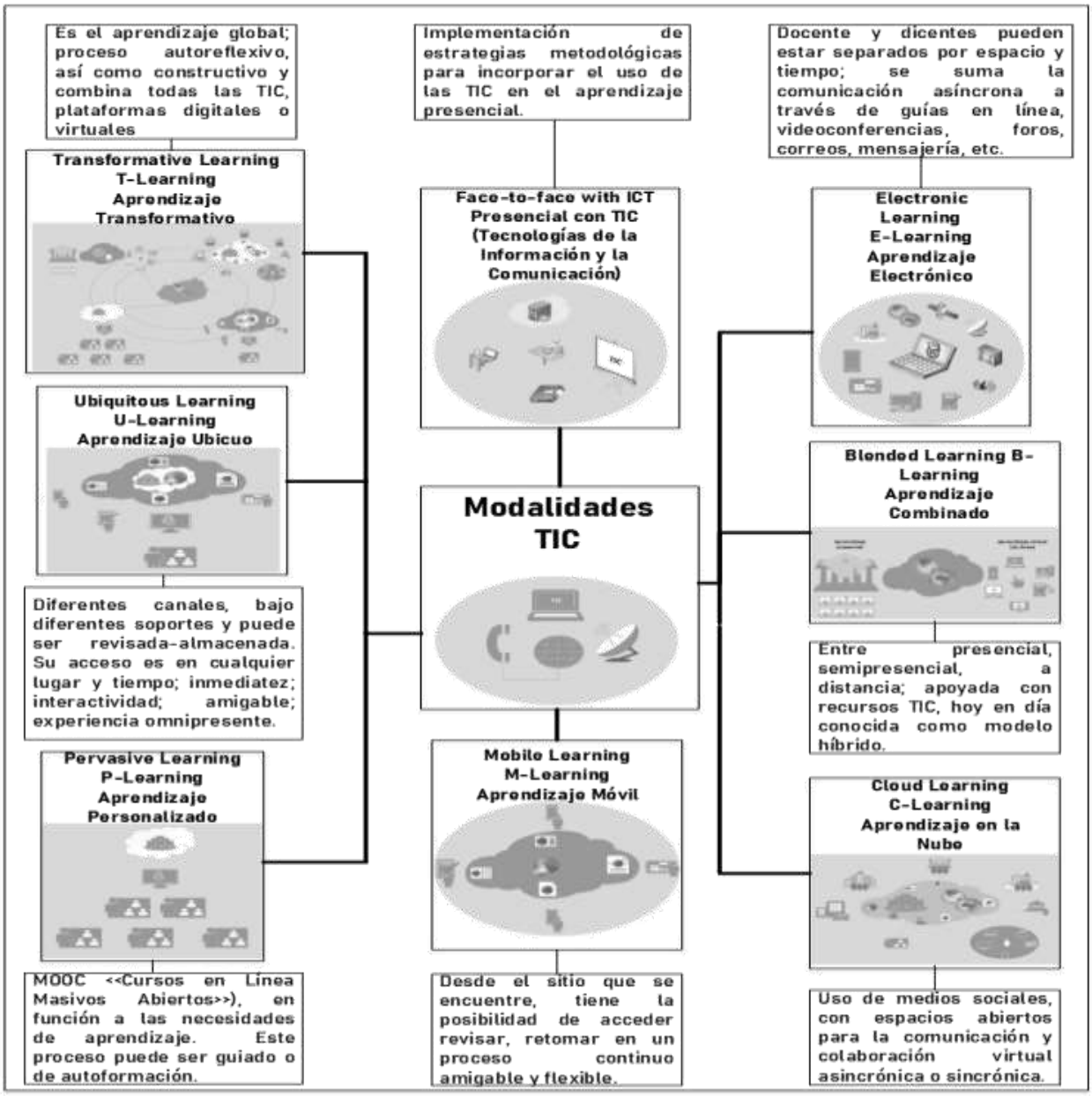
TIC modalities

The study or learning modalities participate in technological advances, with which the training scenario is conditioned to technological trends. Therefore, a fundamental aspect is communication: synchronous (real-time) and asynchronous (deferred time).

Synchronous / asynchronous communication is an essential resource in technological platforms and systems. It allows control of communication tools such as chat, emails, forums, messaging, videoconferences, etc. They facilitate the development of educational and interactive activities for the actors of the PEA. This process allows managing the ICT modalities: Face-to-face, E-learning, B-learning, C-learning, M-learning, P-learning, U-learning, T-learning (H. Hernández, 2013). It enables the student or participant in a learning process to access different training alternatives, training, or updating. Figure 3 illustrates a mind map of TIC modalities.

Figure 3

TIC modalities



Note. Own elaboration based on Belloch (2018) and Vela (2015).

2. METHOD

The present study was carried out in a higher education institution with permanent training processes. The non-experimental design was used, with a descriptive approach and quantitative cross-sectional analysis, due to the courses' characteristics at certain times and topics (Molina & Ochoa, 2013). For the comparative analysis, the 2019 and 2020 editions were considered. The research participants were professionals with performance in teaching and/or competent work areas.

The descriptive design allows an objective vision of the benefit of TIC resources in teaching, as well as a perspective of the learning modalities. In this sense, the participants are active protagonists of the PEA, accessing

information and developing creative ways to "know" and "know-how". The daily practices determined an openness to the knowledge allowed by ICT and its versatility in innovation, thereby strengthening the worldview and critical-reflective capacity of the university participant

The 2019 edition was carried out in the b-learning modality with 44 participants, of which 77% had postgraduate studies. The applied procedure meets two conditions.

- The programmatic contents are conditioned to the virtual work sessions -STP and face-to-face framing.
- The activities are carried out according to the work schedule delivered to the participant.

The virtual session uses the STP that is scheduled in an identical way to the face-to-face session "one per workweek". Regarding the activities (creditable products) and short online tests. The dedication times and the evaluation process are determined in the activities schedule.

The 2020 edition was carried out in the e-learning modality with 37 participants, of which 81% had postgraduate studies. The applied procedure meets two conditions:

- The programmatic contents are conditioned to the virtual work sessions - STP.
- The activities are carried out according to the work schedule delivered to the participant.

The virtual session uses the STP that is programmed by programmatic content, in what corresponds to the activities and short tests online in an identical way to the b-learning modality.

The planning of the programmatic contents for TIC competencies in the b-learning and e-learning modalities was structured based on guidelines established by the IES. Aspects of professional teaching practice, pedagogical criteria, trends, and current technological tools of frequent use in permanent training that link academic, productive, and technological development are considered (Flores et al., 2021). The instructor's experience was fundamental in the development of the programmatic contents that were later subject to review for final approval. The content review is in charge of the pedagogical coordination and its support by the continuing education director of the institution.

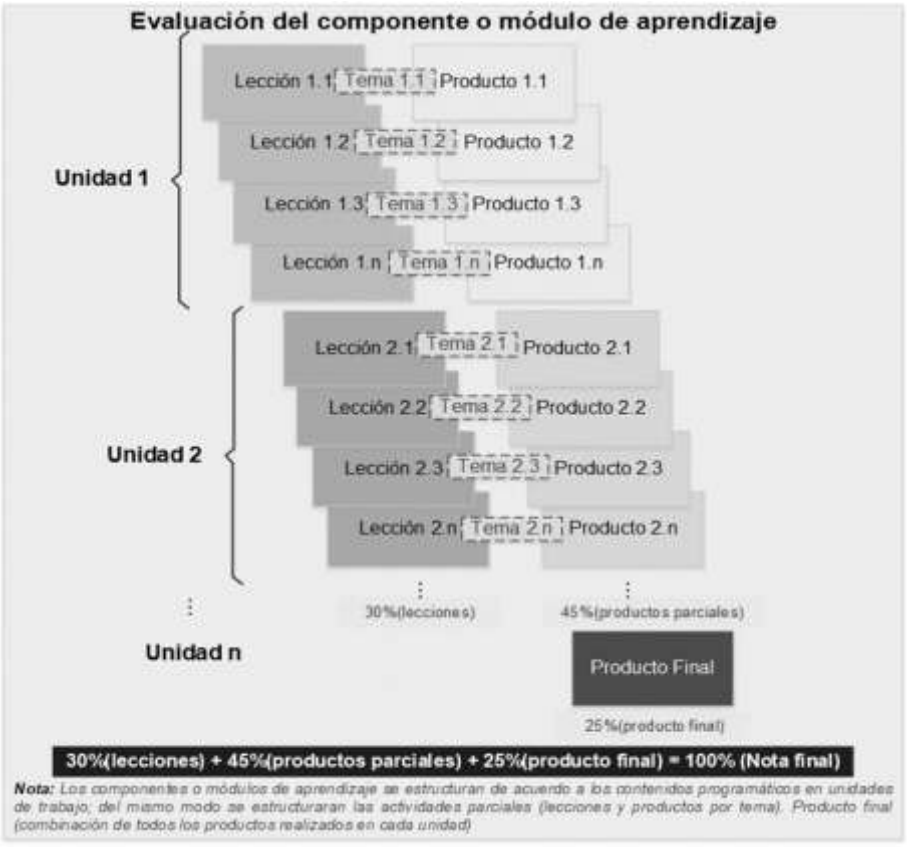
The execution of the b-learning and e-learning courses was in charge of a multidisciplinary team to supervise and offer support to communications and information (design, organization, functionality, interactivity, EVA, etc.), without forgetting that the instructor is the one that coordinates all the activities developed in the learning process in digital skills.

The evaluation of the b-learning and e-learning courses combined a series of characteristics such as continuous evaluation that was carried out in the development of the system, a systematic evaluation that was given by stages or planned units, a formative evaluation that provides information and feedback, summative evaluation as an activity or final product of all learning, hetero-evaluation carried out by the teacher and integrated into the summative assessment (L. García, 2020).

In figure 4, the evaluation process that was managed in the two learning modalities for the approval of the course is illustrated.

Figure 4

Evaluation process for permanent training in b-learning and e-learning modalities



Note. Own elaboration based on the course planning sheet.

The TIC skills course addressed the following contents: editors of text documents, spreadsheets, presentations, forms; graphic organizers such as mind maps and concept maps; multimedia editors such as infographics, videos, animated video presentations and design of evaluations such as rubrics, evaluations, self-evaluations, and management of the EVA as well as the STP.

As a result of the process illustrated in Figure 4, the partial and final grades of the b-learning and e-learning modalities were obtained.

3. RESULTS

The analysis of results was supported by the excel computer program and is presented in three sections. The first section shows the conformation of the TIC skills courses in their two modalities, 2019 b-learning edition and 2020 e-learning edition. The second section corresponds to the participants' academic performance and the descriptive statistics of the courses in question. Finally, the third section corresponds to the average grade for each TIC skills course, where the b-learning mode is shown first and then the e-learning mode.

Formation of the courses

The distribution of the ICT skills courses in its two modalities 2019 b-learning edition and 2020 e-learning edition are observed in Table 1.

Table 1

Number of participants in TIC skills courses

Course	Modality	Gender	Frequency	Percentage
Edition 2019	*b-learning*	Male	28	64%
		Feminine	16	36%
		Total	**44**	**100%**
Edition 2020	e-learning	Male	20	54%
		Feminine	17	46%
		Total	**37**	**100%**

Note. This Table shows the distribution of the courses according to the edition, learning modality and gender of the participants.

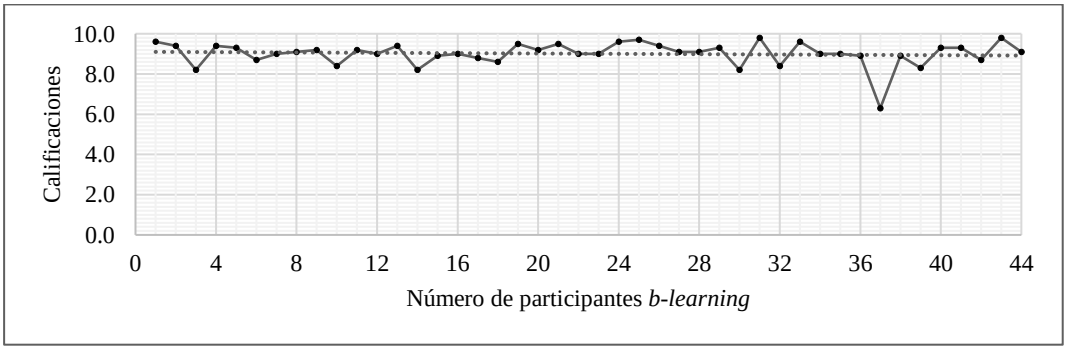
In the courses developed in table 1, different numerical percentages are observed in the training of the male gender concerning the female one. The b-learning modality has the greatest difference (male 64%, female 36%) with 28%. The e-learning modality approaches equilibrium with a difference (male 54%, female 46%) of 8%. A fundamental aspect in educational access is gender equity, with possibilities, opportunities and benefits for the professional development of men and women under equal conditions (Gal, 2019). Another aspect to consider are the characteristics of the learning modalities that were initially specified.

Descriptive statistics

The participants' academic performance was estimated through the qualifications achieved in the module on TIC competencies (online tools) in the b-learning and e-learning modality. Figures 5 and 6 illustrate the scores obtained by the participants in each learning modality, respectively, which helps to elucidate the comparative analysis of the characteristics of the descriptive statisticss.

Figure 5

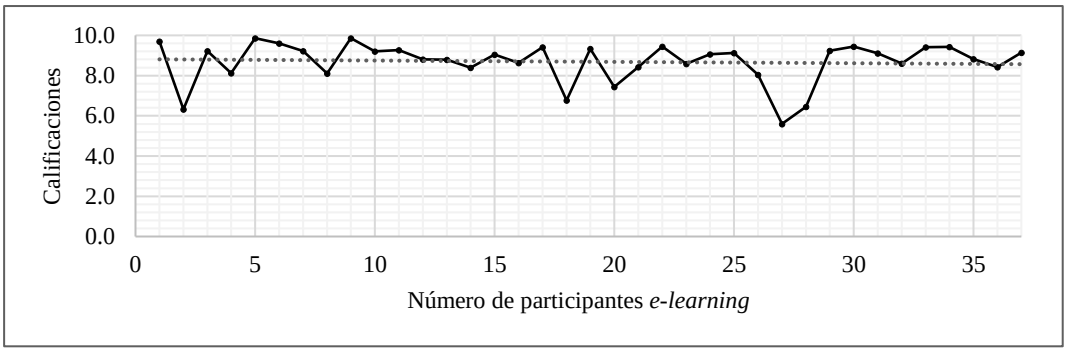
Qualifications of the b-learning modality



Note. Own elaboration based on course results.

Figure 6

Qualifications of the e-learning modality



Note. Own elaboration based on course results.

Table 2 presents calculations of the descriptive statistics obtained using the Excel data analysis tool. Computerized data has key characteristics for research and comparative analysis. For the construction of Table 2, the final mark of the ICT skills courses in the b-learning and e-learning modalities was considered.

Table 2

Descriptive statistics of TIC skills courses

Descriptive statistics	Course and modality	
	Edition 2019 *b-learning*	Edition 2020 *e-learning*
Arithmetic mean (average)	9.01	8.69
Typical error	.09	.17
Median	9.10	9.06
fashion	9.00	9.22
Standard deviation	.60	1.01
Sample variance	.36	1.02
Kurtosis	8.83	2.11
Asymmetry coefficient	-2.27	-1.56
Rank	3.50	4.26
Minimum	6.30	5.60
Maximum	9.80	9.86
Sum	396.40	321.48
Bill	44	37
Older (1)	9.80	9.86
Minor (1)	6.30	5.60
Confidence level (95.0%)	.18	.34

Note. This Table shows the descriptive statistics of the courses according to the edition and learning modality. Scores range from 0 to 10.

According to the results shown in Table 2, differences between the learning modalities are specified:

The average (arithmetic mean) of the b-learning course is higher than the average of the e-learning course. Therefore, it is estimated that the superiority of the standard of the b-learning modality, also known as the combined hybrid or mixed modality, is due to better theoretical-practical positioning and harmonizes the face-to-face with the virtual (Salinas et al., 2018). You get a balance in interactivity, flexibility and sociability. As well as facilitating face-to-face framing and friendliness with EVA technology (Reynolds & Greiner, 2005; Turpo, 2013).

The typical error "is a measure of dispersion that is used as the best fit around the mean to explain it" (Ardila, 2012, p. 85). The e-learning modality presents a more significant standard error than the b-learning modality due to the variation in grades achieved in the course and fewer participants. Figures 5 and 6 respectively illustrate such an appreciation.

The median observed in both learning modalities has a similar value, dividing the courses into two halves concerning a grade.

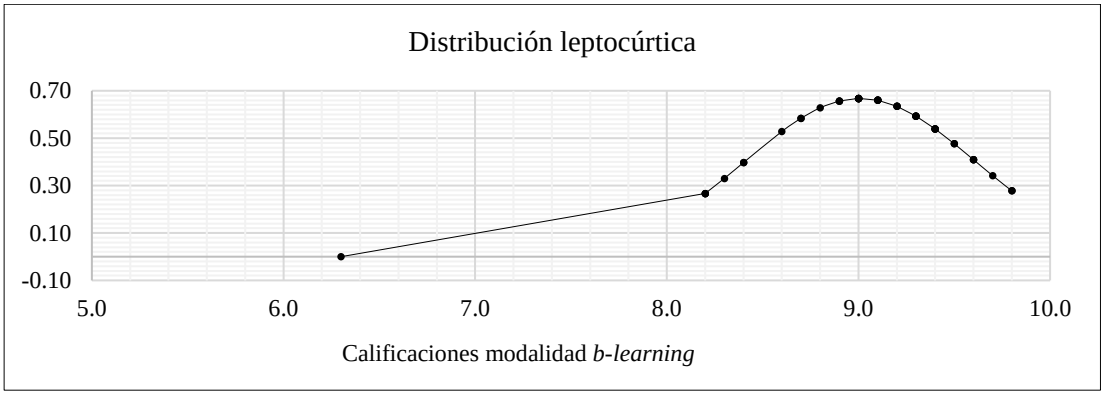
The mode value repeated the most in the b-learning modality presents a lower numerical rating about the e-learning modality. It is estimated that their difference may be related to the academic training of the participants who attended the different modalities, information previously indicated in percentage values.

The standard deviation and variance in the e-learning modality are higher than in the b-learning modality due to the dispersion of values (fluctuation of the scores achieved). Figures 5 and 6 respectively illustrate such an appreciation.

The kurtosis "K" is the frequency distribution in a bell curve or Gaussian curve. If K> 3, the distribution is leptokurtic, which implies that the Gaus bell is very pointed towards the center, declining very rapidly, and at the extremes, it is a little higher than the normal distribution. If K = 3, the distribution is mesocurtic or normal. If K <3, the distribution is platicúrtic, more flattened or flattened due to more significant variation in the data (Barrantes, 2019). Figure 7 illustrates the b-learning modality with a leptokurtic distribution, and Figure 8 shows the e-learning modality with a platicúrtic distribution.

Figure 7

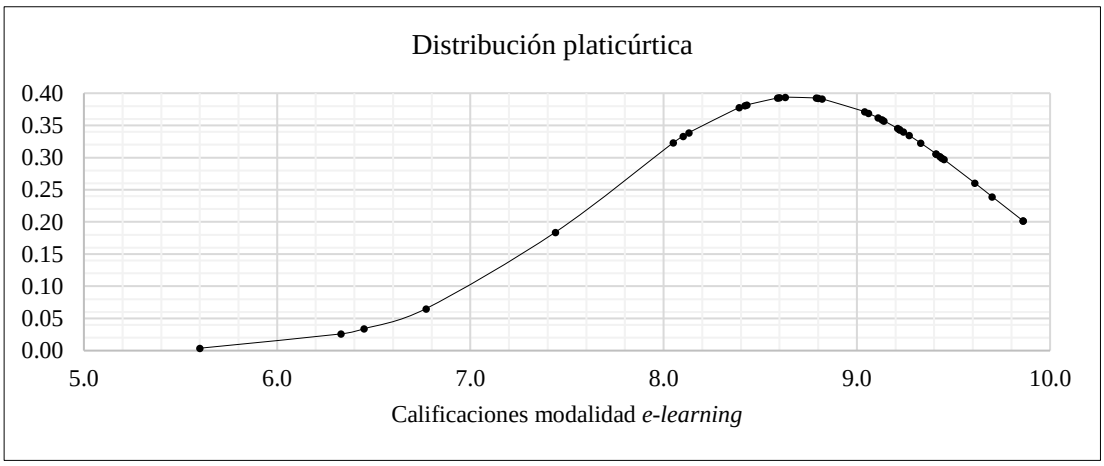
B-learning mode with leptokurtic distribution



Note. Own elaboration based on course results.

Figure 8

E-learning modality with platicúrtic distribution



Nota. Own elaboration based on course results.

The asymmetry coefficient "characterizes the degree of asymmetry of the distribution of values concerning its mean" (Offarm, 2006, p. 151). In both learning modes, the coefficient of asymmetry is negative. Therefore, the distribution tail lengthens towards the lower values of the average of the courses. Figures 7 and 8 respectively illustrate such an appreciation.

The range "is the simplest measure of dispersion and is obtained by establishing the difference between the maximum and the minimum of the quantitative data" (Salazar & Del Castillo, 2018, p. 67). However, the e-learning modality has a more significant difference in its range. Therefore, a longer route is justified by the minimum, and maximum values reached in the modality.

The confidence level is "the probability of obtaining the population value from the estimated sample" (López & Fachelli, 2015, p. 16). In both learning modalities, the confidence level was 95%. The b-learning modality groups the scores in a lower confidence interval concerning the e-learning modality. As a consequence of the typical error of the modality.

Califications average

In Table 3, the percentage of participants approved in the b-learning modality is observed, with the antecedent that the minimum evaluation for the accreditation of the module is eight points.

Table 3

Average of qualifications in the b-learning modality

Califications average	Frequency	Percentage
Note >= 8	43	**98%**
Note < 8	1	2%
Total	**44**	**100%**

Note. The minimum qualification for course accreditation is greater than or equal to 8 points.

In Table 4, the percentage of approved participants in the e-learning modality is observed, with the antecedent that the minimum evaluation for the accreditation of the module is eight points.

Table 4

Average of e-learning modality qualifications

Califications average	Frequency	Percentage
Note >= 8	32	**86%**
Note < 8	5	14%
Total	**37**	**100%**

Note. The minimum qualification for course accreditation is greater than or equal to 8 points.

The percentage of accreditation is higher in the b-learning modality compared to the e-learning modality. The result can be attributed to the differences and qualities of the investigated learning modalities.

4. DISCUSSION

The results obtained confirm the b-learning modality is a better learning experience compared to the e-learning modality. In addition, the results of the academic performance of the permanent training in ICT competencies for teachers show b-learning learning as the most beneficial for the participants. As highlighted by Salinas Ibáñez et al. (2018) that b-learning favors due to its training strategy. The b-learning model stands out for the way of harmonizing, integrating, and articulating technological resources. Of course, they are supported by innovative activities, strategies, and variants that the teacher applies in their face-to-face and virtual encounters. The final result is the fulfillment of curricular objectives and the students' satisfaction and performance (L. García, 2020).

The descriptive statistics of the learning modalities point out the academic performance. The average of the b-learning modality stands out in comparison to the e-learning model; it must be assumed the effectiveness of the b-learning teaching model (Salinas et al., 2018). As well as characteristics that promote convergence with the interaction between face-to-face communication and virtual communication of teachers and students, pedagogical and technological convergence (balance of methodologies and TIC in the PEA), the synergy of efforts of the actors of the PEA (Ruiz, 2011; Salinas et al., 2018; Turpo, 2013).

The most significant variation in the data analyzed (standard error, standard deviation, and variance) occurs in e-learning. In this sense, there is more significant oscillation and dispersion of the ratings achieved. As a result of the analysis, it is determined that the e-learning modality conditions its training mode to technological characteristics, despite growth of didactic-pedagogical aspects that in its beginnings had more limitations in the practices carried out (Ruiz, 2011). For this reason, the incidence of e-learning is lower in university continuing education (Salinas et al., 2018).

The b-learning and e-learning modalities have a negative asymmetry coefficient that lengthens the lower grades concerning their average; which differs in the form of normal distribution of the data; reiterating the Leptokurtic above for b-learning and platicúrtic for e-learning.

The digital teaching competencies programmed in the learning modalities are essential in the permanent training processes for the case of b-learning, and e-learning must be adjusted to the current conditions. These must promote flexibility (EVA adaptability), interactivity (TIC tools), proactivity (PEA innovation), responsibility

(commitment to the modality), and quality (training content). The development and results of digital skills are linked to the organization and planning of the HEI that seeks academic excellence, as well as the satisfaction of the participants when acquiring TIC skills. Valencia et al. (2016) point out that "appropriation is about the knowledge that teachers develop about ICT, the instrumental use they make of them and the transformations they carry out to adapt them to their educational practices" (p. 11).

Digital competencies, when mastered effectively, enable teachers to modernize educational settings (Cobos et al., 2019; Morales, 2013; Rangel, 2014). TIC are the management model of communication media (synchronous/asynchronous), virtual content (text, audio, video), and EVA, based on digital technology. In this sense, it is convenient to generate a perspective that provides robustness to TIC skills, encourages the interest and participation of teacher-students in the PEA (Rivera et al., 2019).

The approval rates in both learning modalities were high due to the academic degree that the majority of participants had. It should be noted that another factor was the commitment shown by teachers to learn, reflected in continuous activities (participation, evaluation, feedback) and the development of creditable products. The follow-up and accompaniment of the instructor was a constant of success to achieve the analyzed results.

The STP favored the b-learning and e-learning courses, which supported the management of the PEA (Romero, 2019). Activities such as compliance and dynamics of telepresence participation were controlled by the teacher, who presented the class guidelines, following the training program guidelines for the virtual meeting. In addition, the EVA automated and complemented the training process with parallel actions and feedback that strengthened the acquisition of digital skills. Additional aspects that were considered were organization, discipline, autonomy as a "requirement and essential component that complements the training of competencies" (Flores et al., 2021, p. 4) and the active participation of the teacher.

Among the study's limitations, it is considered that a small population of continuing training courses was analyzed. A larger population will allow a better vision of the study modalities with more solid contributions. Likewise, new studies can be expanded in other modalities that experience methodological changes and ways of working. Future research will benefit from eventual changes, improvements, and technological advances in the different modalities. Undoubtedly, such educational transformations will shorten the significant differences in learning modalities, benefiting the actors of the PEA.

5. CONCLUSIONS

The b-learning modality in the comparative analysis registers better results by the participants. This is due to the interrelation that exists in face-to-face meetings between the instructor and the teachers. Therefore, the instructor's presence in b-learning strengthens communication and generates closeness and trust in the development of the course.

The tangible value of b-learning is the face-to-face meetings, highlighting the instructor's experience in managing the classroom. In addition, the programmed contents and the feedback with the participants is more reflective, as well as the interaction with a non-verbal language generates additional information for the participant.

The level of appropriation of ICT competencies by teachers in permanent training b-learning and e-learning was evidenced in academic performance and development of activities (questionnaires and creditable products), evaluated with rubrics that describe specific criteria and rating scales.

The b-learning and e-learning courses developed by the entity met technical and pedagogical requirements. Planning, execution, and evaluation were essential. The current programmatic contents stand out, which in combination with digital skills, allowed to improve EVA. The process socialized bases and guidelines for the improvement of ICT skills. The design and development of content, resources, and evaluations contributed with experience and useful knowledge for educational settings where the teacher is the axis of the PEA.

The e-learning modality was established as a flexible means in the participant's training process, as they were not obligated to attend IES. On the other hand, the degree of commitment is significant since the participant's discipline, organization, and responsibility are in her autonomy if she wants to be successful in her skills to be developed.

The analysis and interpretation of the descriptive statistics of the developed courses are useful for decision-making. In addition, it enables a basis for the projection, planning, execution, restructuring, and updating of future programs in ICT skills with the possibility of conducting adjacent studies in virtual methodologies.

Feedback in the two study modalities is a key factor in the training process; it clears doubts, clarifies content, strengthens communication between the actors of the PEA. Therefore, it is useful to have several means of communication, whether synchronous or asynchronous, to motivate and cover the possible needs of the participant in their learning.

Educational institutions with their learning modalities must commit efforts to the development of good practices in digital skills and permanent links with prestigious organizations that control and regulate digital and virtual processes.

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