

Scientific  
Journal of  
**Applied  
Social and  
Clinical  
Science**

## IMPORTANCE OF INDICATORS TO IDENTIFY AREAS OF OPPORTUNITY IN THE DOMAIN OF DIGITAL SKILLS

---

**María Patricia Torres Magaña**

Professor: ``Tecnológico Nacional de México/  
Instituto Tecnológico de Villahermosa``  
Department of Economic-Administrative  
Sciences,  
Villahermosa, Tabasco

**Manuel Antonio Rodríguez Magaña**

Esp. Inf. ``Tecnológico Nacional de México/  
Instituto Tecnológico de Villahermosa``  
Department of Computer Systems  
Engineering,  
Villahermosa, Tabasco

**Ana Laura Fernández Mena**

M.C. ``Tecnológico Nacional de México/  
Instituto Tecnológico de Villahermosa``  
Department of Basic Sciences  
Villahermosa, Tabasco

**Laura Rodríguez Fernández**

M.C.E. ``Tecnológico Nacional de México/  
Instituto Tecnológico de Villahermosa``  
Department of Economic-Administrative  
Sciences,  
Villahermosa, Tabasco

**Manuel Antonio Rodríguez Fernández**

Independent consultant

All content in this magazine is licensed under a Creative Commons Attribution License. Attribution-Non-Commercial-Non-Derivatives 4.0 International (CC BY-NC-ND 4.0).



**Araceli Pérez Reyes**

M.C. *Tecnológico Nacional de México/*

*Instituto Tecnológico de Villahermosa*

Department of Computer Systems

Engineering

Villahermosa, Tabasco

**Abstract:** Digital skills are a fundamental skill that students must acquire to be successful in the world of work. Indicators are tools that allow us to measure the level of digital competence of students and, therefore, identify areas of opportunity on which efforts must be focused to improve education. Indicators are quantitative or qualitative measures that allow evaluating the performance of students in different areas. In the case of digital competence, indicators can measure the level of knowledge of students in the use of digital tools, their ability to solve problems using technology, their ability to communicate online and their ability to work in a team using digital tools. The importance of indicators lies in the fact that they allow teachers and administrators to identify areas of opportunity in which students need to improve. In addition, the indicators allow teachers and administrators to evaluate the impact of teaching strategies on the level of digital competence of students. It must be taken into account that indicators are fundamental tools to improve education in terms of digital skills. They allow teachers and administrators to identify areas of opportunity in which students need to improve and evaluate the impact of teaching strategies on the level of digital competence of students.

**Keywords:** indicators, opportunity areas, digital skills, higher education.

## INTRODUCTION

In the proposal of the Hybrid Adaptive Learning Model in higher education [15,16] considers the preponderant need to face the challenge of adapting to the digital era. The growing expectation of new technologies and their multiple applications have produced transcendent repercussions in all spheres of society [1]. Specifically, in the aspect of higher education, the demands are more than significant [2]. The main objective of

this article is to analyze the importance of indicators for identifying areas of opportunity in the domain of digital skills.

Digital skills have become crucial for participating in society, including employment and lifelong learning opportunities [1]. However, in order to make the most of these opportunities, it is necessary to identify and address areas of opportunity in the domain of these competencies. This is where indicators play a crucial role.

In the current framework, it is essential to recognize the crucial role of indicators as essential tools to discern and take advantage of opportunities in the field of digital skills. These indicators, whether quantitative or qualitative in nature, play a crucial role in providing an accurate assessment of progress towards specific goals and objectives in the digital sphere.

When referring to indicators, we are referring to concrete measures that allow not only to quantify progress, but also to understand in detail the quality and effectiveness of the efforts made. These indicators can range from numerical metrics, such as technology adoption rates, to qualitative assessments that consider users' perception and experience in the digital environment.

In this sense, indicators act as beacons that illuminate specific areas of opportunity. They facilitate the identification of strengths and weaknesses, which in turn allows organizations and professionals to direct their efforts towards the optimal development of digital competencies. Furthermore, by adopting a comprehensive approach that considers both quantitative and qualitative aspects, a holistic vision is obtained that favors informed and strategic decision-making.

At this point, indicators stand as invaluable allies in the digital skills landscape, providing a reliable compass to navigate the changing digital environment and maximize progress

towards specific goals. In the educational field, indicators can be used to measure the level of digital competence of students, teachers and administrators, and to identify areas in which greater attention and development is required [6]. Indicators can guide efforts to improve digital competencies, both at the individual and institutional levels.

We will focus on the importance of indicators to identify areas of opportunity in digital skills, highlighting the importance of indicators for their identification and analysis. Various research and studies on the topic will be considered, in order to provide a complete and well-founded vision.

Teacher training becomes a key factor in the insertion of Information and Communication Technologies (ICT) in the teaching and learning processes, in educational innovation with the use of ICT, and the development of digital competence [3]. This last aspect is essential for proper integration in higher education [3].

## **TERMINOLOGICAL AND CONCEPTUAL PRECISIONS**

Indicators are fundamental tools for identifying areas of opportunity in the domain of digital skills. Below, terminological and conceptual details of the indicators for competencies are presented, with the aim of analyzing their importance in the evaluation of quality in educational systems.

In the Lazarsfeld methodological tradition, the term indicator is part of the operationalization process: variables, dimensions and indicators [18]. In the educational field, indicators are used to measure student performance in different areas of knowledge, including digital skills [19]. Indicators are a useful tool for identifying areas of opportunity in student learning, which allows teachers and administrators to design more effective teaching strategies.

The evaluation of digital skills is a topic of great relevance in current education. The indicators allow measuring the level of competence of students in different areas, such as the use of digital tools, problem solving, communication and collaboration [20]. The identification of areas of opportunity in these competencies is essential for the design of study plans and the implementation of teaching strategies that allow students to develop digital skills effectively.

Indicators are fundamental tools for identifying areas of opportunity in the domain of digital skills. Its use allows teachers and administrators to design more effective teaching strategies and improve the quality of educational systems. It is important to continue researching and developing new indicators that allow us to more accurately measure the level of competence of students in different areas of knowledge.

## **DIGITAL INNOVATION AND THE NEW PILLARS IN EDUCATION**

Education is a constantly evolving field, and technology has played a critical role in transforming the way it is delivered and received. Digital innovation has demonstrated its capacity to complement, enrich and transform education, and has the potential to accelerate progress towards achieving Sustainable Development Goal 4 (SDG 4) for education, as well as to transform modes of universal access. to learning [4,5].

Identifying areas of opportunity in the domain of digital competencies is essential to ensure that students are prepared to face the challenges of the digital world. Digital competence refers to the ability to use digital technologies effectively and responsibly to solve problems, communicate, create and share information, and collaborate with others [7]. Digital competence is essential for success in education and in today's labor market, and

is a prerequisite for active participation in the digital society [8].

The identification of areas of opportunity in the domain of digital competencies is also important for the development of effective educational policies and programs. Indicators can be used to evaluate the effectiveness of existing policies and programs, and to identify areas where further investment and development is required [9]. Digital competence is a prerequisite for active participation in the digital society.

Digital innovation has demonstrated its ability to transform the ways of universal access to learning. Digital technologies have grown from stand-alone projects to networks of tools and programs that link people and things around the world, and help address personal and global challenges.

In the modern world, education faces a number of challenges, such as lack of access to education, lack of resources and lack of digital skills. Digital innovation can help address these challenges and improve the quality of education. Digital education has become an important tool for education as it allows students to access online education and learn at their own pace.

Digital education can also help students develop digital skills, which are increasingly important in today's working world. Digital skills include the ability to use digital tools, the ability to communicate online, and the ability to work in a team online. Digital education can help students develop these skills and prepare them for the world of work.

Indicators in the domain of digital competencies are essential for the success of digital education. Indicators are important tools for identifying areas of opportunity in the domain of digital competencies. Indicators can help educators identify areas where students need the most help and develop instructional plans to address these areas [10].

Indicators can also help educators evaluate the success of their teaching plans and make adjustments as necessary. Indicators may include the number of students who have completed an online course, the number of students who have improved their digital skills, and the number of students who have found work after completing an online course [5].

It must be considered that digital innovation is an important tool for education and can help address the challenges facing education today. The identification of areas of opportunity in the domain of digital competencies is essential for the success of digital education and indicators are important tools for the identification of these areas [10].

## **IMPORTANCE OF INDICATORS IN DIGITAL COMPETENCES**

Continuous evolution in the fields of education and technology have changed the way knowledge and information is accessed, shared and produced. The Covid-19 pandemic has significantly increased the digital transmission of knowledge, making digital skills crucial for participating in society, including employment and lifelong learning opportunities. Our main interest is to analyze the importance of indicators for identifying areas of opportunity in the domain of digital competencies in education.

Digital competencies are skills that allow people to use technology effectively and efficiently. These skills are essential for everyday life, work and learning. UNESCO defines digital competences as “the set of knowledge, skills, attitudes and values necessary for the effective use of digital technologies and active participation in society” [1].

Identifying areas of opportunity in the domain of digital competencies is important because it allows educators and educational administrators to develop training and

teaching programs that address the specific needs of students. Indicators can also help students identify their own areas of opportunity and work on them effectively.

A study conducted by UNESCO identified five key areas of digital competencies: information literacy, content creation, communication and collaboration, security and problem solving [1]. These areas are essential for the effective use of technology in everyday life, work and learning.

Information literacy refers to the ability to search, evaluate and use information critically and responsibly using digital tools. Content creation refers to the ability to create digital content using digital tools. Communication and collaboration refers to the ability to communicate and collaborate effectively using digital tools. Security refers to the ability to protect personal information and privacy online. Problem solving refers to the ability to solve digital problems and discover new ways to leverage technology.

The indicators can help educators and education administrators assess the skill level of students in these key areas of digital competencies. For example, indicators may include the ability to search for information online effectively, the ability to create digital content using digital tools, the ability to communicate and collaborate effectively using digital tools, the ability to protect personal information, and online privacy, and the ability to solve digital problems.

The identification of areas of opportunity in the domain of digital competencies is crucial for the development of effective digital skills. Indicators are useful tools to identify these areas of opportunity and assess the skill level of students in key areas of digital competencies. Educators and educational administrators can use this information to develop training and instructional initiatives designed to specifically address the particular

needs of students. and allow them to use technology effectively and efficiently.

## **INTERPRETATIVE FRAMES**

Nowadays, the use of digital technologies in education is increasingly common. However, the lack of digital skills among teachers and administrators can be an obstacle to its effective implementation. Therefore, it is important to identify areas of opportunity in digital skills to improve the quality of education.

Indicators are valuable tools to discover aspects that can be improved in digital skills. These indicators constitute measures, either quantitative or qualitative, that are used to assess the performance of educators and administrative staff when using digital technologies. These indicators can be applied to identify opportunities for improvement in teaching, learning, school management, continuing professional development, and the alignment of classroom practices with institutional and/or national priorities, as established in policies. corresponding.

UNESCO has developed the ICT Competency Framework for Teachers (ICT-CFT) Version 3, which provides a framework from which digital competencies can be identified and used to support ICT in the guidelines. of educational policy, the design of the curriculum and prior and continuous training, as well as supporting the development of educators' capacities to adopt and use technology appropriately in their professional practice [13]. The ICT-CFT framework encompasses digital competencies, presented at three levels of greater sophistication that are required for: Teaching and learning, School administration, Continuing professional development, Harmonization of classroom practice with institutional and/or national priorities as established in policies. The implementation of ICT-CFT requires a strong enabling environment, including strong

leadership from government, those responsible for teacher education and the professional development of in-service teachers, and heads of studies and school principals. The UNESCO ICT-CFT framework identifies 18 ICT competencies that teachers must aspire to and subdivides them into 64 specific objectives.

Competencies range from encouraging teachers to understand national priorities identified in national ICT in education policies, how ICT can support the curriculum, assessment strategies, pedagogy, school organization and classes, administration and continuing professional development.

In a recent study, areas of opportunity were identified in the digital competencies of teachers and administrators in education. The results of the study indicate that teachers and administrators have a lack of digital competencies in areas such as creating digital content, evaluating the quality of digital resources, information management and online communication [17]. These areas of opportunity can be addressed through the use of indicators to evaluate the performance of teachers and administrators in these areas.

It is essential to recognize and establish that indicators play a crucial role as valuable tools to detect areas of improvement in the digital competencies of teachers and administrative staff in the educational field. The UNESCO ICT Competency Framework for Teachers provides a framework for identifying and applying digital competencies to support Information and Communication Technologies (ICT) in educational policy guidelines, curriculum design, as well as in initial and continuous training. This framework also supports the development of skills among educators to adopt and use technology effectively in their professional practice.

Indicators become key tools to identify

opportunities for improvement in various areas, such as teaching and learning, school management, continuing professional development, and the alignment of classroom practices with institutional and/or national priorities, as established in educational policies. Its use contributes to a systematic and strategic approach that facilitates the optimization of educational practices in accordance with the specific needs and goals outlined in current educational policies.

## **DISCUSSION AND ANALYSIS**

In the constant evolution of the educational process, adapting to the demands of society and technological progress becomes an imperative. Today, digital competence stands as an essential skill that students must cultivate to thrive in the workplace. In this context, indicators emerge as crucial tools that make it possible to measure the level of digital competence of students, outlining specific areas that require attention and improvements.

These indicators, whether quantitative or qualitative, provide a comprehensive assessment of student performance in various spheres. In the area of digital competence, these indicators can cover the measurement of knowledge in the use of digital tools, the ability to solve problems using technology, online communication skills and the ability to work in a team using digital media.

The relevance of the indicators lies in the capacity they give to teachers and administrators to identify areas of opportunity that demand improvements. For example, if indicators reveal difficulties in online communication by students, educators can direct their efforts to strengthen these skills through the use of digital tools.

Additionally, the indicators empower teachers and administrators to evaluate the impact of teaching strategies on the level of

digital competence of students. If indicators show improvements after implementing a specific strategy, educators can continue to apply it in the future, thus contributing to continuous improvement.

In summary, the indicators emerge as fundamental pillars for the constant improvement of education in digital competence. Its effective use by teachers and administrators stands as a determining factor to optimize the preparation of students, adequately equipping them for the challenges of today's world of work.

Currently, the effective integration of indicators in the educational field is not only limited to their diagnostic and evaluation function, but also opens the door to a more holistic approach in the development of digital skills. The interactive dynamic between indicators and teaching methods promotes a constant symbiosis, where the feedback provided by the former drives the evolution and adaptation of the latter.

By considering measuring knowledge in the use of digital tools, indicators can reveal not only students' technical competence, but also their ability to practically apply these skills in real-world situations. This broader facet of assessment contributes to a deeper understanding of the effectiveness of teaching in preparing students for the complexities of the modern workplace.

In this sense, the ability to solve problems using technology, as measured by the indicators, not only reflects technical skill, but also the analytical acumen and creativity of students when applying digital solutions. This evaluative dimension becomes a valuable barometer to adjust pedagogical strategies and encourage critical thinking and problem solving, crucial skills in the contemporary world of work.

Additionally, indicators that address online communication skills and digital collaboration

provide a comprehensive view of students' readiness for interaction in professional environments. The ability to express yourself effectively on digital platforms and collaborate as a team through online tools has become a vital component of digital competence in today's world of work.

## CONCLUSIONS

The acquisition of digital skills stands as an essential pillar for success in the workplace, and it is imperative that students develop solid skills in this area. Under this premise, indicators emerge as key tools that allow the systematic evaluation of the level of digital competence of teachers and students, outlining specific areas that require attention and efforts to enhance education.

These indicators, whether quantitative or qualitative in nature, provide a comprehensive view of student performance in various dimensions. In the area of digital competence, such indicators can address the measurement of knowledge in the use of digital tools, the ability to address problems using technology, online communication skills and the ability to collaborate as a team using digital media.

The fundamental importance of these indicators is manifested in their ability to empower teachers and administrative staff to identify specific areas that require improvement. By highlighting specific aspects of performance and competencies, indicators provide a detailed view that serves as a strategic guide. Take, for example, the situation where indicators point to difficulties in online communication by students. Given this scenario, teachers have the opportunity to direct their efforts towards strengthening these skills by incorporating digital tools more effectively in the educational process.

Ultimately, the thoughtful application of these indicators becomes an essential step in raising the quality of teaching and educational

management, allowing for continuous adaptation to the changing demands of the digital educational environment.

Evaluation-oriented indicators play a fundamental role in promoting digital skills education. Not only do they provide educators and administrative staff with a means to identify specific areas of improvement where students can consolidate their skills, but they also make it possible to evaluate the direct impact of pedagogical strategies on the level of digital competence of students.

It is essential to highlight the critical importance of both teachers and administrators effectively using these indicators, since this not only allows for the improvement of teaching in digital competence, but also contributes to preparing students more effectively for the work environment. where digital skills are increasingly essential. The thoughtful and strategic application of these indicators thus becomes an essential component to boost the quality and relevance of education in a constantly evolving digital world.

Ultimately, the effective integration of indicators in digital competence education not only translates into the development of technical skills, but also in the training of critical and adaptable students. By taking advantage of the insights provided by the indicators, an educational approach is promoted focused on students' ability to learn and adapt to technological innovations, comprehensively preparing them to face the complex challenges of the digital age.



## REFERENCES

- [1] Morduchowicz, Roxana. (2021). Competencias y habilidades digitales. UNESCO. <https://unesdoc.unesco.org/ark:/48223/pf0000380113.locale=en>
- [2] Levano-Francia, Luz, Sánchez Díaz, Sebastián, Guillén-Aparicio, Patricia, Tello-Cabello, Sara, Herrera-Paico, Nancy, & Collantes-Inga, Zoila. (2019). Competencias digitales y educación. *Propósitos y Representaciones*, 7(2), 569-588. <https://dx.doi.org/10.20511/pyr2019.v7n2.329>
- [3] Silva Quiroz, J., Miranda, P., Gisbert, M., Morales, J., & Onetto, A. (2016). Indicadores para evaluar la competencia digital docente en la formación inicial en el contexto Chileno – Uruguayo. <https://dialnet.unirioja.es/descarga/articulo/5766441.pdf>
- [4] UNESCO. (s. f.). Aprendizaje digital y transformación de la educación. Recuperado el 16 de enero de 2024, de <https://www.unesco.org/es/digital-education>
- [5] UNESCO. (2023). Resumen del informe de seguimiento de la educación en el mundo, 2023: tecnología en la educación: ¿una herramienta en los términos de quién? Recuperado el 16 de enero de 2024, de <https://www.unesco.org/es/2023-gem-report>
- [6] OECD. (2015). *Students, Computers and Learning: Making the Connection*. Recuperado el 16 de enero de 2024, de <https://www.oecd.org/education/students-computers-and-learning-9789264239555-en.htm>
- [7] European Commission. (2018). Digital Competence Framework for Citizens. Recuperado el 16 de enero de 2024, de <https://ec.europa.eu/jrc/en/digcomp/digital-competence-framework>
- [8] European Commission. (2018). Digital Competence Framework for Educators. Recuperado el 16 de enero de 2024, de <https://ec.europa.eu/jrc/en/digcomp/digital-competence-framework-educators>
- [9] European Commission. (2017). Self-assessment tool for schools. Recuperado el 16 de enero de 2024, de <https://ec.europa.eu/jrc/en/digcompedu/self-assessment-tool>
- [10] UNESCO. (2023). Los indicadores como herramientas para la evaluación de la calidad de los sistemas educativos. Recuperado el 17 de enero de 2024, de [https://www.scielo.org.mx/scielo.php?script=sci\\_arttext&pid=S1665-109X2010000200004](https://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S1665-109X2010000200004)
- [11] Mundo Posgrado. (2022). 5 áreas donde desarrollar competencias digitales avanzadas. Recuperado el 17 de enero de 2024, de <https://www.mundoposgrado.com/competencias-digitales-avanzadas/>
- [12] The Economist. (2022). The Future of Jobs Report 2022. Recuperado el 17 de enero de 2024, de <https://www.weforum.org/reports/the-future-of-jobs-report-2022>
- [13] UNESCO. (2023). Marco de competencias para docentes en materia de TIC de la UNESCO. Recuperado el 17 de enero de 2024, de <https://unesdoc.unesco.org/ark:/48223/pf0000373259>
- [14] UNESCO. (2023). Directrices para la formulación de políticas y planes maestros de TIC en educación. Recuperado el 17 de enero de 2024, de <https://unesdoc.unesco.org/ark:/48223/pf0000373259>
- [15] Rodríguez M. (2023). MODELO DE APRENDIZAJE ADAPTATIVO HIBRIDO EN LA EDUCACION SUPERIOR, Copyright 2003 por Rodríguez Fernández Manuel Antonio.
- [16] Rodríguez Magaña, M. A., Torres Magaña, M. P., Fernández Mena, A. L., Pérez Reyes, A., De la Cruz López, S. (2023). ANALYSIS OF THE HYBRID ADAPTIVE LEARNING MODEL IN HIGHER EDUCATION. *International Journal of Human Sciences Research* v.3/n.38. <https://doi.org/10.22533/at.ed.5583382310109>
- [17] Martínez Rizo, Felipe. (2010). Los indicadores como herramientas para la evaluación de la calidad de los sistemas educativos. *Sinéctica*, (35), 1-17. Recuperado de [http://www.scielo.org.mx/scielo.php?script=sci\\_arttext&pid=S1665-109X2010000200004&lng=es&tlng=es](http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S1665-109X2010000200004&lng=es&tlng=es).

[18] Martínez Rizo, F. (2010). Los indicadores como herramientas para la evaluación de la calidad de los sistemas educativos. *Sinéctica*, (35), 1-15. Recuperado de [http://www.scielo.org.mx/scielo.php?script=sci\\_arttext&pid=S1665-109X2010000200004](http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S1665-109X2010000200004)

[19] Sistema de Indicadores para la Evaluación de las Competencias Básicas. (s.f.). Recuperado de <http://www.lascompetenciasbasicas.es/attachments/article/56/sistemaindicadores.pdf>

[20] Fernández Smith, G. (2014). Precisiones terminológicas y conceptuales en el ámbito de la lingüística textual y discursiva. *Revista Internacional de Lingüística Iberoamericana*, 12(30), 139-156. Recuperado de <https://dadun.unav.edu/bitstream/10171/36996/1/201406%20RILCE%2030.1%20%282014%29%20-7.pdf>