

BEST PRACTICES IN THE USE OF MOBILE LEARNING BY UNIVERSITY TEACHERS OF DIDACTICS LANGUAGE-LITERATURE

MELHORES PRÁTICAS NA UTILIZAÇÃO DA APRENDIZAGEM MÓVEL POR PROFESSORES UNIVERSITÁRIOS DE DIDÁTICA LINGUAGEM-LITERATURA

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ABSTRACT

The use of mobile learning is becoming increasingly widespread among university teachers, thanks to its many benefits. Moreover, its application is associated with good teaching practices. The aim of this study is to analyse the development of good teaching practices in the use of m-learning by university teachers from the Department of Didactics of Language and Literature, as well as to identify the factors that influence the development of best practices. The research method developed is based on a transversal design. 110 teachers from the Department of Language and Literature Didactics participated in the study. The instrument used is the scale of Analysis of M-learning practices at the University (APMU). The results show that more than half of the teachers use the teaching method based on mobile learning. It can be concluded that in the development of best practices, gender is not influential, but age and teaching experience are. In addition, personal concern and experience in the use of mobile devices by teachers is a key factor in the appropriate development of the m-learning method.

Keywords: Mobile learning. Good teaching practices. ICT. Higher education. Language training.

RESUMO

A utilização da aprendizagem móvel está a tornar-se cada vez mais generalizada entre os professores universitários, graças aos seus múltiplos benefícios. Além disso, a sua aplicação está associada a boas práticas de ensino. O objectivo deste estudo é analisar o desenvolvimento de boas práticas de ensino na utilização do m-learning por professores universitários do Departamento de Didáctica da Língua e Literatura, bem como identificar os factores que influenciam o desenvolvimento de boas práticas. O método de investigação desenvolvido é baseado num desenho transversal. O estudo envolveu 110 professores do Departamento de Didáctica da Língua e Literatura. O instrumento utilizado é a Análise das práticas de M-learning na escala da Universidade (APMU). Os resultados mostram que mais de metade dos professores fazem uso do método de ensino baseado na aprendizagem móvel. Pode-se concluir que, no desenvolvimento de boas práticas, o género não é influente, algo que ocorre com a idade e a experiência de ensino. Além disso, o interesse pessoal e a experiência na utilização de dispositivos móveis pelos professores é um factor chave para o desenvolvimento adequado do método m-learning.

Palavras-chave: Aprendizagem móvel. Boas práticas de ensino. TIC. Ensino superior. Ensino de línguas.

1 INTRODUCTION

The inclusion of Information and Communication Technologies (ICT) in society is a clear reality today (HINOJO-LUCENA *et al.*, 2020), influencing directly and indirectly work, social, educational and personal life (MORENO-GUERRERO *et al.*, 2020). Among the various resources that ICT can offer are mobile devices (AZNAR-DÍAZ *et al.*, 2020), which have advanced at a rapid technological pace in recent times (MOORTHY *et al.*, 2019). Mobile devices, like all ICT, have been included in the educational field (NOURI, 2019), especially in recent times, where their inclusion has been dizzying (BAYDAS; YILMAZ, 2018), especially in recent months, due to the pandemic generated by the COVID-19 (ERKUT, 2020).

The use of ICT in the teaching and learning process is associated with a change in the roles of educational agents, where students are the real architects of their learning, and teachers become the guides to it. At an international level, the use of ICT in education is endorsed by the European Commission's Digital Agenda 2020 (DÍAZ-GARCÍA *et al.*, 2020), and the Horizon Reports, which promote and indicate trends related to the inclusion of mobile devices in educational processes, among other aspects (DE PABLOS; LLORENT-VAQUERO, 2020).

In the university environment, there is a growing demand for the application of active teaching methods (MORENO-GUERRERO *et al.*, 2020), many of which are associated with the use of ICT in training processes (MAKONYE, 2020), specifically with the use of mobile devices as a means of promoting the acquisition of content (DÍAZ-LÓPEZ *et al.*, 2020).

Therefore, this document establishes an analysis of the degree of use of mobile devices and the application of best practices with mobile devices, specifically with the mobile-learning method (m-learning) in university teachers from the Department of Didactics of Language and Literature.

2 BACKGROUND

The use of the m-learning method in education has been growing in recent years (MITTAL; ALAVI, 2020). This can be understood as the training process, which is carried out from any place and at any time, thanks to the use of mobile terminals with a wireless connection, which allows students to access the necessary data, either through the network or in documentation stored in the device (AL-EMRAN *et al.*, 2020).

This teaching and learning process is based on the socio-constructivist theory of learning (VYGOTSKY, 1979), in that knowledge is constructed on the basis of social interactions and the experience developed with mobile devices. Among all the existing pedagogical models on the use of m-learning,

the most extended is the one established by Kearney *et al.* (2012), which is based on three dimensions: authenticity, collaboration and personalization.

M-learning has a series of characteristics that make its use in the educational field attractive, such as the use of mobile technology, which generates the intrinsic development of digital competence (SHODIPE; OHANU, 2021); it promotes functional learning, making the student learn what he or she is really interested in (CURUM; KHEDO, 2021); it is flexible, as it allows learning from any place and at any time (HWANG; CHANG, 2021); it promotes self-learning, due to the instantaneous access to information (SHUKLA, 2021); it generates objective learning, due to the possibility of contracting the various information provided on the same subject (AL-SIYABI; DIMITRIADI, 2020); and it generates motivation and interest towards learning (SEIFERT; HAR-PAZ, 2020).

The use of this teaching method has a number of advantages, including the possibility of learning anywhere and at any time (NIKOLOPOULOU *et al.*, 2021), promotes instant interaction between all educational agents involved (SWANSON, 2020), encourages collaborative learning and cooperative learning (MITRA, 2020), promotes exploratory learning (KUMAR; SHARMA, 2020), improves student academic performance (KAROUI *et al.*, 2020), increases creativity (BUABENG-ANDOH, 2021) and facilitates language learning (WANG *et al.*, 2020). Although the success of their implementation depends on students' expectations regarding effort, academic performance, expectations, confidence and self-management of learning (CHAO, 2019).

The use of m-learning has become widespread in university education (PRADO, 2020). This is due to the good results it generates in students (RAZZAQUE, 2020). Its perception in the training processes is mainly focused as a means of communication, management of teaching materials, collaborative work and development of new ideas (KHAN *et al.*, 2019). Its didactic application requires a good pedagogical foundation, infrastructure and know-how (POPOV *et al.*, 2020). In addition, personal innovation and previous experiences in mobile social media directly influence student use in the university environment (SIDIK; SYAFAR, 2020). It is noteworthy that in depressed socioeconomic and cultural contexts, knowledge about the m-learning process is low, although there is a lot of interest in its use (OKAI-UGBAJE *et al.*, 2020).

The use of m-learning has led to the development of best practices in the university environment, defined as those practices that lead to the development of skills in students and high satisfaction, and can be transferable to other educational contexts (ROMERO-RODRÍGUEZ *et al.*, 2020a). Aspects which influence the development of good teaching practices include the status of the teaching staff, the type of institution, research into educational technology, the application of pedagogical innovations on a regular

basis, agreement on the suitability of mobile devices, and the belief in the expansion of mobile learning (ROMERO-RODRÍGUEZ *et al.*, 2020b). The use of m-learning is often associated with other pedagogical practices, including collaborative learning, play-based learning and research-based learning (BAI, 2019). A clear example of this is the use of m-learning for teaching didactic programming in future teachers, where an improvement in performance, motivation, resolution and interaction between the educational agents was observed (SOLER *et al.*, 2020), or the application of multi-channel teaching, which merges m-learning and b-learning for teaching the performing arts, where great learning experiences were achieved among the students (ZHOU; LI, 2019).

M-learning has also been used for language teaching, specifically for the acquisition of specific vocabulary in English as a foreign language, with an increase in student attitude (WANG *et al.*, 2020), for teaching English through the use of the Tablet, which increased motivation and attitude towards learning English (ONAL *et al.*, 2019); or for the preparation of the language accreditation exam, through the use of WhatsApp, which provided active learning, continuity of learning, student-instructor interaction, student satisfaction and motivation to learn foreign languages (SARITEPECI *et al.*, 2019).

There are not many studies that analyse the influence of age and gender on the use of m-learning. One such study, by Wang *et al.* (2009), indicates that age differences moderate the effects of effort expectation and social influence on the intention to use m-learning, while gender differences moderate the effects of social influence and self-management of learning. Or the study by Bao *et al.* (2013), where differences are observed in relation to gender, specifically in the self-efficacy of computer use, perceived ease of use and intention to use, but no differences are observed in the usefulness of use.

In short, studies on the use of m-learning in training processes related to language teaching are related to its involvement in pedagogical acts and the factors that influence its use (ONAL *et al.*, 2019; WANG *et al.*, 2020; SARITEPECI *et al.*, 2019). Studies on this subject are scarce, which is why this research was created, with the intention of providing a greater scientific gap on the subject. The objectives set out in this study are i) to analyse the development of good m-learning teaching practices among Spanish university teachers of Didactics of Language and Literature, and ii) to check the factors that influence the development of good m-learning teaching practices. The research questions posed in this study are:

- RQ1: What is the frequency of application of good m-learning teaching practices among university teachers of Language and Literature Didactics?
- RQ2: What socio-demographic factors influence the development of good m-learning teaching practices?

- RQ3: What kind of influence is generated in the interactions between the conditioning factors of the development of good teaching practices?

3 METHOD

3.1 PARTICIPANTS AND PROCEDURE

The study focused on the population of university teachers attached to the Department of Didactics of Language and Literature (DLL), from public and private universities throughout Spain. Through a transversal design by means of a survey, all active teaching staff were invited to participate during the 2019/2020 academic year. So an online survey was distributed using Google Forms, where the faculty decided to participate. The data collection period was from September to December 2019.

Before answering the questionnaire, the participants were informed about the study and gave their informed consent. The research approach resulted in a convenience sampling, since it was proposed to send the invitation for participation to all DLL faculty. A total of 110 teachers from different Autonomous Communities in Spain (Andalusia, Aragon, Asturias, the Canary Islands, Castile and Leon, Catalonia, Madrid, Valencia, Extremadura, Galicia, La Rioja, Navarra, the Basque Country and Murcia) took part. Thus, the sample was made up of 29 men and 81 women, aged between 20 and 68 ($M = 44.72$; $SD = 9.79$). The rest of the socio-demographic data is shown in Table 1.

Table 1. Sociodemographic data

Sociodemographic data	N	%
Gender		
Male	29	26.4
Female	81	73.6
Age		
20-29	3	2.7
30-39	32	29.1
40-49	38	34.5
50-59	26	23.6
60 or more	11	10
Teaching experience		
1-5	20	18.2
6-10	25	22.7
11-15	19	17.3
16-20	17	15.5
21-25	6	5.5
26 or more	23	20.9
Educational technology research		
Yes	45	40.9
No	65	59.1
Mobile learning is appropriate		
Yes	99	90
No	11	10

3.2 MEASURE

The Analysis of M-learning practices at the University (APMU) scale was used for data collection. This scale assesses good m-learning teaching practices among university teachers (AZNAR-DÍAZ *et al.*, 2021). Thus, the instrument analyses the presence of good teaching practices in m-learning through 16 items. The items are divided into five dimensions related to the development of m-learning practices:

mobile devices; digital competence; knowledge construction; cooperative work and; education in good use. The scores on the scale range from 16 to 64 points, where a higher score indicates that the teaching staff have applied good teaching practice, with the cut-off score being 48 points. The response mode is based on a 4-level Likert scale based on frequency, from never to always. The reliability obtained in Cronbach's Alpha test was good (Cronbach's $\alpha = .77$).

3.3 DATA ANALYSIS

Data analysis was performed using IBM SPSS and IBM SPSS Amos, version 24 (IBM Corp., Armonk, NY). With the help of these programs, sample mean scores and standard deviations were established based on each of the socio-demographic factors. In addition, possible significant differences between factors were analysed with the calculation of the T-test for independent samples and the ANOVA.

On the other hand, two path analyses were carried out to check the sociodemographic factors that influenced the development of good teaching practices and the type of influence generated among the dimensions related to good teaching practices. Prior to the establishment of the path analyses, the hypothesis of multivariate normality based on the Mardia coefficient was tested (MARDIA, 1970). Along the same lines, different goodness-of-fit indices were collected to confirm the suitability of the two models (Byrne, 2013): Chi-square (χ^2); degrees of freedom (df); the ratio χ^2/df ; Goodness-of-Fit Index (GFI); Root Mean Squared Error of Approximation (RMSEA); Normalised Fit Index (NFI); Comparative Fit Index (CFI); Adjusted Goodness-of-Fit Index (AGFI); Standardized Root Mean Square Residual (SRMR).

4 RESULTS

The development of good teaching practices by the Language and Literature Teaching staff was 52.73%, extracted from the average scores of each teacher on the APMU scale, where 58 teachers obtained values equal to or greater than 48. In contrast, the statistical-descriptive data show the average scores obtained for each of the socio-demographic factors in the study. At the same time that the possible significant differences between them were collected (Table 2).

With respect to gender, the highest average score is in the women's group ($M = 47.27$), however there have been no significant differences with respect to the men's group ($M = 45.59$; $p = .241$). In the age group, the highest average score was obtained by teachers over 60 years of age ($M = 51.73$). In addition, there has been a trend towards the older the age, the higher the degree of development of good m-learning teaching practices. There were also no significant differences between the age groups ($p =$

.212). The teaching experience groups showed an irregular trend, where the highest score was obtained by those teachers who had a teaching experience of more than 25 years ($M = 49.96$), followed by those teachers who had an experience of between 6 and 10 years ($M = 47.60$). No significant differences were obtained between the groups of teaching experience ($p = .184$). In terms of the line of research, teachers whose line is educational technology obtained higher scores ($M = 49.56$) than those who did not ($M = 44.94$). In this case, significant differences were found between groups ($p = .000$). Finally, among the teachers who believe that the use of m-learning is appropriate, the scores were higher ($M = 47.09$), although there were no significant differences either ($p = .212$).

Table 2. Descriptive statistical data and differences between groups

Sociodemographic data	M	SD	<i>p</i>
Gender			
Male	45.59	5.089	.241
Female	47.27	7.060	
Age			
20-29	45	10	.212
30-39	45.06	6.825	
40-49	46.58	5.875	
50-59	47.50	5.968	
60 or more	51.73	7.577	
Teaching experience			
1-5	43.70	6.634	.184
6-10	47.60	6.212	
11-15	46.11	5.943	
16-20	46.82	6.626	
21-25	44.33	4.546	
26 or more	49.96	7.029	
Educational technology research			
Yes	49.56	5.810	.000
No	44.94	6.521	
Mobile learning is appropriate			
Yes	47.09	6.519	.212
No	44.45	7.353	

On the other hand, the confirmation of the hypothesis of multivariate normality of the data was essential for the elaboration of the structural equation models (SEM). This was calculated with the Mardia coefficient, obtaining in the case of the first path analysis (path 1) adequate values (Mardia = .954). As in the second path analysis (path 2) (Mardia = 1.992). These two coefficients were lower than the value 288, which was extracted from the formula of $p^*(p+2)$ established by Bollen (1989) for the calculation of Mardia's coefficient, where "p" is the number of total variables of the scale (in this case it was 16). For their part, the model goodness-of-fit indices were adequate (Table 3), taking as a reference the criteria established for each of the indices (BYRNE, 2013).

Table 3. Goodness of fit measure

Fit indices	Obtained values		Criteria
	Path 1	Path 2	
χ^2	.809	35.4	
df	3	25	
χ^2/df	.269	1.416	≤3
GFI	.998	.943	≥.90
RMSEA	.000	.042	<.05
NFI	.993	.921	≥.90
CFI	1	.932	≥.90
AGFI	.983	.974	≥.90
SRMR	.019	.077	<.08

Note: GFI = Goodness-of-Fit Index; RMSEA = Root Mean Squared Error of Approximation; NFI = Normalised Fit Index; CFI = Comparative Fit Index; AGFI = Adjusted Goodness-of-Fit Index; SRMR = Standardized Root Mean Square Residual.

The estimates collected in Track 1 show the relationships generated between gender, age, teaching experience, research on educational technology and the belief that mobile learning is appropriate with good teaching practice (GTP) (Table 4). However, the only significant relationship was that established between educational technology research and good teaching practices ($p = ***$).

Table 4. Parameter estimates of final model

Associations between Variables	RW	SE	CR	p	SRW
GTP ← Gender	1.606	1.281	1.254	.210	.107
GTP ← Age	1.115	.798	1.397	.162	.172
GTP ← Teaching experience	.353	.459	.769	.442	.095
GTP ← Educational technology research	-4.646	1.147	-4.051	***	-.347
GTP ← Appropriate	-1.145	1.914	-.598	.550	-.052

Note: GTP = Good Teaching Practices; RW = regression weights; SE = standard error; CR = critical ratio; SRW = standardized regression weights; *** $p < 0.001$.

Thus, the SEM in path 1 graphically captured the associations between socio-demographic factors and the development of good m-learning teaching practices (Figure 1). Good teaching practices, which were influenced by the other socio-demographic factors, were placed as the main construct. The line of research into educational technology was significant. The percentage of variation in GTP was 20% ($R^2 = .204$).

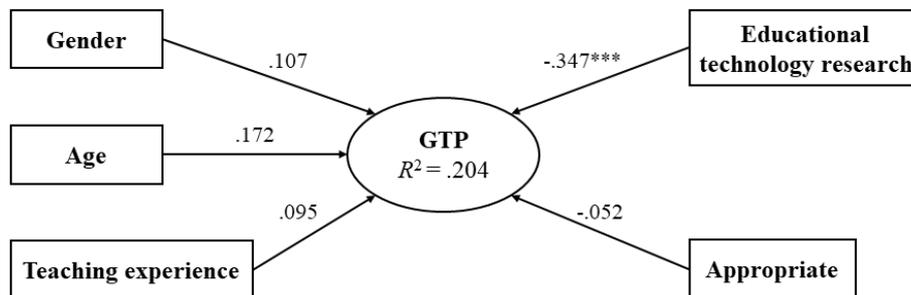


Figure 1. Path 1 structural equation model. Note: *Significant at $p < .001$.**

With regard to path 2, the dimensions that make up the development of good teaching practices were outlined. Thus, connections were established between sociodemographic factors and the dimensions of the APMU scale according to the subordination of factors. Therefore, the relations were established between gender, age and teaching experience with mobile devices and digital competence. At the same time, mobile devices and digital competence with knowledge building and cooperative work. And finally, knowledge building and cooperative work with good use of technology and the factors educational technology research and the belief that mobile learning is appropriate with good use of technology (Table 5). Significant relationships were only established between mobile devices and knowledge building ($p = .001$); mobile devices and cooperative work ($p = .048$); educational technology research and good use of technology ($p = ***$).

Table 5. Parameter estimates of final model

Associations between Variables	RW	SE	CR	p	SRW
MD ← Gender	.293	.336	.872	.383	.081
MD ← Age	-.050	.209	-.237	.813	-.032
MD ← Teaching experience	.054	.120	.450	.653	.060
MD → KB	.369	.115	3.211	.001	.287
MD → CW	.204	.104	1.975	.048	.183
DC ← Gender	-.097	.217	-.448	.654	-.031
DC ← Age	.067	.135	.494	.621	.049
DC ← Teaching experience	.060	.079	.758	.449	.077
DC → KB	1.337	.746	1.793	.073	.897
DC → CW	.215	.120	1.792	.073	.166
EDU ← KB	.282	.179	1.572	.116	.157
EDU ← CW	-.105	.204	-.512	.608	-.050
EDU ← Appropriate	1.247	1.062	1.174	.240	.102
EDU ← Educational technology research	-2.17	.656	-3.31	***	-.291

Note: MD = mobile devices; DC = digital competence; KB = knowledge building; CW = cooperative work; EDU = good use of technology. RW = regression weights; SE = standard error; CR = critical ratio; SRW = standardized regression weights; *** $p < 0.001$.

The graphic expression of path 2, showed the relationship of factors, where they were placed as main constructs: mobile devices; digital competence; knowledge building; cooperative work; good use of technology (Figure 2). The significance in the established relationships exemplified the possible factors that were the cause of the development of the construct KB, CW (in this case MD) and EDU (in this case educational technology research). The percentage of variation of each construct established by the coefficient of determination was .09% for mobile devices ($R^2 = .009$), of 1.5% for digital competence ($R^2 = .015$), of 44% for knowledge building ($R^2 = -.448$), of 6.1% for cooperative work ($R^2 = .061$); and 12% for good use of technology ($R^2 = .126$).

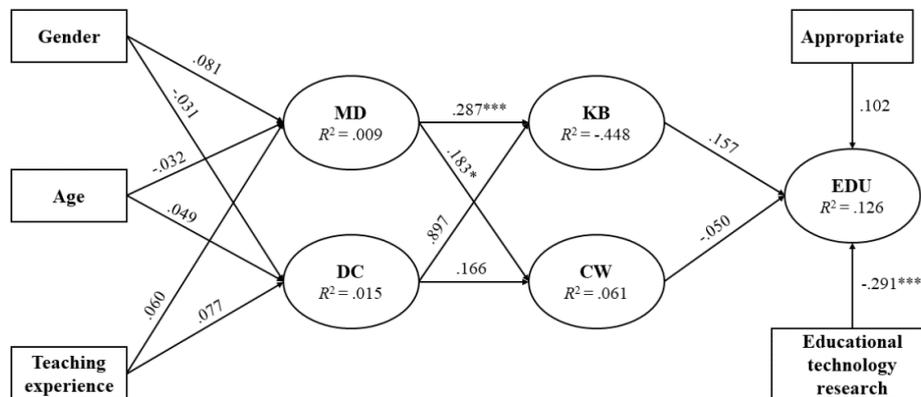


Figure 2. Path 2 structural equation model. Note: *Significant at $p < .05$; ***Significant at $p < .001$.

5 DISCUSSION

The data indicated a prevalence rate on the development of good teaching practices of almost 53% of university teachers of Language and Literature Didactics. Likewise, the results obtained show a panorama in line with international organisations that are calling for the application of mobile devices in the classroom (DÍAZ-GARCÍA *et al.*, 2020; DE PABLOS; LLORENT-VAQUERO, 2020).

Regarding gender differences, no significant difference was found between women and men unlike other studies (BAO *et al.*, 2013). However, the highest average score was obtained in the women's group. So possibly, based on the data obtained, women have been more likely to successfully develop learning based on the use of mobile devices.

On the other hand, the greatest development of good teaching practices has been achieved by the group of teachers with the greatest teaching experience and age. Although no significant differences were established between these population groups, it is curious that scores are higher in senior teachers than in junior teachers. This calls into question some beliefs and experiences that encourage young people to use technology more easily than adults. Thus, age is a possible determinant in the use of m-learning (WANG *et al.*, 2009).

With regard to the line of research in educational technology, it was confirmed that this was a possible conditioning factor for the development of good teaching practices, where significant differences were found between the groups. In addition, teachers who had a firm belief in the suitability of m-learning for the development of learning obtained a greater predisposition to apply good teaching practices. Thus, personal concern and experience in the use of mobile devices is a key determinant for

the successful development of m-learning practices (SIDIK; SYAFAR, 2020). This can be explained by the level of experience with technology presented by teachers who know and experiment with ICT, which has a significant influence on the development of good teaching practice experiences. Not surprisingly, these teachers have a higher predisposition to develop good practices, as indicated by previous research data (ROMERO-RODRIGUEZ *et al.*, 2020b).

For their part, the data obtained in the path analysis gathered evidence that the preconditions for the use of mobile devices in the classroom is a possible conditioning factor in both the construction of knowledge (in line with previous studies - AL-SIYABI; DIMITRIADI, 2020; CURUM; KHEDO, 2021; MITRA, 2020; SHUKLA, 2021) and digital competence (SHODIPE; OHANU, 2021). Teachers are therefore urged that the preconditions for students' use of mobile devices are the first stage in developing more advanced skills. At the same time, being an expert in educational technology research makes it easier for teachers to understand the risks associated with it and therefore, m-learning practices introduce elements on education in the proper use of technology. All of this is fundamental for the development of good m-learning teaching practices in a context marked by the speciality of teachers, associated with Language and Literature, where it has been observed that the use of mobile devices facilitates language learning (ONAL, *et al.*, 2019; SARITEPECI *et al.*, 2019; WANG *et al.*, 2020).

6 CONCLUSION

It can be concluded that more than half of the university teachers in the Department of Didactics of Language and Literature develop good teaching practices through the use of m-learning. In these good practices, gender is not influential, but age and teaching experience are. The older and more experienced you are, the better the use of m-learning. In addition, the personal concern and experience in the use of mobile devices by teachers is a key factor in the appropriate development of the m-learning method.

The purpose of this research is to offer a specific vision to the scientific community about the use of m-learning. Specifically, a vision of the use and the factors that influence the use by university teachers of the Department of Didactics of Language and Literature. With these results, the bodies responsible for training these teachers can establish appropriate guidelines to offer training programs based on the results achieved in this research.

The limitations of the study focus on several aspects. On the one hand, the compilation of the sample presented here, given that the selection of such a specific sample has required many communications with the various strata. This fact makes the research more difficult. On the other hand, in this research

the sample has been selected for convenience, so care must be taken when extrapolating the data presented here to other similar contexts. As a future line of research, it is proposed to carry out a study of similar characteristics in other teaching departments, in order to be able to know more accurately the specificities of the use of m-learning in other fields of knowledge.

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