Analysis of use of virtual spaces in higher education

Análisis del uso de espacios virtuales en educación superior

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Édgar Alfonso Pérez García*
José de Jesús Rodríguez Sánchez**

Keywords
ICT; digital competency; technology incorporation, educative technology

ABSTRACT

This work aims to know how the trend in the use of virtual spaces is, from the proposals is of incorporating technology in the teaching practice in Higher Education and knows if the level of use of information and communication technologies(ICT) affects the design and development of the proposals. In this work was used a correlative transactional methodology and the process was concurrent by complementation with a group of professors from a Mexican public university. We observed that sending and receiving documents is the most used dynamic and that, the main obstacles and difficulties are get internet accessibility and the connection speeds. The main learning activity used is creating individual documents. We concluded that, the level of skill in use of ICT that the teacher considers having does not improve the integration of technologies inside of teaching practice, and that the use of virtual spaces is oriented towards instrumental aspects (do not spent paper, automatic evaluation, and others), the possibility of structuring pedagogical proposals with integration of ICT that seek to improve the teaching and learning process in students is left aside.

Palabras clave
TIC; competencia digital; incorporación de tecnología; tecnología educativa

RESUMEN

Esta investigación analizó el uso de espacios virtuales por parte de profesores universitarios a partir de las propuestas de incorporación de la tecnología en la práctica docente. Se buscó determinar si el nivel de uso de las tecnologías de la información y la comunicación (TIC) incide en el diseño y el desarrollo de estas propuestas. El trabajo fue de tipo no experimental, de corte transaccional descriptivo y el proceso fue concurrente por complementación(QUAL+QUAN), lo que permitió analizar la realidad desde la perspectiva docente de una universidad pública mexicana. Se observó que el envío y la recepción de documentos es la dinámica más recurrente y que la principal actividad de aprendizaje utilizada es la elaboración de documentos individuales; asimismo, se detectó que los principales obstáculos se encuentran en la accesibilidad a internet y la velocidad de conexión. De esta investigación se concluye que el nivel de capacidad en el uso de las TIC que los profesores consideran tener no propicia la integración de las tecnologías dentro de su práctica docente, además de que el uso de los espacios virtuales se orienta hacia aspectos instrumentales (ahorro de papel, evaluación automática, entre otros), por lo tanto, deja de lado la posibilidad de estructurar propuestas pedagógicas con integración de las TIC que busquen la mejora del proceso de enseñanza-aprendizaje.

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* PhD. in Innovation in Educational Technology from the Universidad Autónoma de Querétaro. Professor of Assignment at the Universidad Autónoma de San Luis Potosí, Mexico. ORCID: https://orcid.org/0000-0003-4923-8266
** Master in Learning Management in Virtual Environments by the Universidad de Guadalajara. Lecturer at the Universidad Autónoma de San Luis Potosí, Mexico. ORCID: https://orcid.org/0000-0002-6308-2053

INTRODUCTION

During the first decades of the 20th century, the daily dynamics of communication and interaction between individuals with similar interests depended on coincidence in time and space. Later, the rise of the telephone provided the possibility of establishing synchronous communication at a distance, from which a set of social dynamics was established. In the 21st century, through the internet (which is thought of as a set of interconnected devices), the web (which began as a mechanism for storage, organization and arrangement of hypertextual content), and its evolution towards digital services (portals, websites, social networks, email, among others), we have moved from a static dynamic of information consultation (non-social) to one of collective knowledge construction. Among the benefits that this network represents, communication mechanisms, information and documentation exchange, as well as storage in the same (virtual) space are brought together, providing users with scenarios for interaction and collaborative learning (Fernández, Burbano and Botina, 2018; Rodríguez and Espinoza, 2017).

These virtual spaces are supported by technological tools, such as email, social networks, instant messaging, blogs, cloud storage, among others. Virtuality allows simultaneous interaction between individuals through internet access and web browsing, even when they do not share the same geographical location. Within these spaces, time concurrence is not an essential aspect either; it is enough for the media to keep the historical record of the exchange of information to give continuity to communication. This process is known as asynchronous, while in the case of individuals who meet at the same time it is synchronous (for example, communication through a video call by applications such as Zoom, Microsoft Teams or other means).

This represents a frequent alternative for people with similar interests who seek to form a community where it is possible to share, exchange information and collaborate. Under these virtual scenarios, dialogues and interactions are generated remotely, both synchronous and asynchronous.

In the educational field, it is required to have the means to offer training alternatives different from the traditional or conventional ones, which overcome space-time limitations, provide interaction and promote simultaneous and cooperative learning (Rodriguez and Espinoza, 2017). Thanks to Internet access, changes in web dynamics and the development of technological applications focused on promoting interactive scenarios, it has been possible to design and build educational spaces mediated by technology, known as virtual learning ambiences (VLA) or virtual learning environments (VLE). In these spaces, the participants in the training process interact within the same digital environment, which exists within the web, so that their access requires technological tools. Although the VLA

is not physically palpable and its access is mediated by technology, its academic objective is not different from that of physical educational environments, namely, to obtain information, promote knowledge, develop competencies, achieve learning or generate training.

From this research, we show the evolution of virtual spaces, their components and their commitment at different educational levels towards a constructivist perspective, where the actors involved in the educational process focus not only on the transfer of information, but also on the construction and active participation in learning (Chong and Marcillo, 2020). The objective was to determine the trend in the use of virtual spaces in higher education, the influence they have on the design of non-face-to-face learning activities and on evaluation; in addition, we sought to determine the factors that stimulate their use, the main activities that are developed through them and the difficulties encountered by teachers in their context that limit their use. Finally, we sought to conclude which are the necessary actions that contribute to the appropriation of information and communication technologies (ICT) and the modification of teaching practice with their use.

VIRTUAL LEARNING SPACES

The emergence of virtual learning spaces is accompanied by the development of technological tools and these, in turn, by the evolution of the web (see Table 1). While Web 1.0 (or just web) consisted of the exposure of information through hypertext and hypermedia, Web 2.0 has as its main features interactivity, collaborative learning and freedom of creation, editing and dissemination of content (García, 2014).

Table 1. Significant stages of the web

	Web 1.0	Web 2.0	Web 3.0
Dynamic	Exposure and provision of information. One way through static content pages	Exchange and creation of information in collaborative and social schemes Multi-directional through applications	Generation, storage, distribution and provision of distributed information Ubiquitous, through services

This evolution within the web opened a range of possibilities to interact and expand the educational offer (Pérez and García, 2016) by the creation of alternative scenarios to the physical ones in virtual spaces aimed at generating meaningful learning (Aguilar, 2020). Although mediation in

these training schemes is developed through technological means, their paramount objective is learning.

From the functionalities of virtual spaces, communication, interaction and collaboration are encouraged, mechanisms that serve as the technological basis for the creation of environments focused on teaching through learning management systems (LMS); that is, the necessary components are available to promote direct communication with the group-class, accessibility to materials and the exchange of information and documentation (Blanco and Anta, 2016).

This is one of the main reasons why ICTs and virtual spaces play a predominant role in teaching activities within higher education institutions (Cedeño and Murillo, 2019). By using these tools, alternatives are provided to the challenges of educational innovation, whose functionality is to support "flexible and active learning under a constructivist scheme" (Cabero, Arancibia and Del Prete, 2019, p. 27). From this theory it is considered that "the planned structuring of virtual spaces should allow students with any learning style to receive the best possible education" (Demian & Morrice, 2012, p. 11).

According to the Educause Center for Analysis and Research (ECAR) report, which considers the perspective of students from more than 130 higher education institutions in nine countries, students consider themselves satisfied or very satisfied with the use of LMSs in their educational center, due to the advantages it offers, such as real-time monitoring of their progress, making adjustments during the course (if necessary), the flexibility to advance their off-campus activities, the possibilities to communicate with their instructors and classmates, in addition to permanent access to course content; all of this is part of the internal functional aspects of the LMS (Galanek, Gierdowski, & Brooks, 2018).

As for teachers, the design, construction and conduction of the teaching process through virtual spaces requires them to have the appropriate level of digital teaching competence, in addition to a positive and proactive attitude to integrate communicative strategies and develop information literacy (safeguarding, retrieval and exchange of information); it also requires the appropriate incorporation of digital educational resources (Pérez, 2021; Castro and Artavia, 2020) with a critical, grounded and intentional sense. As Cabero *et al*. point out, it is necessary that "teachers have knowledge about the tools, being aware of how they should be used" (2019, p. 28).

Especially, the virtual spaces provided by LMSs -regardless of their brand or provider- have the central objective of favoring the management and organization of courses, favoring the creation, storage, distribution, control and monitoring of learning activities (Palacios *et al*., 2016; Pérez and García, 2016; Fernández and Rivero, 2014).

Regarding the technical and internal operation characteristics, virtual spaces have also evolved (Palacios *et al.*, 2016), they have been strengthened in the following aspects:

1) Interaction, interpreted as communication in more than one sense between the actors, the materials and the means.

2) Greater flexibility in adapting the pedagogical conditions established for teaching.

3) Scalability, with the possibility of increasing work capacities without compromising performance, quality and available resources.

4) Standardization, which guarantees the integration of elements generated by other authors.

5) Usability, which evidences effectiveness and efficiency focused on user satisfaction.

6) Functionality, by preventing the actions required to control the information within the system.

7) Ubiquity, simultaneous availability of contents and functionalities from different devices or media in remote locations.

8) Accessibility, from two perspectives: the first one, when seeking to achieve the highest level of use, and the second one, which favors inclusion from a social perspective with geographical, economic, language and even people with different abilities (Capanegra *et al.*, 2016).

The academic and administrative characteristics of virtual spaces make it possible to contribute to the creation of pedagogical strategies, conceived as the combination of procedures organized and executed in a systematic and premeditated manner, so that students can achieve learning (Chong and Marcillo, 2020); at the same time, they are intended to facilitate the management of information and learning paths. As there are different tools -both paid and free- it is evident that they must have a different number of elements and functionalities (see Table 2). The joint work of the technical, pedagogical and administrative components provides the possibility to administer, communicate, collaborate, manage content and groups, keep personal follow-up and evaluate (Fernandez and Rivero, 2014).

Table 2. Elements of the academic and administrative components of an LMS

Academic	Administrative
Pedagogical	Tools for help
Communication	User management
Course structure	Technical support
Student	
Tracing	
Teacher	

It should be considered that the alternatives for the use of virtual spaces are varied and depend on the approach, methodology and educational mode, among other elements; however, it is possible to recognize that within educational institutions they are used as a support to face-to-face, in mixed scenarios (blended, hybrid, hybrid, blended, etc.) and non-face-to-face (virtual, online, distance, among others). Thus, the role of the virtual space is defined and delimited on the basis of the pedagogical proposal of each mode. Based on this, virtual spaces, through LMS, are established as support tools that contribute to the development of the teaching-learning process, independently of the educational theory used by the teacher.

Establishing a tool that allows learning management represents a challenge for educational institutions: on the one hand, due to the diversity of needs, educational practices and the level of digital competence of teachers; on the other hand, due to the variety of features, functionalities and dynamics that they offer, as well as their orientation, the resources they provide inside, the ease of use, licensing, the required infrastructure and the technical equipment for maintenance and updating.

According to Cedeño and Murillo (2019), although there are innovative learning bets, there also are spaces used for the exchange of documents or with a merely instrumental orientation. On the other hand, despite the fact that economic investment in the educational field to provide virtual spaces with a high technological and human resources capacity has been gradual and constant, educational practices have not been able to transform in all contexts (Cabero *et al.*, 2019), or "have not produced sufficient impact among education professionals" (Blanco and Anta, 2016, p. 114).

Moreover, it is admitted that the incorporation of ICT in the educational field through the incorporation of non-face-to-face or mixed modes implies a reconfiguration in the pedagogical, curricular, technical and

administrative areas, as well as the adjustment of rules and regulations. In this sense, teaching practice, as a basis, requires technological selection from the context of the student, the contents, the teacher and the institution (Pérez and Andrade, 2020). From this perspective, virtual spaces as communication and information exchange tools demand strategic approaches that support the academic objectives; and, likewise, within each of the technical elements available, they should harmoniously justify their contribution to the general academic and pedagogical approach.

Claro (2017) emphasizes that the incorporation of virtual spaces modifies the teaching process, in addition to the fact that their use contributes to the development of technological skills between the teacher and the students, as long as it is reflective and intentional. In this sense, the elements of communication (synchronous or asynchronous) within virtual spaces force a rethinking of teaching strategies to improve performance in the educational field (Viloria and Hamburger, 2019).

Pedagogical implications are relevant for the incorporation of virtual spaces, which are based on educational technology as a discipline that seeks to strengthen the teaching-learning process by the integration of resources, applications or digital services, once the teaching approach or methodology has been defined in a given teaching context. In this regard, virtual spaces and their components follow the same objective.

Implications that the use of virtual spaces require to be part of the collection of available technological resources should not be neglected. It requires the provision and enabling of the infrastructure, in addition to the necessary considerations within the teaching process (design, conduction and evaluation). In this sense, the review of the topic is oriented in this research, with the objective of determining what the use is that the university professor gives to his virtual spaces through a learning manager, and how much his teaching practice is modified.

The use of virtual spaces as an object of study has led to the analysis of their implementation at different educational levels, modes and training approaches, as well as some of the elements provided therewith. Each of these works provides direction (where to) and the recognition of the practices that are carried out within them (how they are used).

From the theoretical perspective, it is identified that virtual spaces contribute to the teaching process and that teachers' pedagogical practices must continue to be reconfigured. These spaces “do not always generate the desired transformations, since there are teachers who transfer daily teaching models to virtual spaces despite the potential of ICT” (Chong and Marcillo, 2020, p. 59).

This research seeks to recognize the use, implications, problems, advantages and disadvantages, as well as the main learning and evaluation

activities that university teachers have related to virtual spaces. Therefore, it is possible to recognize the elements that are predominantly used and, finally, to identify whether there is a relationship between the level of digital skills and the level of incorporation of virtual spaces in the pedagogical practice.

METHODOLOGY

Design of this research was non-experimental, correlational transactional cut, since it sought to associate more than two variables measured in the same group of participating teachers (Hernández & Torres, 2018). It considered the level of knowledge and use of ICT which the teacher recognizes to have and how both variables have an influence on the design of teaching activities through virtual spaces. The process was concurrent by QUAL + QUAN complementation (Pluye *et al.*, 2018; Razali *et al.*, 2016) with the aim of retrieving the necessary data for each variable considered (information expansion).

The group of participating teachers was formed from an open call, free and at no cost to active full-time, hourly class or subject teachers and academic technicians, from a Mexican public university. A total of 53 professors were consulted (see Table 3), who expressed interest in analyzing and modifying their practice in the incorporation or adaptation of virtual spaces.

Data collection was carried out in two stages. The first stage was of a qualitative nature, according to the measurement and description of the data as subjective results based on the context (Sánchez, 2019), it consisted of conducting a group discussion as a space for reflection, training and openness, based on the experience of the participants (their feeling, thinking and living) (Hernández and Torres, 2018). Through this technique, information was gathered on the teacher's experience in three senses: 1) as actors responsible for organizing content, designing and structuring learning activities, 2) as participants in training processes through non-face-to-face courses, and 3) the opinion of those who did not yet have the experience of using virtual spaces in their courses.

Table 3. Distribution of participating professors by disciplinary area, gender and type

Disciplinary area	Class time		Full time		Technical academic		Total
	M	H	M	H	M	H	
Economic sciences	5	1	1	0	0	0	7

Disciplinary area	Class time		Full time		Technical academic		Total
	M	H	M	H	M	H	
Agronomic and veterinary sciences	2	2	1	1	0	0	6
Health sciences	3	1	3	0	1	0	8
Technology sciences	5	4	3	3	0	0	15
Earth and cosmos sciences	0	0	1	1	0	0	2
Life sciences	0	0	0	1	0	0	1
Legal sciences and law	2	0	0	0	0	0	2
Geography	1	0	0	1	0	0	2
Math	0	0	0	1	0	0	1
Chemistry	1	0	0	0	0	0	1
Sociology	1	3	0	3	0	1	8
Total	**20**	**11**	**9**	**11**	**1**	**1**	**53**

The second stage was of a quantitative nature, due to the objectivity provided by the data in relation to the phenomenon studied (Sánchez, 2019). The survey technique was used and, in order to facilitate access, organization and data collection (Hernández & Torres, 2018), an online questionnaire was designed, managed by the application of Microsoft Office 365 forms. In this self-diagnosis process, teachers provided information regarding the level of ICT use they consider having and the use of virtual spaces as support for their courses. Instrument validation was carried out supported by two experts in the area of technology integration and teacher training at university level. Clarity, precision, relevance, coherence and sufficiency were assessed (López *et al.*, 2019), based on their experience, availability and impartiality. The reliability of the instrument was determined with Cronbach's alpha, with a coefficient of .88, which determines a good internal consistency and correlation between items (González and Pazmiño, 2015).

The instrument was developed specifically for this project and consisted of 25 mandatory questions, of the following type: 1) open-ended, 2) multiple choice and 3) Likert-type scale, aimed at retrieving information in the following categories: 1) general context, with the purpose of

knowing the main conditions of the teachers; 2) use of ICT, which allowed identifying knowledge and use of these technologies in the areas of communication, generation of materials, collaboration and security; 3) the use of virtual spaces, to recognize which are the elements mostly used, the orientation and the experience the teacher has had with these elements; and 4) the pedagogical approach, through the recognition of the learning strategies used and the design of the activities carried out within these strategies.

According to the diversity of the professors within the university, it was expected that the variance of the group would be high in relation to age and teaching experience; however, it is important to analyze the values related to the average number of courses being taught, the years of use of virtual spaces and the number of teacher training courses they have had (see Table 4).

Table 4. Relationship of the contextual variables of the teachers

	Age	Years of teaching experience	Number of courses taught	Number of courses supported with virtual spaces	Years using virtual spaces	Number of training courses taken about virtual spaces
Mean	40.20	9.896	3.849	1.886	2.849	2.150
Median	40	9	4	2	2	2
Mode	43	6	3	0	1	1
Standard deviation	8.103	6.839	1.801	1.867	2.619	1.736
Sample variance	65.66	46.78	3.246	3.486	6.861	3.015
Minimum	27	1	1	0	0	0
Maximum	64	35	9	6	10	10

RESULTS

From the analysis of the data, it is emphasized that the participating teachers consider that they have a good to excellent level of ICT use in aspects of communication, information exchange, generation of materials, collaborative work and computer security (see Table 5).

It was established that the main factors that stimulate teachers to use virtual spaces are communication/interaction with students (20.7%) and carrying out non-face-to-face activities (20.7%). In this regard, the low importance (1.8%) of only complying with the requirements of school authorities regarding the use of ICTs stands out.

Table 5. Perception of teachers regarding their use of ICT, by areas

Use of ICT	Communication	Information exchange	Generation of digital materials	Collaborative work	Informatic security
None	0%	0%	0%	0%	0%
Little	5%	2%	4%	6%	10%
Enough	10%	8%	19%	14%	24%
Good	49%	32%	43%	45%	41%
Excellent	36%	57%	34%	35%	25%

Likewise, there is consistency between the difficulties and implications teachers find in the use of virtual spaces, and the investment of time in the learning curve is highlighted as the main implication (24.53%), not only in the use of the tool, but also in the immersion of this tool in their teaching practice. Conversely, difficulties detected were internet access (20.75%) or low connection speeds, as well as the preparation or structuring of the activities on the platform (16.98%) and the time invested to carry them out (15.09%).

The use of technological tools has several advantages when incorporated into teaching, some of these include access to course materials and information by the student (28.30%), optimization of time in which non-face-to-face activities are carried out with respect to face-to-face activities (26.41%) and the support for evaluation (24.52%) offered by automatic grading of items. Internet access and connection speeds (45.28%) are the main disadvantage.

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Sending documents (96.2%) and receiving products (94.3%) are the most relevant activities, above the construction of activities for the development of learning in the virtual space, such as course planning, providing learning follow-up through activities or considering the virtual space as a mechanism that supplements the teaching practice, with an estimate of less than 1.9%. Teachers agree that students use virtual spaces only to send assignments (96.2%) and receive documents (88.7%), leaving aside participation in forums for a collective construction of learning (1.9%).

Regarding the strategies implemented by the teachers in the virtual spaces, it was found that individual assignments (79.24%), sharing information (67.92%), preparing projects (64.15%) and doing research (60.37%) are mostly used, while the development of discussions stands out as the least implemented (1.88%).

The main learning activities planned through virtual spaces are: preparation of individual documents (81.13%) and review of multimedia material (60.37%) as supplements to the course bibliographies. Although learning management applications provide the opportunity to give feedback to students, this is the activity used to a lesser extent (1.88%). Regarding evaluation activities, data reflect that the most evaluated products in virtual spaces include reports (67.92%), essays (58.49%), summaries (56.60%) and tests (54.71%), leaving aside group discussion (18.86%), which is the least used resource.

Accompaniment of virtual spaces with other technologies to strengthen interaction and communication between teachers and students is mainly done through the social network Facebook and e-mail. In addition, it was found that teachers who do not have access to virtual spaces supplied their need by means of using blogs (digital blogs).

The main objectives of teachers regarding the use of virtual spaces include the exchange of information (39.58%), automatic evaluation (25%) and student interaction (14.58%); however, they consider that it requires student participation and access to internet and infrastructure (25%), maturity and discipline for autonomous work (14.28%), in addition to the fact that teachers require a correct structuring of activities (31.25%) and learning in the use of the platform (18.75%).

The internal elements of the virtual spaces mostly used by teachers are assignments and tests, while wiki-type elements are presented as a last resort. Folders or libraries in which documents are placed for students are the most used elements (see Table 6).

Table 6. Consideration of use of elements of virtual spaces

Use of elements within virtual spaces	Discussion forums	Chat	Wikis	Exams	Homeworks	Folders /Libraries
Never	0%	0%	0%	0%	0%	0%
At times	28%	26%	33%	11%	5%	4%
Regularly	26%	44%	33%	24%	14%	9%
Generally	36%	13%	35%	38%	39%	24%
Always	11%	17%	0%	27%	43%	62%

The tendency that stands out in the participating teachers in relation to the design and creation of activities in virtual spaces is that generally the student develops them outside the classroom; however, the frequency with which the teacher proposes teaching strategies or activities for his/her students is average.

Based on the above, the results show that the technical elements (Internet access and connection speeds) maintain a significant weight in the initiatives for the use of virtual spaces (at least as variables from the teacher's perception). In the same way, teachers seek to improve the processes they develop (speeding up the delivery of materials), although this does not reflect an integrated rethinking between the pedagogical proposal and ICT.

DISCUSSION

It has been established that the university professor prioritizes the mechanisms of communication and exchange of information with his students through virtual spaces, even when he has at his disposal other means to carry out these activities. Mostly used elements within virtual spaces (assignments and tests) point out that teachers do not consider changes or restructuring in their pedagogical practices, but are oriented to replace the means of delivery (either printed or by e-mail) by one that allows a better control of the students' products (document management) and optimizes the grading process (automatic evaluation).

There is evidence of the search for mechanisms to achieve greater efficiency, depending on the effort and time invested, as well as the development of the educational process which the teacher has previously implemented without the use of virtual spaces, so there is no transformation, even with the incorporation of this type of technology.

This is consistent with the teacher's perception regarding the use students make of virtual spaces. If learning activities are not structured in these spaces, students do not enter, they only visit the space when they have to deliver a product, download a document or submit their evaluation.

Although teachers consider that they have a good use of ICTs, the elements of synchronous or asynchronous communication offered by virtual spaces are used occasionally, which is observed in the development of collaborative work with ICTs. The estimated use is good to excellent, but in practice collaboration elements within the virtual spaces are used to a lesser extent. Although the teacher considers that he/she has a sufficient level of digital competence, this does not automatically favor its development. Regarding the use of ICT, it was found that it is not enough to have them available to encourage learning; an intentional pedagogical proposal is also required that incorporates their use and promotes the development of digital competence in teaching practice.

The relationship between the advantages and disadvantages of the use of virtual spaces turns out to be technical or instrumental. The main disadvantage is access to the Internet by teachers and students, as well as the respective connection speeds. Among the advantages is the solution of instrumental aspects (fewer sheets of paper, automatic evaluation, etc.), however, the possibilities of making pedagogical proposals mediated with virtual spaces or other digital tools are left aside.

It is interesting to note that one of the main difficulties the teacher has regarding the use of virtual spaces is the amount of time he/she uses to learn and develop skills for the use of ICT. The difficulty increases within this variable due to the constant updating and evolution of devices, tools and digital services. According to the results, strategies that establish communication mechanisms between teachers and students are required, since this activity is essential within the teaching process (Vilora and Hamburger, 2019), in addition to the fact that communication is developed based on teacher's needs and not taking student's needs into consideration.

CONCLUSION

Based on the approaches of this research and the analysis developed, it may be concluded that the orientation and tendency of use of virtual spaces in the educational context is aimed at promoting learning processes; however,

practices focused on products are identified. Hence, the main activity carried out by teachers in virtual spaces is the bidirectional exchange of information and documentation, so mostly used elements are assignments and tests. This shows that teachers are not proposing a change in methodology, but rather they are looking for mechanisms (means) that make the workload and time involved in the educational process more effective. Based on this, the importance of modifying the teaching process by integrating virtual spaces is highlighted. Actuality shows that teachers do not reach this stage and continue in the techno centric environment, since a critical, planned and integrated reflection on the use of ICT is not encouraged.

Although it seems that teachers' digital competence is benefited from the teacher's high level of digital competence, it is established that there is no direct influence. This confirms that knowledge and use of ICT is not directly proportional to the development of this set of interfering factors or variables.

When the teacher shows concern about the time that must be devoted to learn and use changing technological tools, it follows that training programs must be in accordance with the diversity of needs and factors of the educational scenario. At the same time, the more abstract the training strategies for ICT use are, the lesser the gap between the teacher's digital competence and its incorporation into teaching practice will be reduced.

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