Revista Iberoamericana para la Investigación y el Desarrollo Educativo
ISSN 2007 - 7467

https://doi.org/10.23913/ride.v11i21.702

Artículos Científicos

Competencias digitales de docentes de nivel secundario de Santo Domingo: un estudio de caso

Digital Competences of Secondary Level of Santo Domingo: A Case Study

Habilidades digitais de professores do ensino médio em Santo Domingo: um estudo de caso

José Antonio Vólquez Pérez
Universidad de Baja California, México
volquez.jose@gmail.com
https://orcid.org/0000-0002-0518-0181

Carlos Miguel Amador Ortíz
Tecnológico Nacional de México, Instituto Tecnológico José Mario Molina Pasquel y Henríquez, Campus Puerto Vallarta, México
carlos.amador@vallarta.tecmm.edu.mx
https://orcid.org/0000-0001-6654-8448

Resumen

En los últimos años se ha generado una transformación en la educación a causa del uso de las tecnologías de la comunicación y de la información (TIC). A partir de esta transformación se espera que los docentes desarrollen nuevos conocimientos y habilidades para el uso de la tecnología. Este trabajo tiene como propósito analizar el uso de las TIC en el proceso de enseñanza-aprendizaje por parte de maestros de nivel secundario con el fin de establecer estrategias para el desarrollo de competencias digitales orientadas a la docencia. Para esto se utilizó una metodología descriptiva, analítica y transversal, y se aplicó un cuestionario con una escala de valoración de competencias digitales considerando tres dimensiones: competencias instrumentales, competencias didáctico-metodológicas y cognitivas. Este cuestionario se aplicó a un total de 124 docentes de dos instituciones de educación secundaria del distrito 10-04 de Santo Domingo, República Dominicana. Los resultados muestran que 47 % de los docentes

requiere capacitación en las competencias digitales didáctico-metodológicas, 39 % en las cognitivas y 32 % en las instrumentales. A partir de estos resultados se concluye con la necesidad de establecer un plan de capacitación que considere prioritarias las competencias en las que se obtuvieron los resultados más bajos.

Palabras clave: formación docente, integración, procesos de enseñanza-aprendizaje, recursos didácticos, TIC.

Abstract

Recently a transformation has been generated in education due to the use of communication and information technologies (ICT). From this transformation, teachers are expected to develop new knowledge and skills for the use of technology. The purpose of this research is to analyze the use of ICT in the teaching-learning process by secondary level teachers in order to establish strategies for the development of teaching-oriented digital competencias. A descriptive, analytical and transversal research methodology was used in this study, and a questionnaire was applied with a scale of assessment of digital competences considering three dimensions: instrumental competencies, didactic-methodological and cognitive competences. This questionnaire was applied to a total of 124 teachers from two secondary education institutions in the 10-04 district of Santo Domingo, Dominican Republic. The results show that 47 % of teachers require training in digital didactic-methodological skills, 39 % in cognitive and 32 % in instrumental. Based on these results, it is concluded with the need to establish a training plan considering the competences in which the lowest results were obtained as priorities.

Keywords: teacher training, integration, teaching-learning processes, didactic resources, ICT.

Revista Iberoamericana para la Investigación y el Desarrollo Educativo
ISSN 2007 - 7467

Resumo

Nos últimos anos, uma transformação foi gerada na educação devido ao uso das tecnologias da comunicação e informação (TIC). A partir dessa transformação, espera-se que os professores desenvolvam novos conhecimentos e habilidades para o uso da tecnologia. O objetivo deste trabalho é analisar o uso das TIC no processo de ensino-aprendizagem por professores do ensino médio, a fim de estabelecer estratégias para o desenvolvimento de habilidades digitais orientadas ao ensino. Para isso, utilizou-se uma metodologia descritiva, analítica e transversal, e aplicou-se um questionário com escala para avaliação de habilidades digitais, considerando três dimensões: habilidades instrumentais, habilidades didático-metodológicas e cognitivas. Este questionário foi aplicado a um total de 124 professores de duas instituições de ensino médio no distrito 10-04 de Santo Domingo, República Dominicana. Os resultados mostram que 47% dos professores necessitam de treinamento em competências didático-metodológicas digitais, 39% em cognitiva e 32% em instrumental. A partir desses resultados, conclui-se com a necessidade de estabelecer um plano de treinamento que considere prioritárias as competências nas quais os menores resultados foram obtidos.

Palavras-chave: formação de professores, integração, processos de ensino-aprendizagem, recursos didáticos, TIC.

Fecha Recepción: Febrero 2020 **Fecha Aceptación:** Julio 2020

Introduction

The transmission of knowledge has been a determining factor in the development of human civilization: from the foundations of survival in its beginnings to the specialized training required by an industrial society with around 6 billion inhabitants. It is due to the importance of the transmission of knowledge, especially with the demands of a diverse and industrialized society, that the educational issue acquires prominence for many intellectuals, and is an area in constant development, since training practices must be in constant updating in order to train individuals and generate societies with different degrees of technification and specialization.

Given the adjustment of practices to the demands of modernity, the teacher cannot be left behind, his new role in educational centers requires not only academic knowledge, but also the practical management of technology, and its application as an essential tool. in the teaching-learning process. Information and communication technologies (ICT)

have generated an impact and a series of changes in all areas of society. The management and use of ICT is essential in pedagogical practice.

Therefore, the teacher would have to overcome the application of traditional and impersonal teaching procedures and visions that do not recognize the student as the protagonist of the process. The new educational needs of the 21st century can no longer be adapted to the use of a rigid, finished and uncompromising methodology, and that do not take into account the student's experiences and their need to understand reality (Reis and Lunardi, 2018; Silveira and de Luca , 2015; Zabala, 2000). Thus, it is up to the teacher to recognize the needs of the students and create mechanisms that can satisfy them during their daily practice. (Turra y Flores, 2018).

There are different factors that affect the development of digital skills by teachers. One of them is the generation gap. Digital immigrants, according to Prensky (2012), are those who were born before the ICT revolution and their appropriation has been difficult, or of little interest, since their professional studies base was developed without these tools. Another factor is the lack of access to technologies and the lack of skills training for the use of technologies with a specific focus on training processes.

Integrating ICTs in the educational system has its implications, among them, the lack of interest and the little preparation of teachers to introduce them into their practice in the classroom (Fernández and Fernández, 2016); In addition, projects are needed to promote the use of ICT in schools; therefore, many of the didactic practices carried out with digital technologies do not represent a true innovation that directly impacts teaching and learning processes (Christian and Mathrani, 2014).

The rules of the school centers can hinder the implementation of ICT in educational institutions; the organization and culture of the school can hinder innovation processes with the use of ICT. This may have as a consequence that the changes predicted by the integration of ICT in the classroom do not occur (Alonso et al., 2010; Medina and Ballano, 2015).

Franky and Chiappe (2018) mention that, although education is increasingly steeped in technology, it is currently unable to respond to the challenges of our time. This era is characterized by great dynamism and social change. The democratization of information, changes in the structure of families, the media and social networks are shaping a diverse society with educational demands that technology by itself is not capable of satisfying. Technologies have revolutionized learning processes, and are presented as very valuable tools for their potential to improve training processes and for the diversity of tools for acquiring knowledge, including enabling distance learning

through online platforms, which can solve various problems presented in traditional education; however, these must be integrated within a systematized and functional educational system oriented to the social needs of training in order to respond to the challenges that prevail today.

Pressured by a technological and information society, educational institutions invest large resources to acquire technological infrastructures in order to increase the quality of their education. Despite this, following certain authors, the results obtained do not seem to justify this investment (Christensen, Johnson & Horn, 2008; Sosa & Mazuolli, 2019). Along these same lines, Rincón (2018) mentions that an increase in technological infrastructure does not directly imply a change in the way of teaching.

Other authors present a different vision. Enguita (2016), for example, affirms that contemporary society can be identified as a society of change. This is not a trivial and common change, as it has been in history, but a very rapid social change never seen before. In this change, the use of technology is an essential component applied in different areas, such is the case of investments to acquire technological infrastructure by educational institutions, which must be accompanied by a training plan for teachers that allows us to take advantage of these tools to respond to the challenges of our times.

This society of change brings new scenarios. The traditional roles of the teacher as a carrier and source of knowledge transmission lose their preponderance, since learning is promoted through the mediation of technologies (as sources of knowledge and tools for learning).

For Cabero, Arancibia, Valdivia and Aranedas (2018), there is a positive attitude in both teachers and students to use virtual training tools in their learning process, which facilitates the integration of these in educational institutions. In addition to this, Jiménez and Espejel (2019) mention that the integration of ICTs in educational systems is being considered in the public policy agenda, both in Mexico and in Latin America, in order for the student to develop skills for their academic and work performance.

The teacher is considered a key agent and mediator of educational and technological practices in the different approaches to the use of ICT in the educational field (Rubilar, Alveal and Fuentes, 2017); However, although there is a good attitude for the use of ICT by them, at present they do not feel competent and avoid using them (Ayala, 2018). Hence the importance of promoting strategies that contribute to change and adaptation to new scenarios and roles implied by the use of ICT in the classroom, and maintaining constant training on the use of technology for the innovation of educational

practice. as an indispensable element to achieve the expected results of its implementation.

In this research, the model of Quintana (2000) is accepted, who specifies the skills in the standards of competence in the use of ICT for teachers, which have been proposed by the United Nations Educational Organization, Science and Culture (Unesco) in 2008, which, in addition, has defined technical (knowing), methodological (knowing how) and social (knowing how to be).

According to the European Commission (December 30, 2006), digital competence "involves the safe and critical use of information society technologies for work, leisure and communication" (p. 6), and points out that for the development of these, it is necessary to have an adequate understanding and broad knowledge about "the nature, function and opportunities of information society technologies in everyday situations of private, social and professional life" (p. 7).

For Quintana (2000), the incorporation of ICT in the teaching and learning processes requires the development of three categories of digital skills: 1) digital instrumental skills, aimed at knowing and using both the equipment and the computer program for development of the educational process in the investigation, acquisition and processing of the information; 2) digital cognitive competences, which involve the reflection and application of a criterion on the use of ICT within learning, and 3) didactic-methodological digital competences, based on the coupling of ICT within the teaching and learning process in the classroom, in a way that facilitates the elaboration or design of the didactic unit, as well as the learning activity. Table 1 shows the indicators of the categories.

Tabla 1. Indicadores de las categorías de competencias digitales

Competencias digitales instrumentales	**Competencias didácticas-metodológicas**	**Competencias cognitivas-actitudinales**
Conocimiento y empleo de aparatos informáticos	Utiliza herramientas tecnológicas para preparar sus clases, para seguir el proceso de aprendizaje logrando evaluar al estudiante, gestión académica, su formación permanente, y participar en proyectos con otros docentes de la institución.	Aplica criterios en el uso de las tecnologías.
Conocimiento y uso funcional y creativo de los programas informáticos instrumentales estándar (entorno operativo, procesador de textos, base de datos, hoja de cálculo, etc.)	Evalúa o selecciona programas informáticos o en línea.	Posee actitudes de reflexión sobre los usos de los medios en el aprendizaje y en la educación en general, y sobre la propia actividad como maestros y maestras.
Conocimiento y uso funcional y creativo de los programas informáticos estándar para la educación	Crea unidades de aprendizaje incorporando las TIC.	Utiliza habilidades para el tratamiento de la información: análisis e interpretación (evaluación, comparación, contraste, elaboración, representación, relación, síntesis, valoración), uso y comunicación (aplicación, asimilación, expresión, integración, presentación, transferencia).

Habilidades para el tratamiento de la información	Integra las TIC en los procesos de aprendizaje cotidianos en el aula.	
	Utiliza las TIC para facilitar la comunicación y atender a la diversidad.	

Fuente: Elaboración propia con base en Quintana (2000)

The purpose of this study was to analyze the use of ICT in the teaching-learning process by secondary level teachers, in order to establish strategies for the development of digital skills oriented to teaching, taking as a reference the theoretical model de Quintana (2000), a model that categorizes, as we have already seen, digital competences into instrumental, didactic-methodological and cognitive-attitudinal.

Overall objective

This study had the general objective of analyzing the use of ICT in the teaching-learning process of secondary school teachers, specifically of the Pilar Constanzo Polytechnic and the María Marcia Compres de Vargas School in the 10-04 district of Santo Domingo, Dominican Republic . This in order to establish strategies for the development of digital skills aimed at teaching.

Specific objectives

1) Adopt a theoretical position for the analysis of digital competences in teachers.

2) Describe the digital skills of the teachers of the Pilar Constanzo Polytechnic and the María Marcia Compres de Vargas School in the 10-04 district of Santo Domingo Este, based on a theoretical position recognized by the academic community.

3) Identify areas of opportunity for the design of training strategies for the professionalization of teachers.

4) Propose strategies for the development of digital competences of the teachers of the Pilar Constanzo Polytechnic and the María Marcia Compres de Vargas School in the 10-04 district of Santo Domingo Este.

Materials and methods

The present study is based on a descriptive, analytical and cross-sectional research methodology, developed through a quantitative approach in which a questionnaire with a scale of values was used, whose variables were quantified. The study describes the development of digital competences of the teachers of the Pilar Constanzo Polytechnic and the María Marcia Compres de Vargas School, and the results are analyzed in order to propose strategies for the integration of ICT as didactic resources. The research is cross-sectional, since it was carried out only once.

The procedure that was followed for the development of this work corresponds to a deductive-inductive method, since, in addition to starting with pre-established models (from general to particular), inductive processes were also followed in the collection, analysis of data and in formulating general conclusions.

The research was carried out in the following phases:

1) Bibliographic research on digital skills in teachers, and instruments to analyze the use of ICT in teaching.
2) Determine the information gathering instrument to be used.
3) Selection of the sample and administration of the instrument.
4) Analysis of results.

Bibliographic research on digital skills in teachers, and instruments to analyze the use of ICT in teaching

Based on bibliographic research, it was decided to adopt Quintana's (2000) proposal as a theoretical-conceptual framework for addressing digital competences. It proposes the following categories of competences: digital instrumental, didactic-methodological and cognitive-attitudinal. These categories are already conceptualized in the introductory section of this work, and the indicators are also already described in Table 1.

Determine the type of instrument to administer

Likewise, a questionnaire prepared by Espino (2018) was used, which consists of a total of 30 items, 10 items for each of the categories adopted as a conceptual theoretical framework, and with a Likert-type scale. Next, in Table 2, the technical data of the instrument is described.

Tabla 2. Ficha técnica del instrumento utilizado

Características	
Nombre de instrumento	Cuestionario sobre las competencias digitales de los docentes
Autor	Eugenio Espino Wuffarden
Dirigido a	Docentes del Instituto Politécnico Pilar Constanzo y de la Escuela María Marcia Compres de Vargas de nivel secundario del distrito 10-04, en Santo Domingo Este.
Propósito	Determinar el desarrollo de competencias digitales por parte de los docentes de las escuelas Instituto Politécnico Pilar Constanzo y María Marcia Compres de Vargas del nivel secundario en el distrito 10-04.
Forma de administración	Individual
Dimensiones por evaluar	• Dimensión 1: competencias digitales instrumentales (10 ítems). • Dimensión 2: competencias digitales didáctico-metodológicas (10 ítems). • Dimensión 3: competencias digitales cognitivas (10 ítems).
Escala de valoración	• Siempre (5 puntos). • Casi siempre (4 puntos). • A veces (3 puntos). • Casi nunca (2 puntos). • Nunca (1 punto).

Fuente: Elaboración propia con base en Espino (2018)

Regarding the validity of the instrument, the indicators of the conceptual framework proposed by Quintana (2000) were used, from which the items of the questionnaire were elaborated (see Table 1). For reliability, the internal consistency coefficient called Cronbach's alpha was used. As can be seen in Table 3, high results were obtained in all three dimensions, which shows a strong relationship between the items in the categories based on the specifications of some authors such as Celina and Campos (2005) and Lucero y Meza (2002).

Tabla 3. Resultados de coeficiente de consistencia interna alfa de Cronbach

Dimensión	Núm. de ítems	Alfa de Cronbach	Confiabilidad
Competencias digitales instrumentales	10	0.926	Alta
Competencias digitales didáctico-metodológicas	10	0.925	Alta
Competencias digitales cognitivas	10	0.925	Alta
Total	30	0.928	Alta

Fuente: Elaboración propia

For the interpretation of the questionnaire data, Espino (2018) proposes a scale based on the sum of the responses in each of the dimensions with the data described below:

- Good: from 40 to 50 points per dimension, considered a high level of development of digital skills, does not require training, but must be constantly updated in accordance with the demands of technological changes.
- Regular: from 30 to 39 points per dimension, considered an intermediate level that requires training in some areas.
- Poor: less than 29 points per dimension, a low level that requires generalized training for the development of digital skills in the category in which this score has been obtained.

Select the sample and administer the instrument

The instrument was administered to all secondary school teachers in two schools in the 10-04 educational district of the municipality of Santo Domingo, the Pilar Constanzo Polytechnic, which has 77 teachers, and the María Marcia Compres de Vargas School, with 47 teachers. Thus, a sample of 124 teachers from this district was obtained.

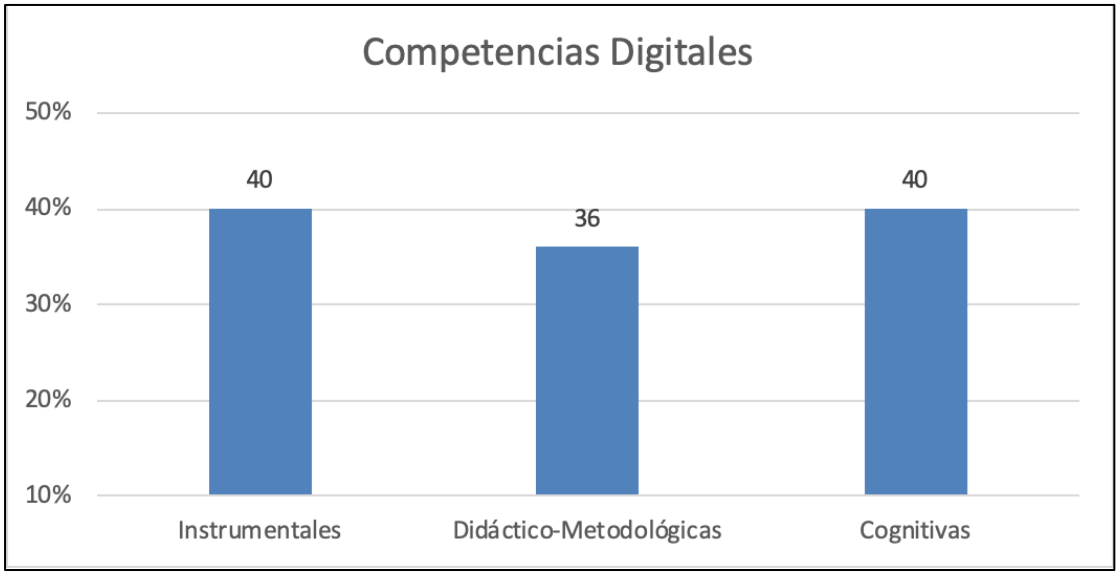
Analysis of results

The information obtained from the questionnaires was processed in a spreadsheet (Excel). And from the database that was generated, the graphs were prepared to analyze the data and draw conclusions.

Results

Next, the results obtained by the teachers in the digital competences (instrumental, didactic-methodological and cognitive) are presented; They are presented first divided by the institutions and then the general results.

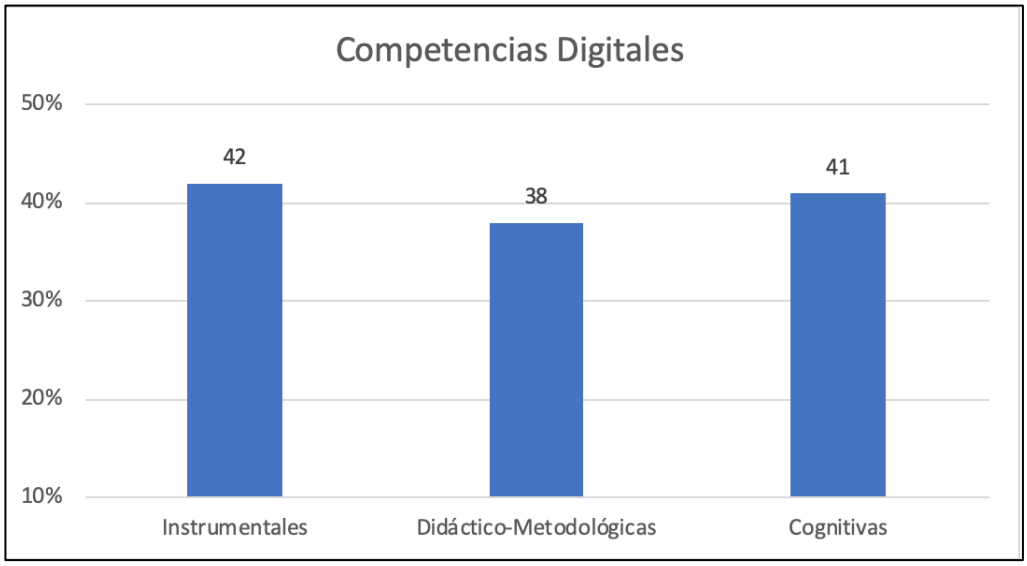
Figura 1. Resultados de los docentes del Instituto Politécnico Pilar Constanzo con base en la escala de interpretación



Fuente: Elaboración propia

Figure 1 presents the results obtained at the Pilar Constanzo Polytechnic Institute. There, the questionnaire was applied to 77 teachers, who obtained averages of 40 in instrumental skills, 36 in didactic-methodological skills, and 40 in cognitive skills. The results do not differ much in the three categories; however, greater deficiencies are shown in the didactic-methodological, which are relevant for the application of technologies in the classroom.

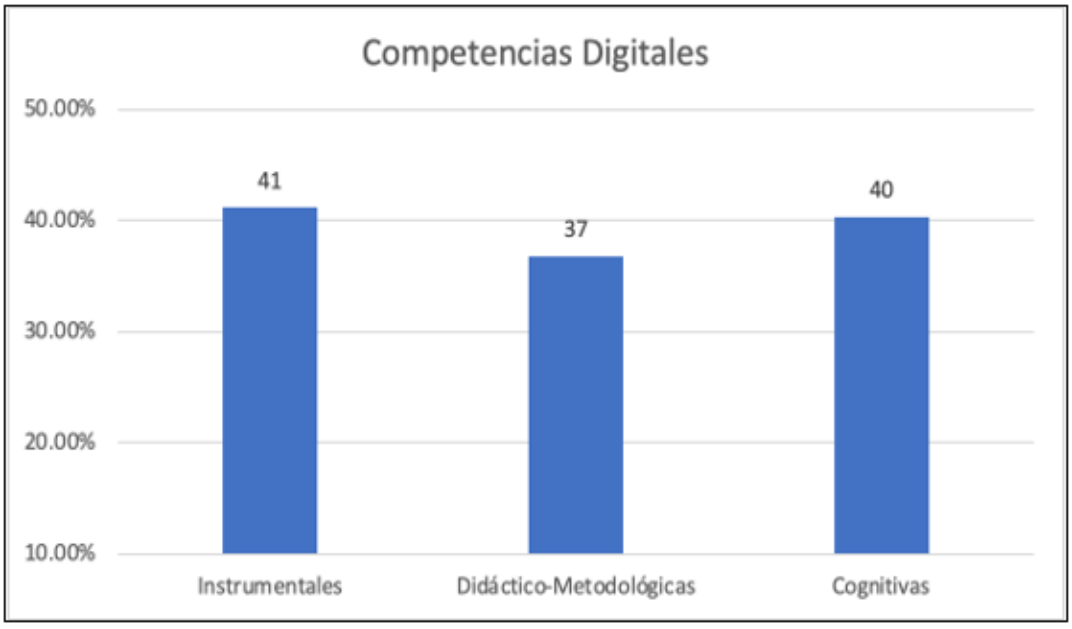
Figura 2. Resultados de los docentes de la Escuela María Marcia Compres de Vargas con base en la escala de interpretación



Fuente: Elaboración propia

Figure 2 shows the results obtained at the María Marcia Compres School in Vargas, where 47 questionnaires were applied to teachers, who obtained averages of 42 in instrumental skills, 38 in didactic-methodological skills, and 41 in cognitive skills. Teachers obtained the most consistent results in instrumental competencies, for which reference is made to knowledge of technologies; however, as in the Pilar Constanzo Polytechnic Institute, the lowest results are in didactic-methodological, referring to the use of technologies in teaching and learning processes.

Figura 3. Resultados del total de docentes con base en la escala de interpretación



Fuente: Elaboración propia

Figure 3 shows the results obtained by the total number of teachers from the two institutions. Overall, 124 questionnaires were applied to teachers, who obtained averages of 41 in instrumental skills, 37 in didactic-methodological skills, and 40 in cognitive skills. The results show the strengths and weaknesses in digital skills. Undoubtedly, didactic-methodological competences should be taken as a priority basis for the design of strategies.

Tabla 4. Resultados de competencias instrumentales del total de docentes

Competencias digitales instrumentales			
Categorías	**Intervalos**	**Frecuencia**	**%**
Bueno	40-50	84	68
Regular	30-39	38	30
Deficiente	<30	2	2
Total		124	100

Fuente: Elaboración propia

Table 4 shows the results obtained in instrumental digital skills by the 124 teachers. Here, 84 teachers obtained results in the Good category, which represents 68% of the total sample; 38 teachers were in the Regular category, that is, 31%, and finally, only two teachers obtained results to be in the Deficient category, that is, 2% of the total. With these data you can see the reality of the development of instrumental skills by teachers. It is notable that the vast majority of teachers in this dimension fall within the Good option; however, adding the results of Regular and Poor, there are 32% of teachers with deficiencies, which is also relevant data.

Tabla 5. Resultados de competencias didáctico-metodológicas del total de docentes

Competencias digitales didáctico-metodológicas			
Categorías	**Intervalos**	**Frecuencia**	**%**
Bueno	40-50	53	43
Regular	30-39	49	39
Deficiente	< 30	22	18
Total		124	100

Fuente: Elaboración propia

Table 5 shows the results obtained in the didactic-methodological digital competences by the 124 teachers. In this regard, 53 teachers obtained results in the Good category, which represents 43% of the total sample; 49 teachers were in the Regular category, that is, 39%, and finally, 22 teachers obtained results to be in Poor, 18% of the total. The main deficiencies are in this category. Only 53 teachers obtained results in the Good category; Adding the data of Regular and Poor, a total of 57% of teachers with deficiencies in skills for the use of technology for educational purposes are made.

Tabla 6. Resultados de competencias cognitivas del total de docentes

Competencias digitales cognitivas			
Categorías	**Intervalos**	**Frecuencia**	**%**
Bueno	40-50	75	61
Regular	30-39	40	32
Deficiente	<30	9	7
Total		124	100

Fuente: Elaboración propia

Table 6 shows the results obtained in cognitive digital skills by the 124 teachers. In this dimension, 75 teachers obtained results in the Good category, that is, 60% of the total sample; 40 teachers remained in the Regular category, which represents 32% of the totality of the participants, and finally, nine teachers obtained results to remain in the Deficient category, that is, 7% of the total. As is evident, most teachers were left with the option Good; Even so, adding the other two categories of interpretation, 39% of teachers require training in this area. Once again, this data is relevant to the design of strategies.

Discussion

With the help of other studies related to the integration of ICT in the teaching-learning process, we can compare the results obtained here. Such is the case of the investigation carried out by Espino (2018) in the Vista Alegre district, Peru. As we have already clarified above, Espino (2018) used the same instrument, or rather, in this study the same instrument was used as in Espino's (2018), who applied it to 165 teachers. In this work, in digital instrumental competences, 146 teachers (88%) obtained a Good level and 19 obtained a Regular level (12%), so that those obtained by us were higher (68% of teachers in Good, 30% in Regular and 2% in Poor).

In the didactic-methodological digital competences, in Espino (2018) 143 teachers (87% of the total) obtained results in the Good category, while 22 (13%) teachers obtained results in the Regular category, and there were no teachers with poor development in this type of competition. In this dimension, these results are more consistent than those obtained in the present study, since here 43% obtained good results, according to the interpretation scale, 39% regular and 18% deficient.

In digital cognitive competences, teachers from the Vista Alegre district of Peru (Espino, 2018) obtained the following results: 143 teachers (87% of the total) obtained results in the Good category, while 22 (13%) teachers obtained results in the Regular category, and there were no participants with poor development in these competitions. On the other hand, in this study the following results were obtained in the dimension in question: 61% of teachers in the Good category, 32% in the Regular category and 7% in Poor.

Therefore, having as a reference the study carried out by Espino (2018), it can be concluded that teachers in the Vista Alegre district of Peru generally have a greater development of digital skills compared to teachers from the Pilar Constanzo and María Marcia Polytechnic institutes Compres de Vargas of secondary level of the district 10-04 of Santo Domingo Este.

One of the strengths of this study is the implementation of a questionnaire validated and implemented in a similar reality, such as the Latin American reality, which allows a comparison to be made between the digital skills of teachers in two regions. Another strength is that this instrument was applied with very good internal consistency between the dimensions of the competences. Likewise, the sample used for the study made up of the total of teachers from two institutions, which is relevant for decision-making in these schools, and even for the other centers of the same level of studies in Santo Domingo.

The scope of this project only reaches the analysis of digital skills. A limitation is that a training plan based on this study, which would correspond to a next phase of this work, was not finalized. Another limitation that can be found is the resistance of teachers to technological change or the lack of resources and supports for teacher training.

On the other hand, it is considered convenient to apply the same instrument to other schools of the same level in the Dominican Republic, considering a probabilistic sample that allows generating a training plan and policies on the use of ICT at the national level at the secondary level, since that the sample, only two schools, is a limiting factor in this sense, although it is relevant for decision-making in the schools where the

instrument was applied. Finally, it is also considered convenient to carry out an analysis of the digital competences of the students that allows obtaining a broader panorama of the subject in question.

Conclusions

The average results obtained in each institution are very similar. In both, good results were obtained in digital instrumental and cognitive competences, and regular in didactic-methodological; therefore, it can be concluded that the areas that require greater attention to contribute to the strengthening of the teaching staff are didactic-methodological in both institutions.

In instrumental digital competitions, 84 of the 124 teachers remained at the Good level, 38 at Regular and two at Poor. This means that there are two teachers with a very low level of development, who, added to the other 38, constitute a total of 40 teachers who require training to reach the optimum level in this dimension.

In the dimension of didactic-methodological digital competences, 53 teachers remained in the Good category, according to the interpretation scale, while 49 obtained results in the Regular category, and 22 in Poor, with a very low level of development. competitions. Therefore, in this category it is concluded that 71 teachers require training to reach the optimal level of didactic-methodological competences.

Regarding the dimension of digital cognitive competences, 75 teachers obtained results in the Good category, while 40 obtained a Regular result and nine obtained Poor. It is concluded that in this category 49 teachers require training to acquire the optimal level of development of cognitive skills.

To obtain better results in the development of digital competences by the teachers of this study, and to obtain the benefits of its implementation in the classroom, it is considered convenient to develop a continuous training plan aimed at technological literacy of the various tools, with the aim of guiding, educating, training and professionalizing teaching staff. This study is relevant since it allows us to have a benchmark of the levels of development of teachers' competences, and it is also valuable in identifying the priority areas for the training plan.

The results of this study establish as a priority for a training plan digital didactic-methodological competences, where the participants obtained the lowest results. Likewise, it is considered convenient to use the results of this study to structure the contents of the training plan, considering both the conceptualization of the competencies

and the indicators that were being analyzed in the study. This is because it can be concluded that a percentage greater than 50% of the teachers to whom the questionnaire was applied require training to acquire the optimal level of development of digital skills in some dimension.

Lastly, the establishment of institutional policies for the use of ICT that include the aforementioned training plan is suggested, in order not only to develop the required competences, but also to update them continuously and permanently, allowing teachers to be up-to-date in the use of technological resources, and adapt to constant changes and updates, and thus make the most of its advantages and potential for improving teaching and learning processes.

References

Alonso, C., Casablancas, S., Domingo, L., Guitert, M., Moltó, O., Sánchez, J. A. y Sancho, J. (2010). De las propuestas de la Administración a las prácticas del aula. *Revista de Educación*, (352), 53-76. Recuperado de https://pdfs.semanticscholar.org/a2d7/ddcf934891cc17476c9fc72ab0ae290f582d.pdf.

Ayala, F. (2018). El trabajo docente mediado con tecnología de la información y comunicación en la telesecundaria. Representaciones sociales de profesores. *RIDE Revista Iberoamericana para la Investigación y el Desarrollo Educativo, 8*(16), 557-579. Recuperado de https://doi.org/10.23913/ride.v8i16.358.

Cabero, J., Arancibia, M., Valdivia, I. y Aranedas, S. (2018). Percepciones de profesores y estudiantes de la formación virtual y de las herramientas en ellas utilizadas. *Revista Diálogo Educacional*, *18*(56), 149-163. Recuperado de http://dx.doi.org/10.7213/1981-416X.18.056.DS07.

Celina, H. y Campo, A. (2005). Aproximación al uso del coeficiente alfa de Cronbach. *Revista Colombiana de Psiquiatría*, *34*(4), 572–580. Recuperado de https://www.redalyc.org/pdf/806/80634409.pdf.

Christian, S. and Mathrani, A. (2014). ICT Education: Socio-Learning Issues Faced by International Students. Paper presented at the 35th International Conference on Information Systems. Auckland, 14-17 December 2014.

Christensen, C., Johnson, C. and Horn, M. (2008*). Disrupting Class, Expanded Edition: How Disruptive Innovation Will Change the Way the World Learns*. United States: McGraw-Hill Education.

Comisión Europea. (30 de diciembre de 2006). Recomendación del Parlamento Europeo y del Consejo de 18 de diciembre de 2006 sobre las competencias clave para el aprendizaje permanente. *Diario Oficial de la Unión Europea*.

Enguita, M. (2016). *La educación en la encrucijada*. Madrid, España: Fundación Santillana.

Espino, J. (2018). *Competencias digitales de los docentes y desempeño pedagógico en el aula*. (tesis de maestría). Universidad de San Martín de Porres, Lima. Recuperado de http://repositorio.usmp.edu.pe/handle/usmp/4525.

Fernández, F. y Fernández, M. J. (2016). Los docentes de la Generación Z y sus competencias digitales. *Comunicar, 46*(24), 97-105. Recuperado de http://ddfv.ufv.es/handle/10641/1177.

Franky, A. y Chiappe, A. (2018). Familias de educación en el hogar de ICT: un estudio de caso cualitativo múltiple. *Ensaio: Avaliação e Políticas Públicas em Educação, 26*(101), 24-46. Recuperado de https://doi.org/10.1590/s0104-40362018002601507.

Jiménez, M. y Espejel, M. (2019). Análisis de aspectos tecnológicos y educativos que influyen en el ingreso económico en México. *RIDE Revista Iberoamericana para la Investigación y el Desarrollo Educativo, 10*(19), 1-20. Recuperado de https://doi.org/10.23913/ride.v10i19.489.

Lucero, I. y Meza, S. (2012). Validación de instrumentos para medir conocimientos. Recuperado de https://nanopdf.com/download/validacion-de-instrumentos-para-medir-conocimientos_pdf.

Medina, A. y Ballano, S. (2015). Retos y problemáticas de la introducción de la educación mediática en los centros de secundaria. *Revista de Educación,* (369), 135-158.

Prensky, M. (2012). *From Digital Natives to Digital Wisdom: Hopeful Essays for 21st Century Learning*. United States: Corwin Press.

Quintana, J. (2000). Competencias en tecnologías de la información del profesorado de educación infantil y primaria. *Revista Interuniversitaria de Tecnología,* 3(25), 166-174 Recuperado de http://www.ub.edu/ntae/jquintana/articles/competicformprof.pdf.

Reis, V. e Lunardi, G. (2018). De iniciantes a vanguardias: o uso de tecnologías digitais jovens professores. *Holos*, *34*(1), 297-316. Recuperado de http://www2.ifrn.edu.br/ojs/index.php/HOLOS/article/view/4867.

Rincón, C. (2018). Proceso de transferencia en el uso de las TIC en las escuelas normales del estado de Zacatecas. *RIDE Revista Iberoamericana para la Investigación y el Desarrollo Educativo*, *8*(16), 1-25. Recuperado de https://doi.org/10.23913/ride.v8i16.361.

Rubilar, P., Alveal, F. y Fuentes, A. (2017). Evaluación de la alfabetización digital y pedagógica en TIC, a partir de las opiniones de estudiantes en Formación Inicial Docente. *Educação e Pesquisa*, *43*(1), 127-143. Recuperado de http://dx.doi.org/10.1590/s1517-9702201701154907.

Silveira, M. y de Luca, N. (2015). Política educativa y cultura digital: entre las prácticas escolares y las prácticas sociales. *Perspectiva, Florianópolis, 33*(2), 499-521. Recuperado de researchgate.net/publication/318843911_Politica_educativa_e_cultura_digital_e

ntre_praticas_escolares_e_praticas_sociais/link/59813b670f7e9b7b5245aadc/download.

Sosa, O. y Manzuoli, C. (2019). Modelos para la integración pedagógica de las tecnologías de la información y la comunicación: una revisión de la literatura. *Ensaio: Avaliação e Políticas Públicas em Educação, 27*(102), 129-56. Recuperado de https://doi.org/10.1590/s0104-40362018002701720.

Turra, O y Flores, C. (2018). Formación práctica desde la vocación del estudiante de pedagogía. *Ensaio: Avaliação e Políticas Públicas em Educação, 27*(103), 385-405. Doi: http://dx.doi.org/10.1590/s0104-40362018002601517

Zabala, A. (2000). *Práctica educativa: cómo enseñar*. Barcelona, España: Grao.

Rol de Contribución	Autor (es)
Conceptualización	José Antonio Volquez Pérez
Metodología	José Antonio Volquez Pérez (Principal) Carlos Miguel Amador Ortíz (apoyo)
Software	Carlos Miguel Amador Ortíz
Validación	Carlos Miguel Amador Ortíz
Análisis Formal	José Antonio Volquez Pérez (Principal) Carlos Miguel Amador Ortíz (apoyo)
Investigación	José Antonio Volquez Pérez
Recursos	José Antonio Volquez Pérez
Curación de datos	José Antonio Volquez Pérez (Principal) Carlos Miguel Amador Ortíz (apoyo)
Escritura - Preparación del borrador original	José Antonio Volquez Pérez
Escritura - Revisión y edición	Carlos Miguel Amador Ortíz
Visualización	José Antonio Volquez Pérez
Supervisión	Carlos Miguel Amador Ortíz
Administración de Proyectos	José Antonio Volquez Pérez
Adquisición de fondos	José Antonio Volquez Pérez