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Mobile learning (m-learning) as a training resource for companies

Aprendizaje móvil (m-learning) como recurso formativo para empresas

Abstract

The impact of Information and Communication Technologies (ICT) has had a significant effect on all areas of society, especially education. In this context, new teaching methodologies are emerging where mobile devices play an important role. This research sought to analyse the digital competences acquired by adults through m-learning training, the starting point being the need to digitally empower the citizen in order to acquire the relevant skills for learning. Undoubtedly, more and more companies have opted for online training courses and require their employees to take them. To this end, a quantitative methodology was carried out through the creation of a 28-item survey. The sample consisted of a total of 267 students/workers from the Environment and Water Agency of the Regional Government of Andalusia. The results led us to conclude that m-learning, especially involving the use of Smartphones, can achieve significant and favourable results in workers' training. However, there remains a lack of skills and media literacy on the proper use of these tools as educational resources.

Resumen

El impacto de las Tecnologías de la Información y la Comunicación (TIC) ha afectado a todos los ámbitos sociales, sobre todo, el educativo. A raíz de este contexto, surgen nuevas metodologías de enseñanza, dónde los dispositivos móviles cobran un rol importante. En este sentido, la presente investigación tiene como objetivo general analizar las competencias digitales adquiridas por los adultos a través de la formación m-learning. Para ello, se parte de la necesidad de empoderar digitalmente al ciudadano con el fin de alcanzar las habilidades pertinentes para su aprendizaje. Sin duda, cada vez son más las empresas que apuestan por cursos de formación en línea y que requieren que sus trabajadores los realicen. Para ello, se ha llevado a cabo una metodología cuantitativa a través de la creación de una encuesta con 28 ítems. La muestra ha estado conformada por un total de 267 alumnos/trabajadores de la Agencia de Medio Ambiente y Agua de la Junta de Andalucía. Los resultados permiten concluir que el m-learning, sobre todo, el uso de los Smartphone, puede alcanzar resultados significativos y favorables en la formación de los trabajadores. Sin embargo, se observa una falta de competencias y alfabetización mediática sobre la correcta utilización de estas herramientas como componentes educativos.

Keywords

Mobile Learning; Adult Learning; Educommunication; Company training; E-learning

Palabras clave

Mobile Learning; Aprendizaje adulto; Educomunicación: Formación de empresa; E-learning

1. Introduction

1.1. The ICT serve for multiple aspects in the life of people

The Information and Communication Technologies (ICT) are provoking great changes in the society of knowledge, and therefore, in the teaching-learning process, which allows for lifelong learning through internet-connected tools and social networks.

The use of the Internet has grown exponentially, thus, in Europe or North America, where more than 85% of the inhabitants are internet users, the increase has been almost 600% and 200%, respectively, from the year 2000 to 2019. The increase in its use is related to the speed with which it can be used. For example, in areas of Asia such as Taiwan or Singapore, the average download speed is more than 70 Mbps, and in many countries in Europe, the average download speed exceeds 30 Mbps in countries such as Sweden, Denmark, Luxemburg, Holland, Belgium or Spain (internetworldstas, 2019).

In 2017, 84% of the population of the European Union aged between 16 and 74 years old, indicated that they had used the internet in the last three months, where men utilized it more (85%) than women (82%). In Spain, these percentages increase up to an average of 85%, where the Spanish women had an increased percentage of use, up to 84%. These data increased in 2018, up to 96.6%, with the data highlighting a usage of more than 95% for those aged between 16 and 35 (Instituto Nacional de Estadística, 2018).

The technological revolution provided by the Internet and the integration of the ICT into every area of modern life result in changes in the manners of communication and relations, as well as how learning is conducted. The ICT have the potential to amplify and make flexible the student's access, making possible higher levels of learning, such as reflection, analysis, problem resolution and the making of decisions (García-Valcárcel & Tejedor, 2017). These technologies can also be employed for developing the student's skills for learning, analysis and the interpretation of information that is relevant not only for their fields of study, but fundamentally for acquiring basic competencies (Paramio, Delgado, & De-Casas, 2018).

1.2. The ICT have a prominent element: the Smartphone

The Smartphone and the Tablet are two of the products that have experienced the greatest expansion in the last few years. These mobile devices have Internet access and a relative high use/charge battery life, with the possibility of downloading numerous applications, and possess diverse functionalities for performing any task.

According to the National Observatory of Telecommunications and the Information Society in 2017, the penetration of mobile phones in the world was 103.5 lines for every 100 inhabitants. Also, in Spain, 97.4% of the homes had a mobile telephone (Urueña, Prieto, Seco, Muñoz López, Ballestero, & Castro, 2018), and 88% of the Spanish population had a mobile phone, with this device being the most utilized for accessing the Internet (94.6%) (Ditrendia, 2017).

Internet access from mobile technology allows learning that is away from formal spaces (Pereira, Fillol, & Moura, 2019), that is personalized and localized (Economides, 2009). This learning is known as *mobile learning* (Sharples, 2003). The great expansion of mobile technology allows most of the population to have, in their Smartphones, some of the best 100 tools for learning, as considered by Hart (2018), such as YouTube, Google browser and Google Drive, with all of these facilitating mobile learning and collaborative learning.

Mobile learning (m-learning) is an intersection between *e-learning*, together with the "here and now" (Martin & Ertzberger, 2013). The possibility offered by the mobile devices to access the internet, at anytime and anywhere, and the fact that the device is usually carried at all times and everywhere, allows the user to obtain data and interact with the content daily (Sundgren, 2017).

1.3. E-learning from1960

An evident use of the integrated use of the ICT from this perspective is *e-learning* (distance, virtual or mixed training), and its technological materialization par excellence, the LMS (*Learning Management Systems*) or VLE (*Virtual Learning Environments*) (Awang, Aji, Yaakob, Osman, Mukminim, & Habibi, 2018). The technology, the availability of the software (free or easy to access), the activity of user communities and developers, and the fast and easy access to the high-speed Internet has resulted in the proliferation of virtual classrooms or campuses in education institutions at all levels. *E-learning* allows collaborative learning through the systems mentioned above (LMS or VLE) which allow synchronous or asynchronous communication, promoting the learning process based on competencies (Mojarro, 2019).

As described by Downes (2012), the evolution of *e-learning* has lived through various generations, from the initial systems such as the PLATO systems from the 60s of the 20th century, through virtual information systems such as electronic mail (e-mail) and software, computer games and online games, the development of the elements that comprise *e-learning* such as the platforms themselves, from the *Content Management Systems (CMS)*, on to the *LMS* and the more modern ones such as *Learning Content Management Systems (LCMS)*. These are characterized, as described by Boneu (2007) by: interactivity, flexibility, scalability and massive online communications through individuals and computers that are connected online, allowing interoperability. This allows for the development of *mobile Learning (m-Learning)*, and also the option arises for the development of content managers, videoconferencing, cloud computing or the development of open content. Downes finalizes with the development of the idea of the MOOC (Massive Open Online Course) as the most current elements of *e-learning*.

All in all, from practically the appearance of the MOOC, these have been differentiated mainly into xMOOC, with the aim of recreating a conductor model, and on the other hand, the cMOOC, which is more connectivist, tries to build knowledge through interconnected exchange and learning, and the sMOOC, with proposals in the social networks (Osuna-Acedo & Gil-Quintana, 2017). Also, other authors include the term transferMOOC or tMOOC as a pedagogic perspective with the objective of the citizen's commitment (Osuna-Acedo, Marta-Lazo, & Frau-Meigs, 2018; Marta-Lazo, Osuna-Acedo, & Gil-Quintana, 2019).

The essence of *m-learning* is "to access information and knowledge at any time and place, from devices that students tend to carry with them everywhere, and which are considered friendly and personal" (Gikas & Grant, 2013, p.19).

Although the transferring of the teaching-learning processes to mobile devices is a strategy that is still found in a phase of growth and its duration is still unknown, due to its short existence, it will become another branch in the education of the future due to two reasons: the first is the large penetration of the mobile smartphones and the *tablets* in the home: the second is what is called "ubiquitous learning", defined by Burbules (2012, pg. 3) as that which can be conducted at anytime and anywhere, and makes possible "seamless learning" (Gros, 2015 :61).

The situatedness, the convenience and the contextuality of learning are features that are possible through *m-learning*, and which are recognized by the expression of "here and now". The mobile technology allows the adaptation of the process of teaching-learning to the context of the students, with the understanding of two types of contexts, that of learning (*Learning context)* (Al-Emran, Mezhuyev, & Kamaludin, 2018; Boelens, Voet, & De Wever, 2018) and mobility (*Mobile context*) (Zervas, Gómez, Fabregat, & Sampson, 2011; Kaliisa, Palmer, & Miller, 2019). The greater the adaptation to the context of the student, the greater the university student's interest (Gómez, Zervas, Sampson, & Fabregat, 2014).

A fact that also places *m-learning* in the epicenter of the current educational processes is the irruption of emergent technologies associated to the use of images, geolocalization, QR codes, Augmented Reality or simulations along with the proliferation of educational applications (Fundación Telefónica, 2014; Cabero, Fernández Robles, & Marín Díaz, 2017). And other applications that are not education-based, but that could have a communication and educational use, such as electronic email or the messaging applications such as WhatsApp (Al-Emran, Elsherif, & Shaalan, 2016; Ahmed, Hussain, Rizvin, & Vighio, 2018).

The latest developments in mobile technologies have created a new range of digital learning tools with touchscreens, with a broad range of applications, which have implied that many of the schools see them as a viable option for equipping their students with a learning resource that satisfies the demands of current times.

Ally and Prieto Blázquez (2014) have underlined that *m-learning* can make learning accessible across time zones and diverse/disperse locations. With the advances of *m-learning* and the intelligent mobile devices, other advantages are observed, such as access to media-rich content and improving the interaction among equals (Arpaci, 2016). Likewise, *m-learning* has two features that characterizes it (Peng, Su, Chou y Tsai, 2009): mobility and ubiquity. Baran (2014) also added, aside from the possibilities belonging to *m-learning*, features such as the immediate access to information/content, the possibility of finding answers that are adjusted to the situation (situatedness), to the interest of the subject (convenience) and the context (contextuality). It is because of these possibilities that companies are utilizing *m-learning* to facilitate their employees with access to knowledge they need whenever and wherever to maintain them updated with the rhythm of the business, which is constantly changing, and to be able to compete more effectively (Pande & Gomes, 2015). Some of these potentially beneficial properties for learning, which shape the current lines of research on the subject, are described below.

The ICT allow learning methodologies that are flexible, ubiquitous and collaborative, and the communication with individuals who are experts in specific fields (Marta-Lazo, Hergueta-Covacho, & Gabelas-Barroso, 2106), the immediate connection with other classmates or teachers, and in this manner, the *Smartphone* allows learning in informal spaces or in non-habitual learning contexts (Ally & Samaka, 2013). *M-learning* can offer help mechanisms for teaching, such as polls and text messages with exchange of opinions in real time, which allow the teachers and the students to communicate freely and opportunistically for better teaching and learning (Wang, Shen, Novak & Pan, 2009).

Despite the possibilities and the almost universal access (in medium-high class areas of Western society) to the internet and the mobile technologies as well, there are still misgivings among the teachers, as well as the lack of contexts and institutional policies that make possible new methodologies Fombona & Rodil, 2018).

E-learning in public administration/companies

The impact of the ICT are reformulating the skills that are needed for performing work. These abilities are, in part, the requirement of the cognitive and behavioral skills (up to 41% in advanced economies) (World Bank, 2019) and on the other hand, technology is considered as a tool for the efficient undertaking of the activities, as well as the functioning of text management in systems of operation, installation of applications and their use in Smartphones, navigation in information, efficient search for information, creative competencies, creation of contents (Guzmán-Duque, 2016). Along the same line, Van Deursen and Van Dijk (2011) state that the competencies required are operational and technological.

Along with this, as indicated by Garcia Aretio (2019), new types of work appear, or others are transformed, for which specific and new abilities are needed, with these being generally digital; jobs disappear and others will come, substituted by robots; the work environment, ever more so, is highly permeable, tending to inter-professional collaboration and the development of mixed professions; a changing job market, which will demand continuous training. Not all of this will be automated and many professions, reformulated, will still be needed; a degree is no longer, and will be less so, a guarantee of finding work. But the skills and competencies acquired will be so, as well as the ease of their acquisition; non-formal training has become more accessible through the net; the jobs that are most in-demand today did not exist in 2005 and will not exist in the future, at least as they are known today.

The current version of the European Framework of Digital Competencies for Citizens, currently named DigComp 2.1 (Carretero, Vourikari, & Punie, 2017) is organized in four initial levels of competency (initiation, intermediate, advanced and highly specialized), to make way to a more detailed description divided into eight levels of aptitude. The areas of competency defined are: digital information and literacy, online communication and collaboration, creation of digital content, online security and problem resolution (Table 1).

Table 1. Areas of competencies and competencies of DigComp

AREA OF COMPETENCY	COMPETENCIES
Digital information and literacy	Navigate, search and filter data, information and digital content Evaluate digital data, information and content. Management of digital data, information and content
Online communication and collaboration	Interact through digital technologies Share through digital technologies Citizen participation through digital technologies. Collaboration through digital technologies. Behaviors online. Management of digital identity.
Creation of digital contents	Development of contents. Integration and re-creation of digital content. Copyright and intellectual property licenses. Programming
Internet security	Protection of devices. Protection of personal data and privacy. Protection of health and well-being. Environmental protection.

Problem resolution	Resolution of technical problems.
	Identification of technological needs and answers.
	Creative use of digital technologies.
	Identify gaps in digital competencies.

Source: Author created starting from Carretero, Vourikari, & Punie (2017).

Learning during adulthood is an important channel for re-setting skills so that they are in agreement with the future of work, but its design needs serious reformulation (World Bank, 2019). Indeed, *e-learning* and *m-learning* have emerged as an efficient possibility for becoming the training medium for thousands of students, as shown by the volume of sales in this sector, numbering 150 billion Euros with an annual growth of 5% (Docebo, 2016). Companies consider *e-learning* as a budget and productivity solution in the presence of business needs and changes in technology, which pushes them to take *online* training actions as compared to more traditional solutions, so that training through social networks and mobile devices is included, as well as the inclusion of *learning analytics* and learning in the cloud.

Companies, as other organizations in civil society, take on education projects that go beyond the education system, and this is named non-formal education. This learning process allows for lifelong learning, and it is in this space in which training in technology is made possible, as a transformative tool (Guzmán-Flores and García-Redondo, 2016).

In Spain, the State Foundation for the Training in Employment (State Foundation for Training, 2019) is the reference institution for lifelong learning, with the aim of being present in all the areas of economic, social and work life, and trying to improve the competencies of workers and businessmen and women for the changes in the job market and production sectors. To achieve these objectives, it favors the access to free and high quality information for all the workers, active or unemployed. This initiative is regulated by law 30/2015, which regulates the system of professional training in the area of work and allows training on activities belonging to the companies themselves, and also allows the compliance of the requisite about information on programmed training activities.

The State Foundation for the Training in Employment allows for assessing data on the volume and characteristics of the training developed by Spanish businesses and the workers. IN 2018, more than 360,000 companies participated, which represented 21.2% of the potential companies that benefitted from training subsidies. These data allow the examination of the training methodology utilized by the businesses. As observed in Table 2, the number of participants grew from almost 600,000 in 2004 to 4.4 million in 2018. Of these, in 2004, only the *e-learning* training methodology was utilized in 4.72% of the cases, with this number exceeding 20% in 2016, almost reaching 1.5 million of *e-learning* participants in 2018. This represents 42% of the hours utilized for training in 2018 from a total of 65,478,682 hours of training given.

Table 2. Number of participants

Year	Percentage of Participants		Total Participants	Percentage hours of training		Total hours
Year	In-person	Tele-training		Tele-training	In-person	
2004	75.76	4.72	596,470	5.38	70.67	15,725,424
2005	72.08	3.43	936,860	4.51	65.77	24,899,472
2006	64.78	4.73	1,156,085	5.47	56.44	32,457,719
2007	65.98	4.91	1,580,809	6.64	51.40	44,012,587
2008	63.34	5.75	1,997,546	7.95	45.44	53,990,008
2009	60.33	7.71	2,421,153	10.32	38.92	67,253,840
2010	59.78	8.85	2,771,069	11.74	35.59	74,261,275
2011	60.47	8.46	2,986,493	11.22	35.80	80,654,568
2012	58.93	9.89	3,176,789	13.03	35.31	82,772,544
2013	57.98	10.91	3,224,182	14.18	34.87	82,435,580
2014	588	10.87	3,291,803	14.78	36.36	79,904,742
2015	61.06	13.28	3,576,748	14.72	37.26	79,229,257
2016	766	21.51	3,766,997	41.72	53.69	64,276,809
2017	76.77	21.77	4,017,000	40.87	54.92	63,822,032
2018	75.51	23.53	4,413,853	41.49	55.67	65,478,682

Source: Author created from the State Foundation for Training, 2019.

2. Methodology

The general objective of the present study is to analyze the digital competencies acquired by adults through m-learning training. For this, we start from the need to digitally empower the citizens in order for them to obtain the pertinent skills for learning. Without a doubt, more and more companies bet on online training and require the workers to take the courses.

To conduct the present research study, a quantitative exploratory-descriptive methodology was utilized. Del Canto & Silva (2013) point that this type of method utilizes the collection of data to demonstrate that the prior objectives have been accomplished. Likewise, they attest that it is important to start from a numerical basis and the statistical analysis to establish patterns of behavior and prove theories, confirming the rigorousness of the research process. On her part, González (2010) highlights that this type of analysis allows for the better comprehension and interpretation of the phenomenon in the study. In this sense, to be able to conduct this research, a poll was created as the data collection instrument to reach the objectives of the study.

As for the reliability and validity of the instrument, it was approved by 10 national and international experts on the subject of communication and education, and it obtained a high internal consistency (Cronbach's Alpha = 0.815). Likewise, among the judges, a high degree of agreement can be highlighted (k= 0.746), thus achieving a high degree of agreement. According to George and Mallery (2003, p. 231), if Cronbach's Alpha is higher than 0.9, it can be confirmed that the reliability is excellent. On the contrary, if it is higher than 0.80, it is good.

The poll was composed by a total of 28 items, established and created around two well-differentiated blocks. On the one hand, a sociodemographic profile with a total of 6 questions, and on the other hand, 22 questions developed through the use of a Likert scale, where 1 means total disagreement and 4 completely in agreement. As for the first block, (items 1-6), these are questions related with gender, year, position at the company, province, availability of a Smartphone and frequency of use. On its part, the second block is comprised by a series of dimensions, which are detailed next: 1) Knowledge and use of the Smartphone (items 7-10), 2) Training and professional uses of the *Smartphone* (items 11-20) and 3) Quality of the online virtual courses (items 21-28). In summary, this instrument collects matters related with the properties of *m-learning* through mobile apps, as well as the commitment/involvement of the students in the learning process. For the collection of data, the questionnaire was sent through the *Online* Training Platform of the Environment and Water Agency of the Junta of Andalusia (the Agency) with the LMS of free software Moodle.

On the other hand, as for the study sample, 267 Agency workers took part in the study. In 2018, 4,647 workers worked at the Agency, of which 75% were forest firefighters in the entire Autonomous Community of Andalusia. Also, 25% had functions related with the conservation of biodiversity, and water, soil and air quality, as well as cross-sectional functions such as management of human resources, prevention of occupational risks, administrative and computer tasks. Likewise, each of these study subjects had taken the course "Road Safety", with a duration of 2 hours to facilitate the possibility of its monitoring through the Smartphone, although the students could also complete it through the computer.

The research was conducted with this course. To obtain this sample quantity, a simple random sample was utilized. According to Torres, Paz & Salazar (2004), this type of sampling is utilized when all the elements of the population possess the same probabilities of being selected as part of the sample. Thus, the probability is known. Lastly, the aim of this study is framed in conducting the pertinent descriptive analyses.
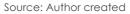
3. Analysis of the results

3.1. Sociodemographic analysis

The present research starts with the sociodemographic analysis of the sample. In this sense, the significant differences found in the first item can be underlined. This first item, related to the gender of the sample, shows the participation of a high number of men (251) as opposed to women (16) in this professional sector (Figure 1).

Figure 1: Gender of the sample

16

251

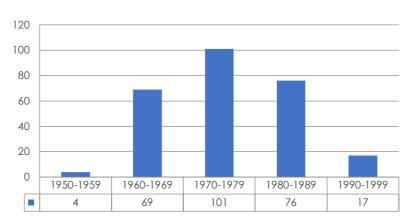■ Hombre ■ Mujer

Source: Author created

On its part, as for the age/year or birth, those born between 1970-1979 dominated, with ages between 40-49 years (101), followed by those born between 1980-1989, whose ages oscillated between 30-39 (76). However, the participation was lesser for those individuals who belonged to the 1950-1959 strata, aged between 50-69 year old, with this group being closer to retirement (Figure 2).

Figure 2: Birth year of the sample

■ Director/a - Subdirector/a

■ Coordinador/a Provincia

■ Jefe/a de Línea

■ Personal técnico

■ Personal de gestión

■ Capataz - encargado/a - supervisor/a - jefe/a de grupo

■ Especialista - operario/a

22 0 14 8

21

201

Source: Author created

As for the position they occupy within the organization, it should be highlighted that the specialists-operators (201) were the most common, followed by other posts without specification (22) and foreman-responsible-boss of a group (21) (Figure 3).

Figure 3: Professional post/position of the sample

	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999
■	4	69	101	76	17

Source: Author created

Lastly, only 13 of those polled indicated that they did not have a Smartphone available. This is significant for the study, as the intention is to understand the influence, knowledge and use of the new technologies for continuous training at the professional level. Likewise, those polled confirmed that they used their Smartphones around 2 hours a day (92), followed by around three hours a day (52). The lowest value was observed for those people who used these devices at all times (11) (Figure 4).
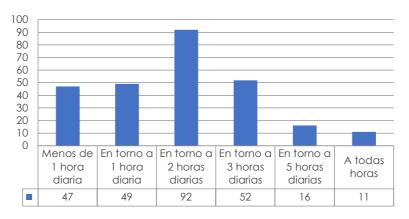
Figure 4: Use of the Smartphone

	Menos de 1 hora diaria	En torno a 1 hora diaria	En torno a 2 horas diarias	En torno a 3 horas diarias	En torno a 5 horas diarias	A todas horas
■	47	49	92	52	16	11

Source: Author created

In brief, the profile of those polled is an individual who is male, who is aged between 40-49 years old, with a medium level position of specialist-operator at the company and with an average use of the Smartphone of two hours a day.

3.2. Descriptive statistical analysis

After the socio-demographic analysis, the results belonging to the descriptive exploration (mean and standard deviation) should be highlighted. For this, three dimensions were taken into account, which will help with elucidating the opinions of the study sample.

The first dimension –Use of the Smartphone- had means close to 3, which could indicate some inequalities in those items with lower scores. As for the higher values, these are found in items 10 (2.85), 9 (2.77) and 8 (2.73). These are related to «I know about useful Smartphone applications for work», «I download applications for the Smartphone» and «I know what Smartphone application are». On their part, lower values were found in items 12 (1.97), 11 (2.55), 13 (2.58). These items were related to «I use the Smartphone in meetings», «I use the Smartphone for my work», «I use the Smartphone to communicate with my work colleagues». On the other hand, the standard deviation had values close to 1. In this sense, it could be said that statistically significant differences were not found. In summary, it can be highlighted that the users had a high level of frequency and use of the Smartphone for activities related with their profession. Nevertheless, the lack of collaborative work through the Smartphone is underlined (Table 3).

Table 3. Dimension 1- Use of the *Smartphone*

	N	Minimum	Maximum	Mean	Std. Dev.
Item 7	267	1	4	2.69	1.224
Item 8	267	1	4	2.73	1.209
Item 9	267	1	4	2.77	1.172
Item 10	267	1	4	2.85	1.044
Item 11	267	1	4	2.55	1.183
Item 12	267	1	4	1.97	1.155
Item 13	267	1	4	2.58	1.288
Item 14	267	1	4	2.59	1.206
Valid N (according to the list)	267				

Source: Author created

In the second dimension –Smartphone and training- means close to 3 can be observed. The items with that were scored the highest were items 15 (2.93), 16 (2.93) and 19 (2.92). These items were «It allows me to search for information quickly», «It allows me to access content at anytime and anywhere». As for the items with the lowest scores, items 21 (2.61), 18 (2.63) and 17 (2.75) can be underlined. These are related with «It allows me to learn through educational games mechanics and techniques», «It gives me security when doing work with my colleagues, because it allows me to have contact with them, at any time» and «It improves my access to documents for their posterior reading».

On the other and, the standard deviations show values higher than 1, indicating that there are no statistically significant differences. Ultimately, it is necessary to highlight that the study sample had an interest and high abilities for accessing any type of information through the Smartphone. However, a lack of correct media literacy was observed for the correct use of the instrument in the professional area (Table 4).

Table 4. Dimension 2- *Smartphone* and training

	N	Minimum	Maximum	Mean	Std. Dev.
Item 15	267	1	4	2.93	1.151
Item 16	267	1	4	2.93	1.156
Item 17	267	1	4	2.75	1.215
Item 18	267	1	4	2.63	1.208
Item 19	267	1	4	2.92	1.143
Item 20	267	1	4	2.84	1.193
Item 21	267	1	4	2.61	1.109
Valid N (according to the list)	267				

Source: Author created

Lastly, the third dimension –Course/Training- exhibited values close and higher than 3. The most important items were (3.1), (3.08), (3.08). These scores corresponded to «With respect to the road safety course, the length of the course was optimal», «With respect to the road safety course, it was easy for me to take the course», and «With respect to the road safety course, the content of the course was adequate». On their part, the least important items were 24 (2.45) and 26 (2.66). These items were «With respect to the road safety course, I used the *Smartphone* to take the course» and «With respect to the road safety course, if I have used the *Smartphone*, I would recommend this type of virtual course». As for the standard deviation, the values were close to 1, indicating that statistically significant differences were not found. Thus, those polled point to the development of the course being correct and ideal for the objectives set. However, the lack of the correct use of the Smartphone as a learning tool is still latent. This affirmation can be linked to the existence of a digital divide and a generational divide, as not all of those polled have been able to become digital immigrants. Likewise, they have not acquired the necessary competencies for correctly utilizing this instrument in the multiple areas of their lives (Table 5).

Table 5. Dimension 5- Course/Training

	N	Minimum	Maximum	Mean	Std. Dev.
Item 22	267	1	4	3.05	1.057
Item 23	267	1	4	3.19	.908
Item 24	267	1	4	2.45	1.245
Item 25	267	1	5	3.08	1.160
Item 26	267	1	4	2.66	1.208
Valid N (according to the list)	267				

Source: Author created

4. Discussion

The impacts of the ICT on the teaching-learning processes are evident at every level of education. However, the training of adults has gained greater importance, and this is conducted in companies with the objective of improving the skills of the workers. For this reason, the aim of the present work was to try to analyze which were the pedagogic/didactic properties of *m-learning* through mobile apps (Cheon, Lee, Crooks, & Song, 2012), and in which manner these determined the commitment/implication of the adults in the learning processes, and the cognitive results in the area of road safety education.

As pointed out by multiple authors within the theoretical framework of this study, the technological revolution has allowed the integration of the ICT in every professional and social sphere. Likewise, the appearance of the new mobile devices has helped with the access to information and to increase the

training of the users (Pereira, Fillol, & Moura, 2019). Starting with this technological evolution, the *m-learning* term is born, whose methodology offers the possibility of more easily accessing information and knowledge. To this, its ubiquitous characteristic should be added: being informed at any place and any time (Arain, Hussain, Rizvi, & Vighio, 2018).

Without a doubt, the mobile devices have become a basic right of society. The diversity of messages and information that are transmitted and received through them is alarming (Gikas & Grant, 2013, pg.19). This, in some occasions, provokes a severe infoxication and disinformation of the users. For this, it is important for them to become media literate. Thus, they should acquire a series of related and specific skills and competencies (Arpaci, 2016; Ally and Prieto Blázquez, 2014).

Taking into account what has been presented, it is important to point out that learning about this topic is significant at any age, overall as related to work life. The companies, at the same time as society, technologically evolve, and for this, they require specialized and well-trained workers. In this sense, it is necessary to highlight that these teaching methodologies stand out as being the most popular.

5. Conclusions

The inclusion of the new technologies in the area of teaching is provoking a vertiginous development with the appearance of new teaching methodologies. *M-learning*, as previously mentioned, has gained a notorious role in current training methods. The online virtual courses developed through mobile devices have created unprecedented significant advances. Thus, the business sector has become even more so interested in training their employees in this particular manner.

In response to the object of study of the present research, its achievement can be highlighted. Without a doubt, the digital competencies of the workers from the Environment and Water Agency of the Junta of Andalusia, as well as the skills, knowledge and training on the use of the *Smartphone* for their training, were analyzed. In this sense, the results obtained through the analysis instruments allows us to highlight that in the company where the Road Safety course was provided, more than half of those polled (65%) utilized the Smartphone for more than 2 hours per day. Likewise, the data obtained demonstrate that the users frequently use the Smartphone for the undertaking of their profession, although there is a lack of the correct use of these technologies as learning tools. Due to this, the existence of a digital divide is underlined, as indicated by previous studies (Tirado-Morueta, Aguaded, & Hernando-Gómez, 2018).

It should be highlighted that, through this study, we can evidence how some of the Digital Competencies have not yet reached the level of companies, such as for example, the "Collaboration through digital technologies" (Carretero, Vourikari, & Punie, 2017). Likewise, the people polled were not familiarized with this type of training either. Nevertheless, the subjects did have high levels in the competencies related with information and digital literacy, such as fast search for information or access to digital content.

On the other hand, the results show that the students did utilize their Smartphone to take the course. Nevertheless, it was observed that there was a lack of the correct use of the technology as a learning tool. Along this line, it is important to underscore that the use of the Smartphone for completing *e-learning* courses, is adequate (Briz-Ponce, Pereira, Carvalho, Juanes-Méndez, & García-Peñalvo, 2017), despite the considerable deficit of digital and media literacy. Also, it is necessary to establish actions that favor the interaction and collaborative work through the Smartphone, according to the analysis.

In summary, at the level of work, it can be observed how scarce training in media and digital competency is, as the age of those polled increases. As pointed out, this technological inequality is intimately linked to the existence of a digital and generational divide, re-enforcing the need for training on these new technologies as a means for education and training. In this way, it is important to re-enforce the learning and the training of students in order to shape citizens who are critical and responsible when faced with a substantial amount of information, which is transmitted daily through multiple communication channels.

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