

Digital competence of upper secondary school teachers in Havana

Competencia digital docente del profesorado de la educación media superior en La Habana

Evelyn Rabí Isla¹  , Alberto Antonio Carballo Soca¹ 

¹Facultad de Psicología, Universidad de La Habana. Cuba.

Cite as

Rabí Isla E, Carballo Soca AA. Digital competence of upper secondary school teachers in Havana. SAP Netnography. 2025; 3:122. <https://doi.org/10.62486/net2025122>

Publication History

Submitted: 11-10-2024

Revised: 01-01-2025

Accepted: 17-03-2025

Published: 18-03-2025

Corresponding Author

Evelyn Rabí Isla 

ABSTRACT

Technological changes in society have made it necessary to transform various sectors. The educational sphere of the 21st century requires the incorporation of digital technologies into teaching and learning processes. In the Cuban context, the incorporation of technologies into education has been a growing objective. Therefore, evaluating teachers' digital competence has become a fundamental task. The research has a representative sample of upper secondary school teachers in Havana, covering the following areas of teaching: pedagogy, professional technical education, and pre-university education. The data were collected using the Digital Competence Scale for Teachers proposed by a study, with a quantitative approach. This was done in order to characterize teachers' digital competence and compare it with other sociodemographic or contextual variables. The study proposes a detailed theoretical review in a national context where this topic has been vaguely studied. It also provides useful and novel results. In this sense, it was found that the five competency areas studied indicate that upper secondary school teachers in Havana have a second-level (basic) competency level. Furthermore, gender does not have a significant influence on any of the competencies studied, while the type of teaching and work experience do influence some of them. Finally, age, access to digital devices and resources, and the frequency of social media use condition the development of various digital teaching competencies.

Keywords: Digital Teaching Competency; Upper Secondary Education; Assessment.

RESUMEN

Los cambios tecnológicos en la sociedad han impuesto la necesidad de transformar diversos sectores. El ámbito educativo del siglo exige la incorporación de las tecnologías digitales en los procesos de enseñanza-aprendizaje. En el contexto cubano, la incorporación de tecnologías en la educación ha sido un objetivo creciente. Por ello, evaluar la competencia digital docente se torna una tarea fundamental. La investigación cuenta con una muestra representativa de docentes de Educación Media Superior de La Habana, abarcando las enseñanzas: pedagógica, técnica profesional y preuniversitaria. Los datos se recopilieron utilizando la Escala de Competencia Digital para Docentes propuesta por un estudio, con un enfoque cuantitativo. Para caracterizar la competencia digital docente, y compararla con otras variables sociodemográficas o contextuales. El estudio propone una revisión teórica detallada, en un contexto nacional, donde ha sido vagamente estudiado. Asimismo, aporta resultados útiles y novedosos. En este sentido, se detecta que, las cinco áreas competenciales estudiadas indican que los docentes de Educación Media Superior, en La Habana, poseen un estadio competencial de segundo nivel (básico). Además, el género no ejerce influencia significativa en ninguna de las competencias estudiadas, mientras que el tipo de enseñanza y la experiencia laboral sí influyen en algunas de estas; por último, la edad, el acceso a dispositivos recursos digitales, y la frecuencia de uso de redes sociales condicionan el desarrollo de varias competencias digitales docentes.

Palabras clave: Competencia Digital Docente; Educación Media Superior; Evaluación.

INTRODUCTION

Rapid advances in technology have transformed the way we interact with our environment. The internet, the optimization of digital tools, and Specific events have catalyzed their prominence. The lockdown caused by the COVID-19 pandemic in 2020 is one such event. In Cuba, it introduced the digital factor into the lives of almost everyone as an indispensable element. It was an alternative solution for many spaces.^(1,2,3)

The education sector, in particular, has witnessed a significant shift towards the integration of digital tools and resources into teaching and learning practices. In Cuba, the government has emphasized the importance of developing a knowledge-based economy, recognizing the crucial role that education plays in driving economic growth and social development. As a result, there is a growing need for teachers in higher secondary education institutions to possess digital skills.^(4,5,6)

The concept of digital competence has gained significant attention in recent years, as it is a key factor in determining the quality of education in the 21st century. Digital competence refers to the ability to use digital tools, resources, and networks to achieve specific goals, solve problems, and communicate effectively in a digital environment. In the context of education, digital competence is essential for teachers to design and deliver engaging and effective learning experiences, facilitate student-centered learning, and stay up to date with the latest developments in their field.^(7,8,9)

Using a quantitative approach, two specific objectives were pursued: to characterize teachers' digital competence and to compare its status with other sociodemographic factors and contextual variables. A representative sample of the universe studied was used: teachers working in upper secondary schools in Havana. Schools from the three types of education that comprise it (pedagogical, technical-professional, and pre-university) were visited in municipalities in the capital. The data were obtained using the scale proposed by García Arnedo⁽¹⁾ to assess teachers' digital competence.

DEVELOPMENT

Through the purpose of evaluating the digital competence of upper secondary school teachers in Havana, several findings have been reached. First, the results reveal that the subjects surveyed are familiar with ICTs, both in the personal and academic dimensions. Personal and academic dimensions. However, this familiarity is not sufficient to speak of digitally competent teachers who are prepared to face the new developments proposed by digital education. The five competency areas studied reflect similar values and indicate incipient competency development. The research data reveal that teachers have a basic level of competency, with an average of A2, according to the scale used for the evaluation.⁽¹⁰⁾

It is valid to question the level and quality of information that the subjects possess on the topic at hand. Teachers claim to be aware of the risks of digital technologies to physical and mental health and the vulnerability of their digital devices. However, observations suggest that not all of them base their position on accurate and concrete information.^(11,12)

It was also observed that Havana teachers have heterogeneous attitudes toward digital technologies and digital education. Through observations, various attitudes toward the use of digital technologies in the educational space were perceived: while some teachers are enthusiastic about them, others highlight their disadvantages over their benefits. This can hurt how teachers interact with ICTs. For example, most teachers do not supervise their students' digital activity, as they believe this to be the correct approach in this situation.^(13,14) It has been observed that, for many, not supervising is synonymous with respecting the privacy of students. While this is true, the absence of supervision or guidance will likely result in students being susceptible to the inappropriate use of ICTs. This highlights the importance of providing educators with adequate information so that they can adequately understand the phenomenon in question. It is assumed that knowledge on the subject not only influences favorable attitudes toward the use and promotion of ICTs, but also the development of skills and abilities.^(15,16,17)

It is noteworthy that there is a favorable opinion about individual improvement and learning through digital technologies, as well as about integrating them occasionally into teaching tasks. In this regard, it has been observed that, although many subjects recognize the benefits of digital technologies and digital education, on several occasions, they do not carry out practices supported.^(18,19,20)

On these technologies. The subjects recognize the ease of assessment using digital resources, yet the vast majority do not implement this practice.

It appears that gender does not influence the development of digital teaching skills in any way. Furthermore, factors such as the type of teaching and work experience influence certain specific skills. On the contrary, age, access to digital devices and the internet, and frequency of social media use are significant factors for a relevant number of digital skills. These three variables influence at least one skill in each area of competence studied.^(21,22,23)

The results show that, of the 22 skills assessed, only two show significant differences between types of teaching, suggesting that education in the country is relatively uniform. Work experience, for its part, does not have a significant influence on the development of skills. However, it was observed that as experience increases, the level of development of the skills analyzed tends to decrease.

These findings allow us to make some inferences for future interventions. For example, strategies designed to change attitudes, involving improvements in teachers' digital competence, should transcend psychosocial factors such as age in some cases. In contrast, in others, it will be essential to take this into account since, as we have seen, it influences a large number of the competencies studied.^(24,25)

It was found that teachers do not take full advantage of the facilities offered by the resources available to them. Observations during fieldwork and various theoretical background information reiterate that access determines the process of acquiring and executing digital teaching skills. However, the results indicate that this aspect influences nine skills. Although it suggests that it is a significant factor, it is not believed to be the determining factor in the current state of skills.^(26,27)

The basic level of competence currently possessed by upper secondary school teachers in Havana is the result of multiple causes. It is considered that internal factors, already mentioned, such as the level of information possessed by individuals and their attitudes and beliefs about digital technologies, significantly condition the development of teachers' digital competences. In addition, teachers tend to limit their digital activity, even when they have favorable opinions about these technologies, probably due to a perception of precariousness in terms of the resources available to them. However, it is clear that this factor does not solely determine the development of digital competence; teachers could also achieve higher levels of competence if they made the most of the opportunities offered by these resources.⁽²⁸⁾

CONCLUSIONS

The results show that, although upper secondary school teachers in Havana operate at a basic level of digital competence—slightly excelling in digital pedagogy but with greater deficiencies in technological interaction—structural and contextual factors condition their development. The absence of gender differences contrasts with the decisive influence of work experience, access to technological resources, and age, suggesting that competency gaps respond to systemic inequalities. The variability according to the type of teaching reinforces the need for differentiated policies that, based on specific diagnoses, prioritize not only teacher training, but also equity in material conditions and the pedagogical integration of technologies into curricula.

FINANCING

None.

CONFLICT OF INTEREST

Authors declare that there is no conflict of interest.

AUTHORSHIP CONTRIBUTION

Conceptualization: Evelyn Rabí Isla, Alberto Antonio Carballo Soca.

Data curation: Evelyn Rabí Isla, Alberto Antonio Carballo Soca.

Formal analysis: Evelyn Rabí Isla, Alberto Antonio Carballo Soca.

Drafting - original draft: Evelyn Rabí Isla, Alberto Antonio Carballo Soca.

Writing - proofreading and editing: Evelyn Rabí Isla, Alberto Antonio Carballo Soca.

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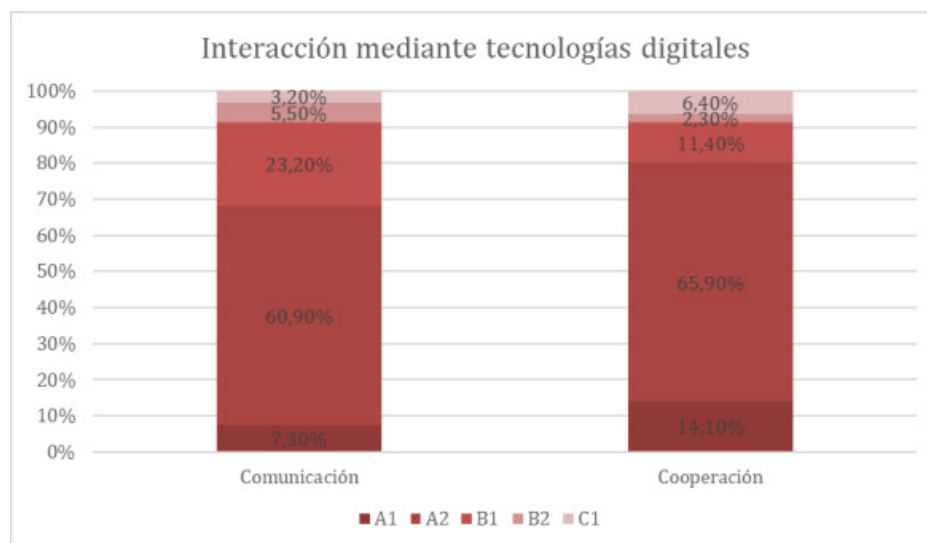
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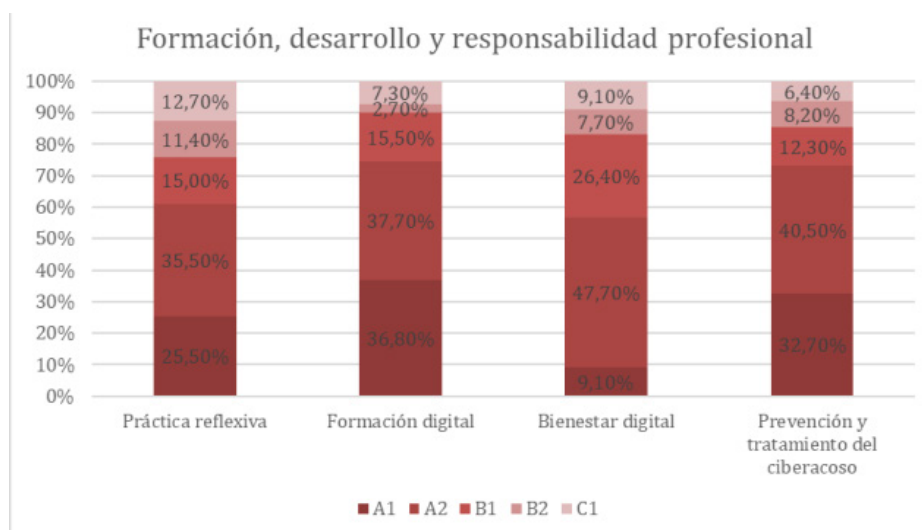
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ANNEXES

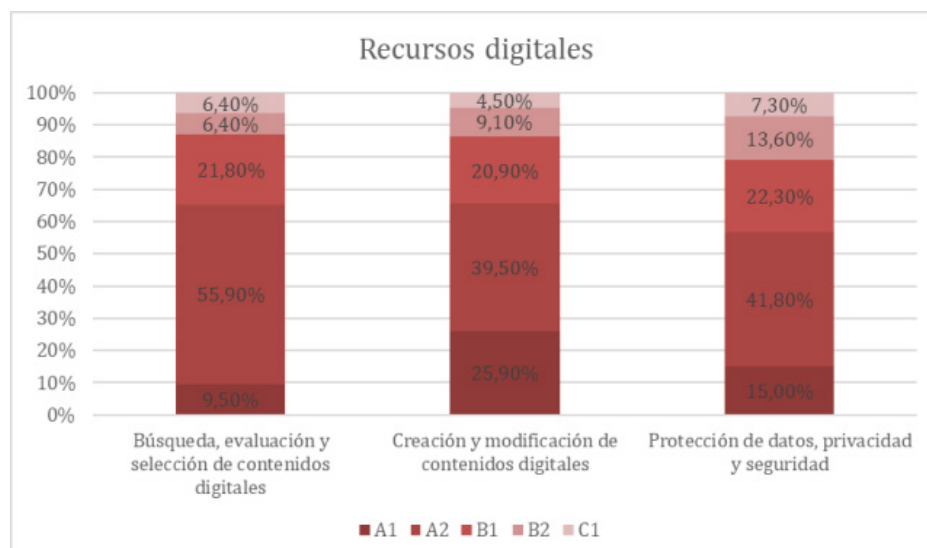
Annexe 1: Average responses in the competency area: Interaction through digital technologies.



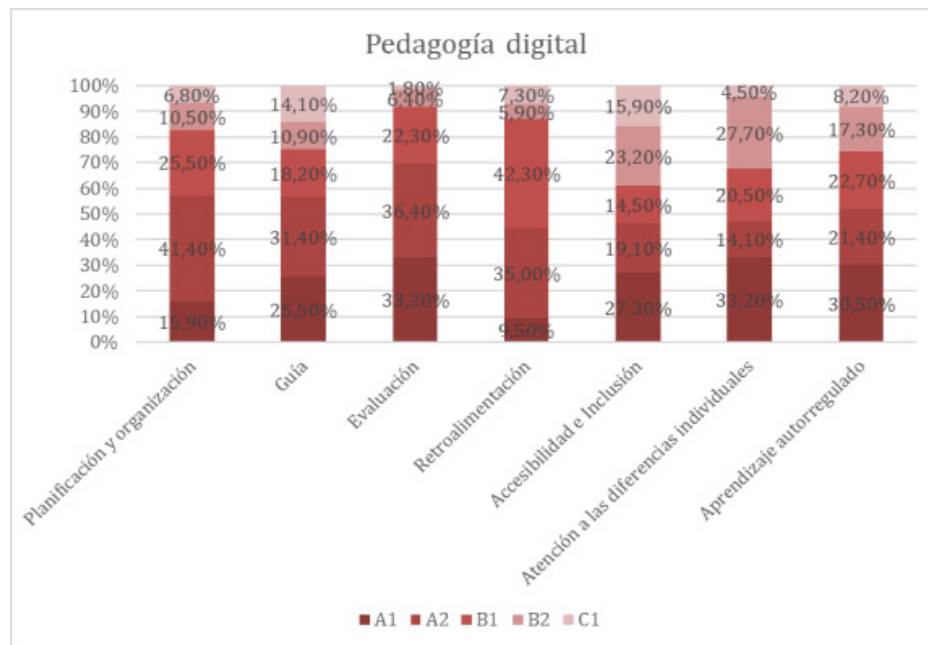
Annexe 2: Average responses in the competency area: Training, development, and professional responsibility.



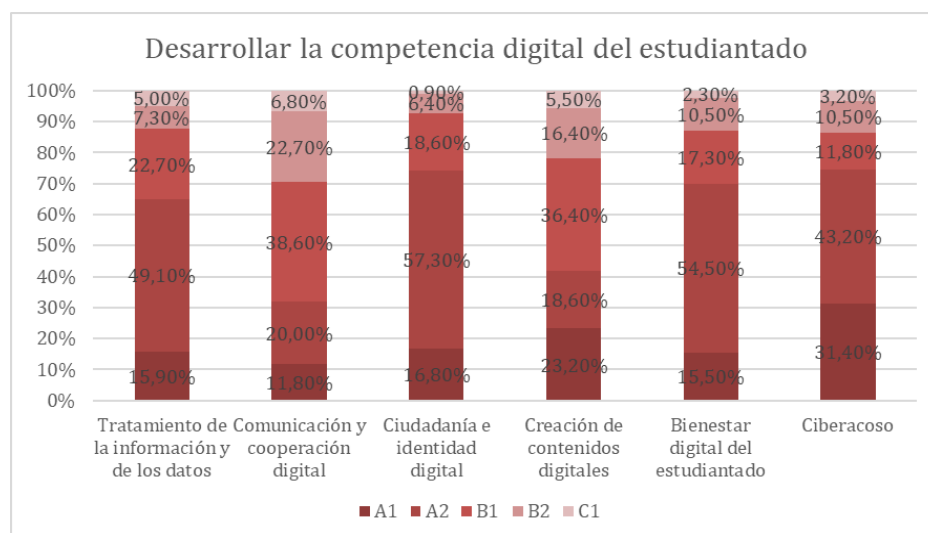
Annexe 3: Average responses for the competency area: Digital resources.



Annexe 4: Average responses for the competency area: Digital pedagogy.



Annexe 5: Average responses in the competency area: developing students' digital competence.



Annexe 6: Correlation of competencies by type of education

Competency	Asymptotic sig.	Kruskal Wallis H
Communication	0,33	2,216
Cooperation	0,89	0,232
Reflective practice	0,154	3,741
Digital training	0,793	0,464
Digital well-being	0,318	2,289
Prevention and treatment of cyberbullying	0,276	2,572
Search, evaluation, and selection of digital content	0,242	2,837
Creation and modification of digital content	0,495	1,406
Data protection, privacy, and security	0,527	1,28
Content planning and organization	0,288	2,492
Guidance	0,339	2,164

Evaluation	0,039	6,469
Feedback	0,392	1,875
Accessibility and inclusion	0,336	2,181
Attention to individual differences	0,686	0,755
Self-regulated learning	0,996	0,008
Information and data processing	0,783	0,49
Digital communication and cooperation	0,015	8,337
Citizenship and digital identity	0,919	0,168
Digital content creation	0,796	0,456
Digital well-being of students	0,73	0,631
Cyberbullying	0,051	5,965

Annexe 7: Correlation of competencies in terms of gender

Competency	Asymptotic p-value	Mann-Whitney U
Communication	0,96	6029
Cooperation	0,989	6044
Reflective practice	0,627	5828
Digital training	0,187	5460,5
Digital well-being	0,087	5295,5
Prevention and treatment of cyberbullying	0,604	5818
Search, evaluation, and selection of digital content	0,688	5878,5
Creation and modification of digital content	0,843	5960,5
Data protection, privacy, and security	0,261	5543
Content planning and organization	0,126	5361
Guidance	0,195	5455
Evaluation	0,415	5683,5
Feedback	0,516	5762
Accessibility and inclusion	0,295	5567
Attention to individual differences	0,547	5775,5
Self-regulated learning	0,856	5966,5
Information and data processing	0,277	5572,5
Digital communication and cooperation	0,231	5506,5
Citizenship and digital identity	0,166	5464,5
Digital content creation	0,147	5389,5
Digital well-being of students	0,728	5900
Cyberbullying	0,967	6031

Annexe 8: Correlation of skills by age

Competency	Asymptotic significance	Kruskal-Wallis H
Communication	0	18,427
Cooperation	0,23	4,311
Reflective practice	0,007	12,253
Digital training	0,009	11,552
Digital wellbeing	0,008	11,801
Prevention and treatment of cyberbullying	0,011	11,129
Searching, evaluating, and selecting digital content	0	18,269
Creation and modification of digital content	0	18,303
Data protection, privacy, and security	0,002	14,566

Content planning and organization	0,085	6,631
Guide	0,118	5,864
Evaluation	0,002	15,285
Feedback	0,005	12,742
Accessibility and inclusion	0,091	6,47
Attention to individual differences	0,073	6,976
Self-regulated learning	0	19,888
Information and data processing	0,013	10,76
Digital communication and cooperation	0,003	13,946
Citizenship and digital identity	0,004	13,369
Digital content creation	0,001	17,723
Digital well-being of students	0,008	11,886
Cyberbullying	0,035	8,612

Annexe 9: Correlation of skills in terms of years of work experience

Competency	Asymptotic significance	Kruskal-Wallis H
Communication	0,023	13,091
Cooperation	0,461	4,643
Reflective practice	0,277	6,318
Digital training	0,028	12,57
Digital wellbeing	0,413	5,023
Prevention and treatment of cyberbullying	0,351	5,566
Search, evaluation, and selection of digital content	0,014	14,235
Creation and modification of digital content	0,009	15,307
Data protection, privacy, and security	0,065	10,389
Content planning and organization	0,665	3,228
Guide	0,652	3,309
Evaluation	0,195	7,37
Feedback	0,497	4,377
Accessibility and inclusion	0,092	9,451
Attention to individual differences	0,857	1,943
Self-regulated learning	0,089	9,562
Information and data processing	0,082	9,755
Digital communication and cooperation	0,106	9,082
Citizenship and digital identity	0,069	10,224
Digital content creation	0,101	9,221
Digital well-being of students	0,054	10,889
Cyberbullying	0,792	2,395

Annexe 10: Correlation of skills in terms of access to digital technologies

Competency	Asymptotic significance	Chi-square
Communication	0,000	78,822
Cooperation	0,251	32,592
Reflective practice	0,003	53,291
Digital training	0,073	39,52
Digital well-being	0,786	21,89
Prevention and treatment of cyberbullying	0,050	41,373
Search, evaluation, and selection of digital content	0,000	60,343

Creation and modification of digital content	0,093	38,302
Data protection, privacy, and security	0,041	42,23
Content planning and organization	0,006	50,509
Guide	0,201	34,002
Evaluation	0,099	37,95
Feedback	0,143	35,979
Accessibility and inclusion	0,060	40,438
Attention to individual differences	0,199	34,063
Self-regulated learning	0,010	48,355
Information and data processing	0,480	27,716
Digital communication and cooperation	0,438	28,501
Citizenship and digital identity	0,280	31,865
Digital content creation	0,438c	28,503
Digital well-being of students	0,006	50,168
Cyberbullying	0,024	44,61

Annexe 11: Correlation of skills in terms of frequency of social media use

Competency	Asymptotic significance	Kruskal-Wallis H
Communication	0	28,941
Cooperation	0,002	14,661
Reflective practice	0	21,245
Digital training	0	28,399
Digital wellbeing	0,249	4,12
Prevention and treatment of cyberbullying	0,008	11,88
Search, evaluation, and selection of digital content	0	21,843
Creation and modification of digital content	0,007	12,09
Data protection, privacy, and security	0,018	10,049
Content planning and organization	0	21,626
Guide	0	26,343
Rating	0	19,919
Feedback	0	21,057
Accessibility and inclusion	0	20,246
Attention to individual differences	0	19,545
Self-regulated learning	0,009	11,652
Information and data processing	0,007	12,18
Digital communication and cooperation	0	25,514
Citizenship and digital identity	0	19,211
Digital content creation	0	20,655
Digital well-being of students	0	19,701
Cyberbullying	0,024	9,46