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Digital Competence of Teachers in the Mayan Region of Mexico: Results of a Preliminary Research in Secondary Education

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Since there is a lack of information on the level of digital competence of secondary school teachers in the Mayan region of Mexico, a preliminary study was conducted to identify the level of digital competence and whether there are differences in the level of digital competence of teachers with socioeconomic variables. The DigCompEdu Check-In instrument was administered to 462 teachers; global and area competency levels were obtained, as well as analysis of means and standard deviations and comparisons using the t-test for independent samples; the Kruskal-Wallis test was also used to find differences. Among the results it was found that 45.2% of teachers are at intermediate levels of digital competence, also that there are differences in the level of digital competence between teachers in urban and rural areas; in addition, it was found that variables such as level of studies, number of social networks and class hours are related to the level of digital competence. With the information obtained, some actions can be defined to be carried out in the next stages of the research, such as working with more teachers and involving their students. The main contribution of this research is to have information on the digital competencies of teachers in the Mayan area of Mexico.

Keywords: digital literacy, competence, teachers, measurement, preliminar research

INTRODUCTION

Nowadays, society is fully technical with a high specialty in the use of mobile devices, applications for communication, entertainment, and acquisition of goods and services, among others. In the case of education, a phenomenon oriented towards the use of technology to achieve autonomy and creative actions in students is observed (Sánchez-López et al., 2021), for their part, teachers are in a transition in the development of their digital skills, accelerated by the urgency of the health contingency (Bhaumik & Priyadarshini, 2020; Yaşar, & Atay, 2023), demonstrating that they have the necessary technological skills to face changes (Rodrigues et al., 2021; Winter et al., 2021) and a

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positive attitude to integrate technology into their teaching practice (Suhayat, et. al. 2023).

Although the levels of technological competence of teachers are generally heterogeneous, some gaps have been observed, mainly in areas where there is marginalization and few opportunities for professional and economic development (Tugelbayeva et al., 2020), also due to the lack of government support or monitoring programs and continuous training to achieve a better adaptation to the digital environment to enhance teaching (Gupta et al., 2020).

According to the UNESCO Report on science (Schneegans et al., 2021), investment in technological infrastructure globally increased from 2014 to 2019 by 19%, mainly in the United States and China. However, in the educational field, despite the implementation of technology and having basic infrastructure, the levels of digital competence have not increased (Cabero-Almenara, et. al., 2020; Thorvaldsen & Sollied Madsen, 2021) mainly because trained teachers are required and with continuous professional development in which technologies are fully addressed with digital skills and teaching strategies. Unfortunately, 83% of teachers have the minimum skills and in developing countries, the proportion is one teacher with the minimum qualifications for every 53 students (UNESCO, 2022).

In Mexico, the same problems can be observed: despite having national programmes to support teaching, the development of digital competencies and technological training and empowerment, these have not had the expected impact, mainly because they address two of the six grades of primary education and without evidence at other levels of basic education (Manzanilla-Granados, et al., 2021). In addition, the national digital literacy (DL) programs have had results with little impact on the development of digital skills and abilities because they are not related to the official study programs (Beltrán-Sánchez et al., 2019; George, 2020; Sámano et al., 2018).

Therefore, it is necessary to have relevant information on the state of digital competencies of teachers in order to obtain reliable data that will allow better decision-making on the present and future of digital skills in a post-confinement environment due to the pandemic and in the face of the challenges posed by the social, economic and public health phenomena of the 21st century (Lucas, et. al, 2021).

Secondary Education and teacher digital competence programs

Secondary education in Mexico is the third stage of the basic education system (SEP, 2017), its curriculum is based on the Key Learning for Comprehensive Education (SEP, 2019) where the importance of teachers in the educational process is described, as well as the actions to achieve their high professionalization and development of competencies such as the transformation of pedagogical practice, initial and continuous teacher training, the improvement of materials, infrastructure, and equipment.

In this context, the training and digital literacy programs for teachers have as reference the @prende 2.0 program (SEP, 2016), whose characteristics are mainly the implementation of technology in the teaching and learning processes, which benefited 16,000 schools. Public schools and the training of eight thousand basic education

teachers (Franzoni et al., 2020). In addition to the fact that this program generated a positive effect on teachers to use technology in their classes (Aponte et al., 2016).

The context of the Mayan region of Mexico

The state of Yucatán is located on the peninsula of the same name, in the southeast of Mexico. Its population is mainly of Mayan descent whose indigenous language is spoken by 23.70% of the population and of this population, 49.5% is in a situation of poverty (CONEVAL, 2021). Among the main economic activities, we can find tourism, then there is the manufacturing industry and commerce (INEGI, 2023).

The capital of the state is Mérida and it is the economic center of the region, with high levels of reception of the population that is not from the state, as well as being an attractive place for foreigners seeking to retire (Government of Mexico, 2022), due to Yucatan has become an important tourist, rest and investment destination at the national level, however, this progress has not permeated the native population of the Mayan region, deepening the opportunities for a better life for that sector.

In the case of education, according to the INEGI population census (2020), 50% of the Yucatan students aged 15 or over have completed their basic education. It was also found that 86% of the teaching staff is located in urban areas and 14% in rural areas; where there are problems associated with discrimination based on ethnic origin and language (Vargas et al., 2021), which deepens the gaps and opportunities for professional development.

The Problem

After the analysis carried out, it is evident to find problems associated with the gaps that teachers have with the mastery of technologies and their digital competences to use them in their school activities, however, in the literature review it was found that there is a lack of information on the level of digital competency of teachers in the Mayan region in Mexico, particularly in secondary education; it is unknown what is the real state of digital competences that they have mastered. This situation is serious because there is no information that would allow the design of national policies to train teachers and meet their equipment needs in order to meet the challenges of today's education, where students demand teachers who provide them with quality knowledge, with innovative strategies and high digital and technological content. So what is the level of digital competency of secondary school teachers in the Mayan region of Mexico?

The Objectives

O1. To identify the level of digital competence of secondary school teachers in the Mayan region of Mexico.

O2. To identify if there are differences in the level of digital competence of secondary school teachers in the Mayan region of Mexico with other variables.

METHOD

The research was developed from a quantitative perspective with a descriptive, non-experimental scope and hypothesis testing (Stockemer, 2019), using the survey method

through a structured and standardised instrument to collect information on the level of digital competence of secondary education teachers in the Mayan region, in order to obtain accurate data in a field where the reality of teachers in relation to their digital competences is unknown.

Research participants

In the Mayan region there are 8,751 secondary education teachers, to obtain the sample of participants for the research, a probabilistic sampling was carried out, (Jannetti, et. al., 2023) the selection criterion was that the teacher taught secondary level classes in cities located in the Mayan region of the state of Yucatan, Mexico, in urban and rural areas. According to the calculation and a confidence level of 95%, the required sample was 246 teachers, finally the sample was 462 teachers who participated in the research; of which 62.8% were female and 37.2% were male. Of the sample, 229 were found to teach in rural schools and 233 in urban schools.

Regarding the Level of study, the majority of teachers have a bachelor's degree (68%), 26% have a master's degree and 1.5% have a doctorate, while 2.4% of the participants have a technical degree and 1.5% have studied up to high school. In relation to years of teaching service, 40% of teachers are in the range of 6 to 15 years and 33% between 16 and 25 years; while teachers with 5 years of service or less represent 10%, the same percentage as teachers aged 26 to 30 years and 6% are teachers with more than 30 years of service. In relation to the courses they teach, 21% of teachers teach social sciences, 18% science, 14% Spanish, 12% technology, 10% mathematics, 8% English, another 8% physical education and 7% arts; while 2% of teachers reported teaching other courses not listed in the secondary education curriculum.

We also asked about the number of hours per week they teach, 26% of teachers said that they teach between 1 and 10 hours, 40% between 11 and 20 hours, 18% between 21 and 30 hours and 15% said that they teach between 31 and 42 hours per week. Finally, regarding the number of social networks they use, 37% have 2, 26% have 3, 20% use 1, 10% use 4, 5% say they have 5 or more and 2% do not use social networks.

Instrument and data collection

DigCompEdu Check-In (Cabero-Almenara & Palacios-Rodríguez, 2020) was used as the instrument for data collection, which is based on the European Framework for the Digital Competence of Educators (European Commission, 2017). 22 competencies are divided into 6 areas within the instrument. In Table 1, the areas and competencies measured are observed as the distributions of each question per area.

Table 1
Description of the areas and competencies part of the instrument DigCompEdu Check-In.

Area of competence	Competence	Items
1. Professional Engagement	A. Organizational communication B. Professional collaboration C. Reflexive practice D. Digital competence	4
2. Digital resources	A. Selecting B. Creation and modification C. Management, protecting and sharing	3
3. Teaching and Learning	A. Teaching B. Guidance C. Collaborative learning D. Self-regulated learning	4
4. Assessment	A. Assessment strategies B. Analysing evidence C. Feedback and planning	3
5. Empowering learners	A. Accessibility and inclusion B. Differentiation and personalization C. Actively engaging learners	3
6. Facilitate students' digital competence	A. Information and media literacy B. Digital communication and collaboration C. Digital content creation D. Responsible use E. Digital problem solving	5

Source: Cabero-Almenara & Palacios-Rodríguez (2020)

To answer this instrument, a Likert scale is displayed with 5 progressive and organized options according to the following levels:

"No commitment - Partial knowledge - Occasional use - Increasing use - Systematic and comprehensive use"

Each option on this scale is given a score, with 0 = No commitment to 4 = Systematic and comprehensive use. The max score that can be achieved is 88. In Table 2, the classification of the obtained score is presented.

Table 2
Global Ranking System DigCompEdu Check-In

Level of competence	Score (Over 88 points)	Descriptor
Newcomer (A1)	<20 points	Newcomers have very little experience and contact with technology. They need continuous guidance to improve their level of teaching digital competence.
Explorer (A2)	20 to 33 points	Explorers have little contact with educational technology. They have not developed specific strategies to include ICT in the classroom. There is a need for external guidance to improve the level of teaching competence.
Integrator (B1)	34 to 49 points	Integrators experiment with educational technology and reflect on the suitability for different educational contexts.
Expert (B2)	50 to 65 points	Experts use a wide range of educational technologies with confidence and creativity. They seek continuous improvement in their teaching practices.
Leader (C1)	66 to 80 points	Leaders are able to adapt to their needs to the different resources, strategies, and knowledge at their disposal. They are a source of inspiration for other teachers.
Pioneer (C2)	>80 points	Pioneers question contemporary digital and pedagogical practices, of which they are experts. They lead innovation with ICT and are a role model for other teachers.

Source: Cabero-Almenara & Palacios-Rodríguez (2020)

The same scale is used for each area. For that reason, as is observed in Table 3, several adaptations were made by a rule of three that was proportionally adjusted to the cut-off values.

Table 3
Classification system by areas of competence DigCompEdu Check-In.

Area of competence	Level of competence	Score
1. Professional Engagement - 3. Teaching and learning	Newcomer (A1)	4 points
	Explorer (A2)	5 to 7 points
	Integrator (B1)	8 to 10 points
	Expert (B2)	11 to 13 points
	Leader (C1)	14 to 15 points
	Pioneer (C2)	16 points
2. Digital resources - 4. Assessment and feedback - 5. Empowering learners	Newcomer (A1)	3 points
	Explorer (A2)	4 to 5 points
	Integrator (B1)	6 to 7 points
	Expert (B2)	8 to 9 points
	Leader (C1)	10 to 11 points
	Pioneer (C2)	12 points
6. Facilitate students' digital competence	Newcomer (A1)	5 to 6 points
	Explorer (A2)	7 to 8 points
	Integrator (B1)	9 to 12 points
	Expert (B2)	13 to 16 points
	Leader (C1)	17 to 19 points
	Pioneer (C2)	20 points

Source: Cabero-Almenara & Palacios-Rodríguez (2020)

Regarding the reliability and validity, similar studies, that had used this instrument, confirmed through internal consistency testing an α of .91 (Mourad et al., 2018), and validated by structural equations (Martín et al., 2022); In the case of reliability, Cabero, et. al. (2020) concluded that this instrument was the best valued to assess digital competences after performing an analysis of seven digital competence frameworks. On the other hand, the European Commission (2017) mentions that this instrument can be used for educators of any educational level.

Although this instrument is focused on measuring the digital skills required in European teachers, the areas it measures are similar for teachers in Mexico, in addition to the fact that the Mexican Digital Literacy program has DigComp Edu as its main reference. Therefore, based on the reliability and validity analyzes, this instrument was chosen to be administered to the participants of this research. To answer the instrument, teachers were sent the online link via Google Forms and 100% of the participating teachers answered.

Data Analysis

Data analysis was done using the mean, standard deviation, frequencies, percentages; overall rankings and rankings for each of the competency areas were also obtained. Moreover, statistical analyses were performed to compare the scores between urban and rural teachers using the t-test for independent samples to identify differences between

the two groups. The Kruskal-Wallis test was used for the differences between the competence areas of teachers in both areas.

Additionally, the scores obtained by competence areas were compared with other socioeconomic variables such as area, seniority, number of social networks used, level of studies, among others, all with a confidence level of 95%.

McDonald's Omega index (Hancock and Ji An, 2020) and Cronbach's Alpha were also obtained in order to confirm the reliability of the instrument. The statistical software SPSS version 25, Jamovi 2.2.5 (www.jamovi.org) and JASP (https://jasp-stats.org/) were used for the analyses.

Ethical considerations

All teachers were asked for permission to participate in the research, the purpose of the research, the characteristics of the instrument and that their personal data would be kept confidential. The educational authorities of the schools where the participating teachers work were also guaranteed to omit data identifying these schools, such as their name, location, or Work Centre Code (CCT in spanish).

FINDINGS

Reliability of the instrument

Concerning internal consistency, it is observed that the competency areas and the total instrument have indices above .80; the total of the instrument was α=.886 and ω=.889, which confirms the reliability of the DigiComp Check-in, which is why it is considered an adequate and pertinent instrument for the investigation.

Global competency levels

Regarding the competence levels of the teachers who participated in the research (n=462), the data presented in Table 4 were obtained globally.

Table 4
Global competence levels of teachers.

Nivel	n	%
Newcomer (A1)	9	1.9
Explorer (A2)	83	18.0
Integrator (B1)	209	45.2
Expert (B2)	129	27.9
Leader (C1)	29	6.3
Pioneer (C2)	3	0.6

Source: Self-Made

As can be seen, the majority of teachers are located at levels B1 and B2 according to the global classification: 45.2% have the Integrator level (B1), followed by the Expert level (B2) with 27.9%, in the case for the other levels, the scores and percentages were lower.

When analyzing each of the areas of competence, the results presented in Figure 1 were obtained.

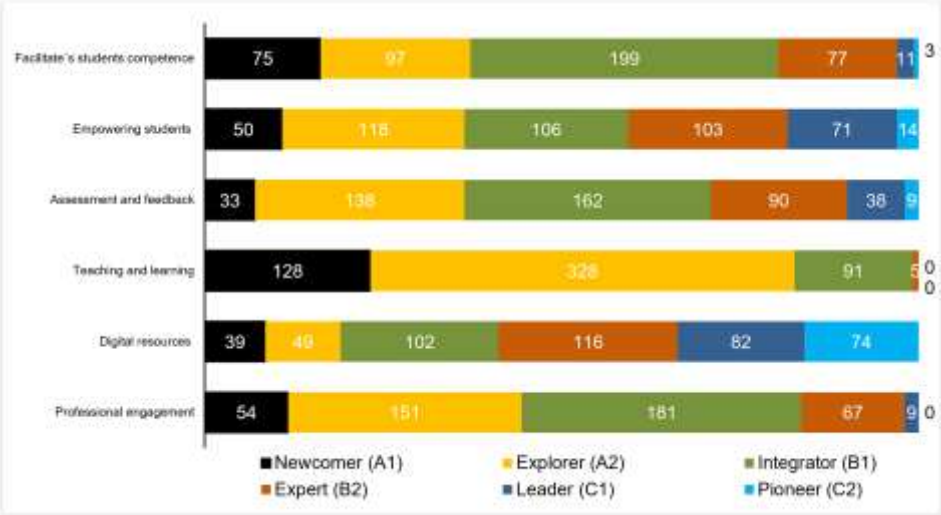


Figure 1
Skill levels of teachers by area
Source: Self-Made

It is observed that five of the six areas of Digicomp Check-In competency levels are mainly concentrated between levels A2 and B1, that is, Explorer and Integrator respectively, while in the area "Digital Resources" the level reached is B2, and there is even a considerable number of teachers who achieved the highest levels (C).

On the other hand, competence and total levels were analysed by variables such as length of service, Level of study, courses taught and number of hours taught. In order to make the data more comprehensible, Table 5 presents the results in the form of means (X) and standard deviation (σ), considering a scale from 0 to 4.

It is observed that the average value achieved by the teaching staff is around 2, which can be considered as a moderate level, which is consistent with the results initially found. It is worth noting that the variable "Level of study" and “Number of social networks” shows a difference in the values obtained, which is an indicator to be considered in the level of digital competence.

Table 5
Teachers' competence levels with other variables

Variables	A		B		C		D		E		F		TOTAL	
	X	σ	X	σ	X	σ	X	σ	X	σ	X	σ	X	σ
Level of study														
High School	1.1	0.3	1.6	0.4	1.6	0.5	1.2	0.6	2.0	1.0	1.4	0.4	1.5	0.2
Technical	1.9	0.6	2.0	0.6	1.9	0.8	2.1	0.4	2.7	0.5	2.1	0.5	2.1	0.4
Bachelor	1.9	0.7	1.9	0.7	2.0	0.8	2.1	0.7	2.2	0.9	1.9	0.7	2.0	0.6
Master	2.2	0.7	2.1	0.7	2.2	0.7	2.3	0.7	2.4	0.9	2.1	0.7	2.2	0.6
PhD	2.4	0.9	2.0	1.1	2.7	1.1	3.3	1.1	3.1	1.1	2.2	1.4	2.6	0.9
Seniority														
5 years or less	2.1	0.7	2.0	0.8	2.0	0.9	2.1	0.7	2.2	1.0	1.8	0.9	2.0	0.7
6 to 15 years	2.0	0.7	2.0	0.7	2.1	0.8	2.2	0.7	2.3	0.9	1.9	0.7	2.1	0.6
16 to 25 years	1.9	0.6	1.9	0.7	2.0	0.8	2.2	0.8	2.3	0.9	1.9	0.7	2.0	0.6
26 to 30 years	2.0	0.7	2.0	0.7	2.1	0.7	2.3	0.8	2.3	0.8	2.1	0.7	2.1	0.6
More than 30 years	1.8	0.8	1.7	0.6	2.0	0.7	1.9	0.6	2.0	0.8	2.0	0.7	1.9	0.6
Courses taught														
Spanish	2.1	0.7	2.1	0.7	2.1	0.7	2.2	0.7	2.4	0.9	2.2	0.7	2.2	0.6
Mathematics	1.9	0.6	1.8	0.7	2.1	0.7	2.4	0.7	2.2	0.9	1.8	0.7	2.0	0.6
Social Sciences	1.9	0.6	1.7	0.6	2.0	0.8	2.1	0.7	2.2	0.9	1.9	0.7	2.0	0.5
Science	1.9	0.7	1.8	0.7	1.9	0.8	2.1	0.7	2.1	1.0	1.8	0.7	1.9	0.6
Arts	2.1	0.8	1.9	0.7	2.0	0.8	2.1	0.8	2.1	1.0	1.9	0.8	2.0	0.7
English	2.1	0.7	2.0	0.6	2.1	0.8	2.2	0.7	2.2	0.8	1.9	0.6	2.1	0.6
Technology	2.1	0.7	2.2	0.7	2.1	0.9	2.1	0.8	2.4	0.8	2.0	0.7	2.2	0.6
Physical education	2.0	0.6	2.0	0.8	2.2	0.8	2.3	0.9	2.4	0.8	2.0	0.7	2.1	0.5
Other	2.4	0.9	2.2	0.7	2.3	1.3	2.2	1.0	2.4	1.0	2.2	1.2	2.3	0.9
Class hours														
1 to 10 hours	1.9	0.6	1.9	0.8	1.9	0.9	2.0	0.7	2.1	0.9	1.8	0.7	2.0	0.6
11 to 20 hours	1.9	0.7	1.9	0.7	2.0	0.8	2.2	0.8	2.4	0.9	1.9	0.8	2.1	0.6
21 to 30 hours	2.1	0.7	1.9	0.7	2.1	0.8	2.3	0.7	2.2	0.9	2.0	0.7	2.1	0.6
31 to 42 hours	2.1	0.6	2.0	0.6	2.2	0.8	2.3	0.7	2.3	0.8	2.1	0.6	2.2	0.6
Number of social networks														
0	1.6	1.2	1.6	1.0	1.9	1.0	2.1	0.9	2.0	0.9	2.0	1.0	1.9	0.9
1	1.7	0.6	1.7	0.6	1.9	0.8	2.0	0.7	2.2	0.9	1.9	0.6	1.9	0.6
2	1.9	0.6	1.9	0.7	2.0	0.8	2.1	0.7	2.1	0.9	1.9	0.7	2.0	0.6
3	2.1	0.6	2.0	0.6	2.1	0.8	2.2	0.7	2.4	0.8	2.0	0.7	2.2	0.6
4	2.4	0.5	2.2	0.7	2.1	0.8	2.4	0.7	2.3	1.0	1.9	0.7	2.2	0.6
5 or more	2.4	0.6	2.3	0.7	2.5	0.6	2.5	0.5	2.9	0.6	2.2	0.7	2.5	0.4

Notes: A. Professional engagement. B. Digital Resources. C. Teaching and Learning. D. Assessment and Feedback. E. Empowering Students. F. Facilitate Students' Competence. Source: Self-Made

Comparison analysis

When contrasting the results of teachers in rural areas with those in urban areas, the following hypotheses were considered:

Ho. There are no differences in the competence levels of teachers from urban areas with those from rural areas in the Mayan region of México.

H1. There are differences in the competence levels of teachers from urban areas with those from rural areas in the Mayan region of México.

Based on these hypotheses, the competency levels of teachers divided into urban and rural areas were obtained, which are presented in Table 6.

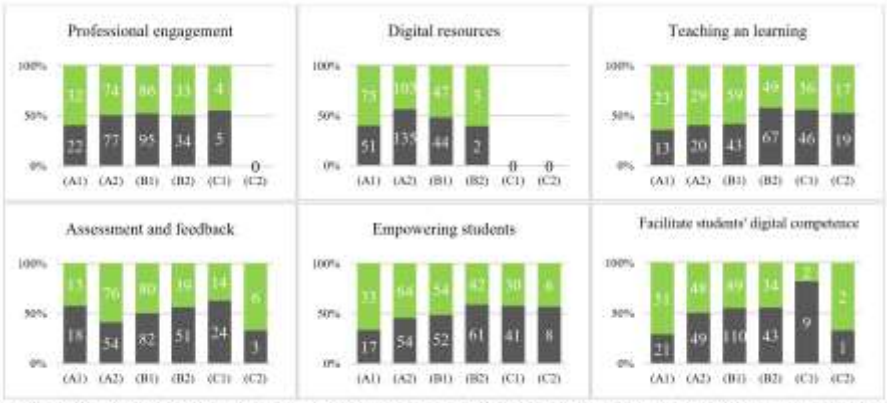
Table 6
Competence level of teachers by area

Level of competences	Area			
	Urban		Rural	
	n	%	n	%
Newcomer (A1)	3	1.29	6	2.62
Explorer (A2)	30	12.88	53	23.14
Integrator (B1)	109	46.78	100	43.67
Expert (B2)	72	30.90	57	24.89
Leader (C1)	17	7.30	12	5.24
Pioneer (C2)	2	0.86	1	0.44

Source: Self-Made

It is observed that the values obtained are similar in the teachers belonging to both areas, however, when doing the hypothesis test it was obtained that there are statistically since ($t=3.44$, $p<.05$, $d=.30$) for what teachers in urban areas have higher levels in areas of competence than teachers in rural areas, consequently, Ho is rejected.

On the other hand, when comparing the competence levels of the teaching staff by zones and by areas, the results presented in Figure 2 were obtained.



Notes: The levels are (A1) Novice, (A2) Explorer, (B1) Integrator, (B2) Expert, (C1) Leader, (C2) Pioneer. ■ n teachers from urban areas, ■ n teachers from rural areas.

Figure 2
Teacher levels are divided by areas and areas of competence

It is observed that the area "Teaching and learning" is the one with the highest levels, between B and C in the teachers of both areas, followed by "Empowering students" and "Facilitating students' digital competence" on the contrary, the "Digital Resources" area is the one with the basic levels in both areas.

When performing the K-W test, it was found that there are differences in the competency levels of "Digital Resources" (X^2=3.191, gl=1, *p*=.005), "Empowering students" (X^2=9.791, gl= 1, *p*=.002) and "Facilitate students' digital competence" (X^2=12.223, gl=1, p=.000) among teachers in urban and rural areas.

Finally, the competence levels of the teaching staff were analyzed according to other variables such as their level of study, seniority, the courses taught, and the number of social networks; therefore, the following scores were obtained, which are included in Table 7.

Table 7
Relation of the areas of competence of the teaching staff with other variables

Variables	A	B	C	D	E	F	TOTAL
Level of study	0.232**	0.146**	0.17**	0.182	0.123	0.096	0.193**
Seniority	-0.065	-0.057	0.008	0.005	-0.013	0.065	0
Courses taught	0.074	0.082	0.033	-0.002	0.023	-0.02	0.05
Class hours	0.074	0.041	0.104*	0.145**	0.051	0.136**	0.121**
Number of social networks	0.322**	0.25**	0.15**	0.172**	0.16**	0.091	0.225**

Note: * p < .05, ** p < .01

According to the data found, the variables of the highest level of studies, class hours, and the number of social networks used are correlated with the areas of competence and the

global level of digital competence of the teaching staff, being the number of social networks a possible indicator that influences the areas of competence, followed by the Level of study.

DISCUSSION

From the results found, it is observed that teachers' competence levels are located between the level of integrator (B1) and expert (B2), as in the research by Barragán, et. al (2021), Boté-Vericad, et. al (2023) and Figueira and Dorotea (2022). According to the description of these competence levels, teachers experiment with technology, use it for their teaching practice, reflect on its use and suitability for a better experience for their students; at these levels, a training programme is not necessarily required, but rather the desire and motivation of teachers to use technological resources, in addition to the undeniable technological transition that teachers have experienced globally (Bhaumik and Priyadarshini, 2020). However, because of the initial and exploratory nature of technology use, the impact on students is limited, even if it is a joint process of technology discovery (Schriver and Harr, 2023).

On the other hand, in the results in competency areas, it was found that the highest levels are in "Teaching and Learning", " Empowering Students" and "Facilitate Students' Competence", which indicates that teachers focus on promoting access to and use of technology, as well as employing teaching and learning strategies. In this aspect, the results are in line with research by Hurtado-Mazeyra et. al. (2022) and Barragán, et. al. (2021).

When contrasting the results of teachers in rural and urban areas, what Tugelbayeva, et. al. (2020) concerning the existence of differences in the level of digital competence, however, the results do not allow affirming whether these differences are due to the existence of social factors such as marginalization or the few opportunities for professional development. However, it was found that there is a correlation with other variables such as highest level of studies, class hours, and the number of social networks used with the level of digital competence and their competence areas (Afandi, et. al., 2023).

CONCLUSIONS

Based on the results found and according to the DigCompEdu scale, the level of digital competence of teachers in the Mayan region of Mexico is considered intermediate, between the Integrator (B1) and Expert (B2) levels, which indicates that teachers have the skills to experiment with technological resources in their teaching practice, reflect on their suitability for different contexts, use a wide range of technology for education, and seek to improve their teaching practices.

It was also possible to identify that teachers have Explorer (A2) and Integrator (B1) levels in five of the six areas that make up the DigcompEdu Check; although these levels are considered basic, it is considered that teachers are in a transition to integrate technologies, probably due to factors such as the level of study, class hours, and the number of social networks they use.

By identifying whether there are significant differences in the level of digital competence of teachers according to the area where they are located, it is established that there are differences, especially when the comparison is made by areas of competence. The area of "Teaching and learning" stands out since it is the one with high levels in the teaching staff of both areas, which suggests that the teaching staff have developed skills in teaching classes using technology.

RECOMMENDATIONS AND SUGGESTIONS

The information obtained in this research allows defining some actions to be carried out for the following stages, such as using in-depth interviews with teachers, expanding the number of participants to make a census; also developing and implementing maximum performance tests to check if teachers really have the level of digital competence that has been found in this research. Another action is to work with students using similar techniques and instruments in order to have a complete picture of the level of digital competence in the Mayan zone in Mexico.

LIMITATIONS OF THE RESEARCH

This is the first stage of a macro-project to identify the level of digital competence of secondary school teachers in the Mayan region of Mexico. Therefore, in this research a first enquiry was carried out using a standardised questionnaire in order to have an estimation of a representative sample of the total number of secondary school teachers about their digital competences. On the other hand, the participation of the teaching staff was voluntary, which could have generated some bias in the responses; however, the number of teachers was balanced, both by area and by sex. On the other hand, it is unknown if the teachers who teach classes live in the same area.

Finally, as discussed, the DigiCompEdu Check-In instrument was designed to measure the competence level of teachers from different environments since it is based on the Common European Framework of Digital Competence. However, national digital literacy and teacher training programs with the use of the technologies are based on the Framework.

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