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Digital competences in distance education for high school education systems. Study case: institutions incorporated to the UAEMex

Competencias digitales para la educación a distancia en la educación media superior. Caso de estudio: escuelas incorporadas a la UAEMex

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Abstract

The purpose of this paper is to identify the perception of digital competencies that teachers should have at the Upper Secondary Level (NMS) based on the recommendations of UNESCO (2019). The case study is for the Schools Incorporated to the Autonomous University of the State of Mexico. The phenomenon has an origin during and post pandemic. The research is based on a review of recent studies no more than ten years old. The methodological design is qualitative, with a case study method based on the population of teachers of the schools incorporated to the UAEMex. An instrument called e-Open (Rámirez and Tenorio, 2021) was adapted and used for a sample of 500 high school teachers during the 2020-2021 school year. Data collection was carried out through questionnaires that were applied through the google forms platform, establishing the procedures for data collection and analysis according to the e-Open instrument for the Measurement of Competencies Recommendations for Open Education in the UNESCO Framework (2019). The analysis of the information is described and narrated from the data obtained through the questionnaire. The data is displayed in bar graphs. The results of the surveys show the percentages with respect to the five recommendations of the instrument with the 31 items, UNESCO (2019). The evidence supports that 70% of teachers have ICT capacity development. The institution raised 70% the development of support policies. But 50% considered that access to ICT was effective, inclusive and equitable. In addition, 55% considered that the creation of sustainability models is required, and finally 80% considered that international promotion models for teachers should be strengthened. In sum, this study supports the importance of dispersing digital competencies in secondary education systems.

Digital competences, High school education

Resumen

El propósito de este documento es identificar la percepción de competencias digitales con las que deben contar los docentes en el Nivel Medio Superior (NMS) basado en las recomendaciones de la UNESCO (2019). El caso de estudio es para las Escuelas Incorporadas a la Universidad Autónoma del Estado de México. El fenómeno tiene un origen durante y post de la pandemia. La investigación tiene su fundamento en una revisión de estudios recientes con una vigencia no mayor a diez años. El diseño metodológico es de corte cualitativo, con método de caso de estudio basado en la población de los docentes de las escuelas incorporadas a la UAEMex. Se adaptó y se utilizó un instrumento denominado e-Open (Rámirez y Tenorio, 2021) a una una muestra a 500 profesores de nivel medio superior durante el ciclo escolar 2020-2021. La recolección de datos se llevó a cabo a través de cuestionarios que se aplicaron mediante la plataforma google forms, estableciendo los procedimientos para la recolección de los datos y su análisis conforme al instrumento e-Open para la Medición de las Recomendaciones de las Competencias para la Educación Abierta en el Marco de la UNESCO (2019). El análisis de la información es descrita y narrada proveniente de los datos obtenidos mediante el cuestionario. La data es expuesta en gráficas de barras. Los resultados de las encuestas muestran los porcentajes respecto a las cinco recomendaciones del instrumento con los 31 reactivos, UNESCO (2019). La evidencia sostiene que el 70% de los docentes cuenta con un desarrollo de capacidad TIC. La institución planteó al 70% la elaboración de políticas de apoyo. Pero el 50% consideró que el acceso a TIC fue efectivo, inclusivo y equitativo. Además, el 55% consideró que se requiere la creación de modelos de sostenibilidad, y finalmente el 80% considera que se deben fortalecer los modelos de promoción internacional para los docentes. En suma, este estudio sustenta la importancia de dispersar las competenciasd digitales en sistemas de educación media.

Competencias digitales, Educación media superior

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Introduction

Competences are the result of different pedagogical approaches to what learners at different levels should master and teachers should have. That is the essence. Digital competences are a variation of curricula that are based on their own socio-cultural needs. That is, the result of global trends from various dimensions. Especially from the perspective of sustainability, perhaps economic, ecological and social. However, this phenomenon needs to be identified in education, especially in upper secondary education.

It is a fact that the process of distance teaching and learning generates multiple reactions, especially controversies of its effectiveness. However, while the issue is being refined, it is essential to identify teachers' perceptions of the requirements needed for the development of digital competences. Higuera and Rivera (2021) point out that virtual or distance education relies, among other things, on the digital competences that teachers must have for the construction of learning based on a scaffolding of social reality.

In general terms, in order to achieve the objective of the study, we first described the background, based on empirical and scientific evidence that allowed us to understand the phenomenon. Secondly, a review of the current state of knowledge was carried out, supported by some current authors. Thirdly, a qualitative design for a case study was proposed, showing the results of an e-Open instrument adapted and applied to upper secondary school teachers of the institutions incorporated to the Autonomous University of the State of Mexico (UAEM) in Mexico.

Various databases were used to obtain studies from primary sources, such as Ecorfan, Ebsco, Proquest, Redalyc, Web of Science, among others. In doing so, recent studies on digital competences for distance education in education in general were identified to theoretically support the relevance of the study, gaps and current status. The research used a qualitative approach for the case study. The adapted e-Open instrument allowed the identification of teachers' perceptions of the requirements needed for the development of digital competences (Hernández et al., 2010).

In relation to the validity and reliability of the instrument and results, according to Cortez (1997), in qualitative studies this occurs through different connections.

Validity, for example, is obtained when a case study finds a sense of the phenomenon that is extracted from reality, regardless of the scientific slant that can be given to it. That is why the study first tries to obtain the perception of a subject through observation, an aspect extracted from reality. Reliability, the same author considers, will be given once the study has the possibility of identifying other replications based on the assumption called social reality (Cortez, 1997).

In this sense, the study allowed us to obtain findings that could be used as data to make decisions in other contexts and, above all, to develop prevention strategies for another event of a similar nature.

Background

Virtual or distance learning (ODL) is a modality that is here to stay, that is the reality. The historical background has its essence in the last century, with an important peak during the 1990s and confirmation after the 2000s. In this process, its incorporation into the academic world has been gradual or slow in various parts of the world. On many occasions it has been doubtful and on others it has lacked credibility. Nevertheless, some Anglo-Saxon universities have detonated this distance or blended learning modality as an excellent educational option. It is recognised that this modality is present day by day in all the educational systems of the world.

It is recognised that the Internet is the driving force behind EaD and ICT. It is, without a doubt, the mechanism that makes possible an educational space that functions virtually or remotely. A virtual teaching-learning classroom that occurs through the transmission of knowledge via electronic communication networks.

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Some systems theorists, such as Luhmann in Urteaga (2010), define a modern society not by its behaviour but by its use of technology and communication. In that sense such a theory is distinguished by its transdisciplinary character, the use of three systems, and the perception of a social system. Regarding the three systems, the first refers to life, the second refers to consciousness and the third is through communication (Urteaga, 2010). In this context, subsystems are identified as social processes for learning. This is why it is necessary to identify, define, characterise and understand the linkage of this study, starting from the co-equalities and then the digital ones in education.

Theoretical approach

Competences should not only help the market but integral human development is a predominant thought. Chomsky (2002) defines competences as the ability to perform, in this case interpretively from a linguistic approach. Educational competences focus on the skills required by the world of work. Competences are recognised as having a set of values based on qualitative, quantitative, performance, performance, and assessment aspects related to life skills. In education, competences originated in the 1960s to 1970s with a pedagogy based on the setting of operational objectives. Subsequently, during the years 1980 to 2015, they incorporated professional standards (cognitive and psychosocial), and standards based on transversal competences (EPC), integrating attainment and terminal competences. And since 2015, they have incorporated a series of emotional dimensions and international standards (UNESCO, 2019).

Educational competences have different approaches, i.e., they are understood in different ways and are generated in relation to the curricular interests of each institution, country or region. Tejeda (1999) classifies competences into four types: 1) Technical, 2) Methodological, 3) Social, 4) Participative. Specifically, knowing, doing, being and being. However, nowadays the context has changed towards globalisation, breaking down borders and fostering citizens of the world with a different way of making environments unusual, these are the challenges.

Opertti, R., and Duncombe (2011), argue that while learning is centred at a local level it must consider international implications. Especially from a vision of sustainability in education, directly influenced by Information and Communication Technologies in Education (ICT in Education).

ICTE

ICTE has its theoretical basis in collaborative learning with a socio-constructivist approach. It is constructive, social, and meaningful learning that is mediated by technology. This model, which favours meaningful learning, breaks with the paradigms of the traditional teaching and learning process: rote and repetitive. It is the opposite: computer-based, digital, communicative, cooperative, autonomous, active, real, among others.

Therefore, for Narvaez (2008), ICT is a practice that arises from an interactive phenomenon with technological implications in education. The authors of this study argue that learning at this juncture requires technology with a universal open source computer language accompanied by algorithms for the generation of knowledge to solve current problems in a realistic way.

It is recognised that ICTE is supported by virtual learning environments (VLE). In practice, there are several elements for success in a VLE: information, management, training, and communication, the latter of which is crucial among participants. There is no VLE that is not supported by exploratory, simulator and virtual software. Each one is characterised to generate knowledge or information that influences instructional designers with certain particularities in their training. Virtual reality is an essential didactic resource for upper secondary and higher education (Menjivar, 2022).

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Digital competence (DC) approaches

UNESCO (2011) defines a digital competence as an ability to harness knowledge, skills for the development of processes making use of knowledge, skills and aptitudes that enable the effective use of technological tools and resources. The Common European Framework of Digital Competences sets out five areas totalling 21 digital competences: 1) Information and Data Literacy, 2) Communication and Collaboration, 3) Digital Content Creation, 4) Security, and 5) Problem Solving (UNESCO, 2011).

Other authors such as Koltay (2011), Gisbert et al., (2011), Gros et al., (2006), add aspects of this era as digital, technological, functional, multiple, information and media literacy. In real terms, this means that students and teachers must be competent to use computers, mobile devices, word processors, spreadsheets, presentations, browsers, multimedia, among others (Arrieta and Montes, 2011). Likewise, access strategies, search for information in repositories or digital libraries and decipher hypertexts (Gros and Contreras, 2006). Designing digital content, identifying active and democratic interaction. All these qualities always understanding and respecting the legal aspects defined as author's rights and copyright. It is worth commenting that the state of the art on digital competences is becoming more robust, however, it is an opportunity to learn about some applications, as data have been generated that allow studies to be replicated in different contexts and dimensions, which in some cases deserve to be presented.

Practical implications

In a paper called Study on digital competences in virtual and distance learning programmes (Silva, et al., 2021) examined the strengths and weaknesses in the technological conduct of virtual distance learning scenarios. The study had a mixed-method approach applying an instrument called self-perception of digital competences to 69 university students. The results show that 3 areas of digital competences were identified with different items where most of the subjects have the necessary competences located in the cognitive dimension axis under the information literacy indicator, and it is concluded that the student must have the ability to search, select and use ICT in relation to the teaching context (Silva, et al., 2021).

Levano et al., (2019), in a paper on Digital competences and education in an analysis of the various approaches to DCs. The authors also recognise that teachers and learners are required to have a range of digital competences (DC). Cognitive skills must go beyond professional, business and commercial management issues. Detonating data management, artificial intelligence as a mechanism to rethink the potential of technology.

In addition, there is a work developed by Razo et al (2022), called teaching work in the context of emergency remote teaching: prioritisation, planning, development, evaluation of learning activities in primary education in Mexico, in which the competence development activities had the participation of parents for the success of the activities. In this sense, it is important to note that in order to achieve learning, the participation of other actors is required. For all of the above reasons, Morin, et al (2022), Mancha, et al (2022), Álvarez-Rodríguez (2022), Macías (2022), among others, agree that CD requires skills, abilities and aptitudes. Teachers must have clear information management, content creation, problem solving, safety and communication skills. Therefore, the question that arises is: What are the perceptions of teachers about the requirements needed for the development of digital competences in the institutions incorporated to the UAEM?

Research Method

This study has a qualitative approach that allowed for the application of an instrument for data collection with respect to the five recommendations of UNESCO (2019), in relation to competencies in open education. This methodological design is appropriate for the research as the given approach allows for the collection of perceptions about a given phenomenon (Hernández, Fernández-Collado, & Baptista, 2008).

Method

Balcazar (2002) argues that the case study method is used as a research tool to conduct studies on current issues. This study falls within the logic that guides the successive stages of data collection, analysis and interpretation of qualitative models.

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In this case, it is necessary to understand how the five UNESCO recommendations are perceived, their components, characteristics and the relationships between them in order to identify qualities of a phenomenon and to obtain basic and descriptive information.

Participants

The sample used was approximately 500 teachers. All of them come from an upper secondary level of education in different institutions incorporated to the UAEM. No inclusion or exclusion criteria were established, only that they were teachers from the incorporated institutions.

Instrument

An instrument called e-Open (Rámirez and Tenorio, 2021) was used, which was adapted to the needs of the research itself. However, it maintained its essence in some of the questions. It was based on the Google Forms platform to collect the information. The instrument was a 31-item questionnaire with closed questions. Supported by a value scale: Totally disagree 2) Disagree 3) Agree 4) Totally agree and 5) Don't know. All with the intention of obtaining information in a simple, truthful and reliable way.

Procedure

To achieve the purpose and answer the research question, the following activities were carried out in the order specified. The steps to obtain the information are as follows:

- e-Open questionnaire was used.
- It was located on the Google forms platform.
- An email was sent to all institutions to invite teachers to participate in filling out the survey.
- A time frame of 30 days was given.
- The platform was monitored to see the degree of response from participants.
- The platform was closed, and the information was collected.
- The results are presented in graphical displays.

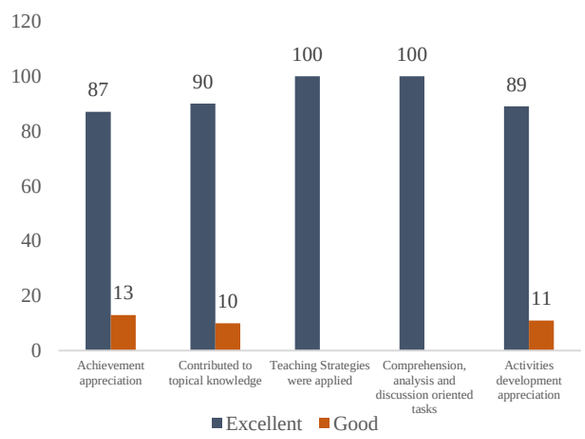
Results

This section collects the data on What are the perceptions of the teachers about the requirements needed for the development of digital competences in the Institutions Incorporated to the UAEM?

For the above, the results are broken down, by axis, in particular:

Axis 1: capacity building

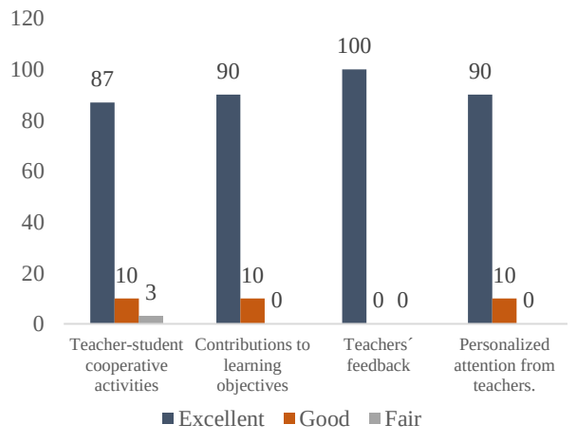
Capacity development comprises six questions oriented to the use of open educational resources (OER). The first question, Q1, focuses on OER integration. The findings show that 70 % of teachers work on it in their activities and practices. In Q2, 80% of the respondents recognise some kind of virtual platform related to Learning Management Systems (LMS). Another fact in Q3 is that the majority of teachers, 60%, build OER in addition to educational technology (OER), especially in presentations, blogs, wikis, podcasts, among others. In P4, in the application of open licences such as creative commons among others, 10% of them do not know about it. However, in P5, 50% of the teachers implement information in multiple formats to carry out OER practices. Finally in P6, 75% of the teachers constructed OER in different digital formats.



Graphic 1 Axis 1: capacity building
Source: Own elaboration

Axis 2: Supporting policy development

This axis has eight items linked to the establishment of institutional support policies for the exercise of open education and open access. Q7 raises ethical aspects or the management of copyright used in academic activities, and the findings show that 70% are aware of this commitment. In this trend, it is known that open education is an incentive mechanism to develop technological and collaborative skills, in this respect in Q8, the results showed that 80% value the issue. Q9 on standards or norms for the protection of personal data showed that 10% are not aware of this obligation. However, in Q10, 60% distinguish that personal data protection policies exist, and that 50% of the participants found that they are promoted. Thus, 60% consider that there are policies that promote open licences in educational resources or research Q12. In the exercise, for Q13, 75% of the respondents stated that there are policies that promote open education. In Q14, 70% consider the role of libraries as promoters of open access to information policies to be important.

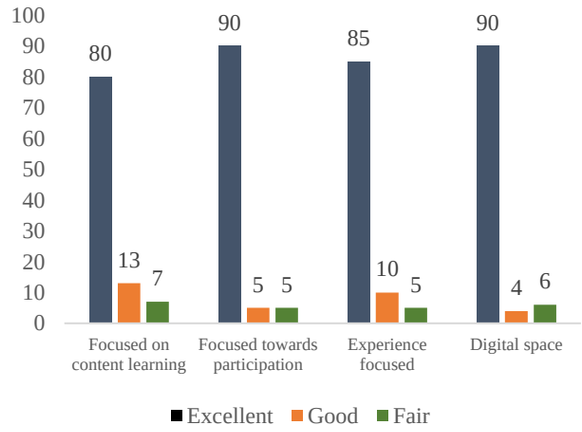


Graphic 2 Axis 2: Policy development
Source: Own elaboration

Strand 3: Effective, inclusive and equitable access

The results for the seven questions generate the following data. In Q15, 70% of respondents identified that there are support programmes that bring internet services to vulnerable sectors. In Q16, 80% acknowledged that the necessary conditions do not exist for open education in this sector, although in Q17, 90% agreed that resources are used to access platforms.

In Q18 on the development of open resources that take into account the principles of universal design (needs for: alternative texts, enlarged font, contrast, among others) 30% have no idea what this is about and 70% are aware of it. In Q19 40% do not use OER applications effectively. For Q20, in relation to publishing work on universal open access sites, 60% do not publish and 20% do not. For Q21 on teachers' participation in education projects with vulnerable groups, the data show that 60% of respondents do not plan to participate in such projects.



Graphic 3 Axis 3: Effective access, inclusion and participation
Source: Own elaboration

Axis 4: Creation of sustainability models

In this axis, the aim is to encourage programmes to promote the issue of education for sustainability. Thus, in Q22, 40% recognise that there are economic sustainability models for viability. However, Q23 indicates that 70% of teachers do not participate in projects with funding (public or private) for sustainability. Q23 shows that 70% of the participants promote the use of sustainability-oriented approaches from various dimensions. The result of Q25 indicates that 80% do not seek any mechanism to make projects sustainable. In Q26, it is shown that 80% are not aware of funding opportunities (national or international). In Q27, it is recognised that 60% of teachers use culturally diverse educational materials (from different gender perspectives, in multiple languages and formats) all in open education.

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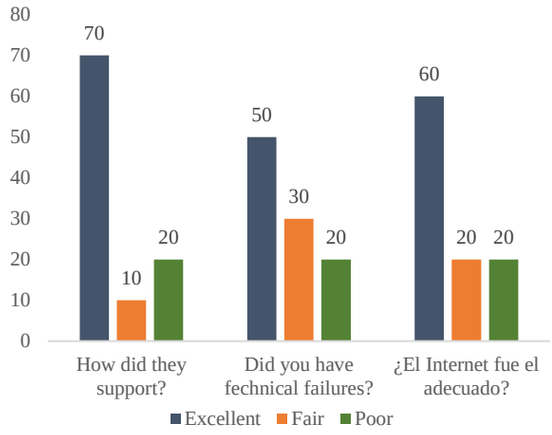
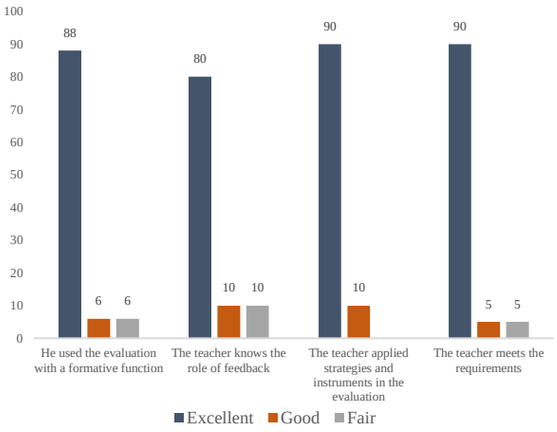


Graphic 4 Creating models of sustainability
Source: Own elaboration

Axis 5: International cooperation

Finally, international cooperation is part of an institutional policy that promotes the mobility of teachers and students for the development of international experiences. The results show, in Q28, that 85% of teachers do not participate in, let alone operate, international cooperation projects. In Q29, when asked about support for inclusion actions in international peer networking projects in which they participate, the results show that only 20% are aware of inclusion actions in this type of projects. Consequently, in Q30, 60% have some intention to participate in international networking activities to promote open education.



Graphic 5 Axis 5: International cooperation
Source: Own elaboration

Discussion

When analysing the teachers' perceptions of the requirements needed for the development of digital competences for the Institutions Incorporated in a University located in the State of Mexico, it was possible to confirm that there is sufficient evidence to say that the teachers moderately identify which digital competences they should perceive or know. The results of the surveys show the percentages with respect to the five recommendations of the instrument with the 31 items, UNESCO (2019).

Axis I Capacity development. The sum of all the questions (6) related to the integration of ICT, shows that 70% of the teachers of the Institutions Incorporated to the UAEMEX have a development in this capacity. The discussion can be centred on the fact that the results show that teachers are committed to the new global dynamics centred on virtuality and the application of ICT competence. It should not be lost sight of the fact that COVID-19 came unexpectedly and not all teachers were professionally ready for this challenge. This issue is also affirmed in the document entitled the crossroads of education in Latin America and the Caribbean: SDG4-Education 2030 regional monitoring report (ECLAC, 2022) presented in recent days. This document argues that there are still technological challenges to be faced in the world and that Mexico is not exempt, the data show that it has a backlog equivalent to two years of schooling. Teachers must be trained with the appropriate competences for the use of technology, as well as be willing to update their knowledge periodically by participating in continuous training (Rivera & Higuera, 2020).

Axis 2: Development of support policies. In eight questions, 60% of the teachers stated that support policies were promoted in the incorporated institutions. While there are a number of criteria to analyse this axis, such as: copyright, data protection, privacy and open licences, among others, there is a line of analysis related to copyright, data protection, privacy and open licences, among others. There is a line of analysis related to co-responsibility in research ethics. First, the teachers state that there are still gaps in the development of institutional policies, there is still evidence that proves that there is a lack of knowledge of the issues related to educational academic resources RAE, from the perspective of research.

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Therefore, what has been done by institutions in the development of digital libraries, information repositories, copyright, author's rights, copyright, among others, has not been enough. However, secondly, from the perspective of these authors, the issue focuses on the issue of research ethics as a competence that all teachers are obliged to know, understand and develop. Currently, every teacher, as Gros and Contreras (2006) argue, recognises that there are strategies to trigger scientific research, however, ethical criteria must be manifest in the teaching of the scientific method, which is compulsory in the teaching of the scientific method to be presented to students. From the results obtained, it is clear that not all teachers, 40%, do not use digital repositories and are unaware of digital libraries. Consequently, they do not know how to do research, they lack the basics, they do not define characteristics, much less encourage students to solve applied problems. There is a significant gap in this area and it is very serious. If nations do not strengthen science education, it will be difficult to achieve national progress or development.

Axis 3: Effective, inclusive and equitable access. This section shows, in seven questions, that there is unusual behaviour. The findings show that 50% considered access to ICTE to be effective, inclusive and equitable. However, the discussion should focus on the gaps that exist in access to educational technology and social aspects.

First, the results show that 70% of respondents had access to educational platforms, but not all have up-to-date equipment, internet and software to do their homework.

It is recognised that there are still problems with the effectiveness of the so-called virtual learning environments (VLE), it is acknowledged that it is not for all audiences.

Secondly, the social aspects linked to vulnerable groups, inclusion and equity, it is known that there is a perception among teachers that there are no institutional inclusion policies, more than 50% of teachers say so. It is likely that access refers not only to educational programmes, but also to equipment, technology, publications, dissemination of science, among others. Recent studies confirm this finding.

The National Institute of Statistics, Geography and Informatics (INEGI), in its survey for the measurement of the impact COVID-19 (INEGI, 2020), comments that the dropout rate was as follows: of 33.6 million people between the ages of 3 and 29 enrolled in the 2019-2020 school cycle, 5.2 million people did not enrol in the following school cycle, and almost one million did not complete their studies. However, data from the National Education System (SEN) show that the highest dropout rates occurred at the upper secondary level (Tello and Velázquez, 2021).

Axis 4: Creation of sustainability models. This section generates answers to six questions related to the issue of sustainability. In general, the findings indicate that 55% considered that the creation of sustainability models is required, mostly oriented towards financing, but perhaps the debate is not economic but social. Particularly in academia from this perspective. Therefore, some questions indicate that a sustainability-oriented curriculum structure should be incorporated, based on the Decade of Education for Sustainability 2004-2014-2018, and the United Nations (UN) 2030 agenda (Ramos, et al, 2020). It should be understood that ESD proposes that students develop sustainability competences: systems and critical thinking, normative and strategic anticipation, collaboration, self-awareness and problem solving (UNESCO, 2017). In order to achieve this goal, it is necessary to implement a cross-cutting curriculum "incorporating sustainability approaches and content into curricula and competency-based programmes" that help to solve real and complex problems in society. This goal will not be achieved first, if teachers do not have these sustainability competences to be able to teach students (Higuera and Rivera 2020).

Axis 5: International cooperation. This section is oriented, in three questions, towards issues of cooperation, networks and placements, all of which are international in nature for teachers. The result shows that 80% of those surveyed consider that international promotion models for teachers should be strengthened. The development of this axis makes it possible to establish various criteria that help to strengthen not only the profile of teachers but also that of students. International experiences are necessary due to the global dynamics we are experiencing.

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Globalisation in education has been a reality, as it represents multiple benefits in the teaching and learning process. One is that teachers should engage with their peers to share good teaching practice guidelines, another is the issue of research, and finally sharing experiences in the application of methods in other contexts. There are probably many other benefits. What is a fact is that the incorporated institutions need to strengthen this area. The results show that there are institutional weaknesses in international networking and cooperation. Teachers demand more links with other higher education institutions, not only on a didactic or pedagogical level but also on a technical and practical level.

Conclusions

Finally, the issue of digital competences, although it emerged a decade ago, it is in the last decade that its implementation has been speeded up due to the causes of the pandemic already known. It is understood that its application forced all HEIs, especially the institutions incorporated to the UAEMex, to develop strategies not only in the media but also in the competences of teachers.

Therefore, remembering that the objective was to identify the perceptions of teachers on the requirements needed for the development of digital competences, the case study of the Institutions Incorporated to the Autonomous University of the State of Mexico. It could be seen from the results that digital competences based on the five UNESCO recommendations. They are moderately present, even with weaknesses in their application and development.

However, the research problem was shown to be in an appropriate context for developing the research. It was possible to validate that the digital competences of upper secondary level teachers in the institutions incorporated into the UAEM were more or less adequate. It is understood that there are internal and external factors that affect their efficiency and effectiveness. Theorists state that there are variables that should be considered in digital competences related to 1) Information and Data Literacy, 2) Communication and Collaboration, 3) Digital Content Creation, 4) Security, and 5) Problem Solving.

The teachers surveyed stated that the ineffectiveness of digital competence development is due to lack of technology, medium support and institutional development.

In relation to the literature review, the studies presented are no more than 10 years old, so the state of the art of the topic shows the relevance of the research. The versatility of the information obtained from primary and secondary sources, with institutional and theoretical references, made it possible to support the need. It is likely that this research exists in other contexts, but with different characteristics, nevertheless we worked with scientific rigour in the choice of publications, always taking care of the ethical aspects of the research itself.

As for the methodological design, the qualitative, case study method was useful. The adapted e-Open instrument allowed us to obtain general responses, but it is likely that the questions need to be posed differently in order to obtain quantitative and qualitative information. In this sense, the control of the group was minimal, as the google forms platform allowed the collection of information to obtain a first approach to the phenomenon. The procedures were adequate as the activities established in this section were followed step by step. It is worth mentioning that some limitations were identified. All of them related to the so-called harassment at work, due to fear when answering the survey. The results, although they show that the digital competences of the teachers in the Institutions Incorporated to the Autonomous University of the State of Mexico did not establish controversies between administrative authorities and teachers, it probably caused other personal, social, communication and technological problems. The following particular results were found: 70% of teachers have competences for development. 70% of those surveyed considered that they have competences for development. 70% of respondents felt that the institution's institutional policies on digital competence issues were improvised. 70% considered that there is dissemination concerning access of vulnerable groups to ICTC but 70% considered that there are no conditions for inclusion. 55% considered that they recognise the issue of sustainability and its programmes but 45% consider that there is no sufficient institutional and curricular progress.

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Finally, on the issue of international cooperation, 80% of teachers think that this area should be strengthened by generating links, networks and teaching research stays.

This study has a universal quality. The results obtained are scientifically rigorous. It is based on systematic criteria based on scientific and field evidence. Therefore, it is a research with an innovative contribution, the institutions incorporated in this public university, are far from being considered for studies. Therefore, criteria of objectivity were followed, rigorousness at the empirical level, methodological procedures were respected and the steps of the scientific method were followed.

One recommendation that emerges from this study is that there are issues that need to be reconsidered or perhaps studied further. But an immediate line of research is identified at this point. It has been said that virtual education is inefficient. Studies show that this has been due to the improvisation of the model. But this inefficiency of e-learning can be remedied if the digital competences of the learners are also identified.

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