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A survey on m-Learning of Secondary School Teachers in Greece

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Abstract

The purpose of this study was to investigate the views towards m-learning, of a specific group of secondary school teachers, who are interested in e-Learning, are experienced in ICT and although they all use mobile devices in their everyday life, only a small percentage of them have adopted m-Learning in their teaching practice. There were 208 teachers who completed online a Mobile Learning Perception Scale questionnaire. Teachers' views were in general positive and the more they use mobile technology in their classroom, the more they express positive perceptions. Four factors were identified (Communication, Delivery of teaching materials, Specialization, Teaching and Learning). 'Specialization' and 'Teaching & Learning' had higher values of average mean, in comparison to the other two factors. This finding indicates that secondary school teachers trust m-learning adequacy for teaching lessons of their specialization more than they do for communication purposes or delivery of teaching materials.

Keywords: Mobile learning, Teacher views, MLPS survey

Introduction

With the rapid technology advancement and the upcoming 5G networks, mobile applications are expected to increase in various aspects of life, including health (m-Diagnosis), finance (m-Banking) and education (m-Learning). We could identify Mobile Learning (m-Learning) as the process of learning mediated by mobile devices, such as smart phones and tablets, anytime and anywhere with no restrictions on time and location (Schuler et al., 2012). Mobile technology has the potential to support teaching and learning and teachers' views are important since these affect the actual use of technology in the classroom (Kim & Kim, 2017). Since the effective implementation of any information technology depends on user acceptance, several studies have been conducted, based on the technology acceptance model (Davis, 1989), or its variants, according to which, the intention of adopting the new technology and the actual use of it, depend on the perceptions of usefulness and easiness of use. Within this framework, teachers' perceptions on mobile learning were explored in different countries, and were found positive, in Belgium (Montrieux et al., 2014), in the USA (Black-Fuller et al., 2016), in Kuwait (Al-Furaih & Al-Awidi, 2018) and in Korea (Kim & Kim, 2017). However, teachers' adequacy levels were reported to hinder the actual incorporation of m-Learning in class, although teachers wanted to use it (Ozdamli & Uzunboylu, 2015).

In Greece, even-though the integration of mobile devices in schools is not directly supported by the current regulations, some teachers do actually use mobile technology in classroom (Nikolopoulou & Kousloglou, 2020). Though there is limited empirical evidence, it seems that teachers (overall) express positive perceptions on mobile technology adoption (Kousloglou & Syrpi, 2018; Nikolopoulou et al., 2021). Most of the above-mentioned studies were conducted with the "average" schoolteacher in mind. In this study we focus in a

specific group of teachers, who are interested in e-Learning, are experienced in ICT and although they all use mobile devices in their everyday life, a small percentage of them have adopted m-Learning in their teaching practice. The research questions are, to investigate the views of this particular group towards m-Learning, to identify the latent factors in teachers' views and to investigate the impact of using m-Learning in the classroom on their views.

Materials & Methods

The results of the survey were derived from a sample of 208 secondary school teachers of all specializations (Literature, Math, Science, Informatics, Foreign Languages, etc.) of whom 126 (60.5%) were females and 82 (39.4%) males. The questionnaire was provided openly through a facebook group to those teachers who were interested. The facebook group addresses issues on e-Learning and m-Learning, and 208 out of 550 members were responded. Their age ranged from 25 to 65+ years, and their teaching experience was varying from 1 to 30+ years. The vast majority of the participants (194) claimed that they use smartphone/tablet on daily basis and almost half of them (119) that they have an extensive experience in using ICT in their classroom; however, most of the participants (136) declared that they rarely (or never) use m-Learning technology in their teaching.

Data were collected online via the MLPS questionnaire during the school year 2020-2021. Ethical issues were considered and the participation was voluntary. MLPS was developed by Uzunboylu and Ozdamli (2011) and consists of 26 items on a 5-point Likert-type scale ranging from "strongly disagree" (value: 1) to "strongly agree" (value: 5). The original questionnaire was adapted, validated for content and construct validity and translated into the Greek language. The questionnaire was administered to Greek secondary school teachers and was checked for the internal reliability by Cronbach-α. Exploratory Factor Analysis (EFA) using the SPSS statistics software, v.20, was performed the data analysis.

Results & Discussion

Table 1 shows the EFA results, along with mean and standard deviation. The original MLPS questionnaire was analysed into three latent factors, namely, *Aim-Mobile Technologies Fit*, *Appropriateness of Discipline/Specialization* and *Forms of M-learning Application and Tools' Sufficient Adequacy of Communication*. In our study four factors were identified that are responsible for the 56.8% of the total variance, as results from the sum of squared loadings. Oblique rotation (Direct Oblimin) was selected, since it gives a clearer picture for the factors, as each question corresponds to a single factor, and is confirmed by the Component Transformation Matrix Table, which is diagonal. This means that factors are correlated, which is believed to be due to the fact that the majority of the teachers rarely use m-Learning in their classroom, and therefore do not have a clear view of each latent factor.

The 1st factor (*Communication*) detects the teachers' views on the adequacy of m-Learning tools for the communication between teacher-student, and student-student. 8 of the questions are grouped under the 1st factor. The 2nd factor (*Delivery of teaching materials*) detects whether m-Learning may help in delivering teaching materials and groups 3 questions. The 3rd factor (*Specialization*) detects the teachers' views on the appropriateness of mobile technology for the teachers' specialization, and groups 7 questions. The 4th factor (*Teaching & Learning*) detects the teachers' views on the adequacy of m-Learning on Teaching & Learning, and groups 6 questions. Two questions were left out, as they do not show any significant loading in any factor. These two items are more directly related to the way that m-Learning is used in the classroom, and therefore they do not show any clear

grouping by teachers who rarely use m-Learning.

The mean value of the questions is high, which is considerable, taking into account that teachers rarely use m-Learning in their teaching. The impact of teachers' characteristics (gender, age, years of teaching experience, and discipline/specialization) has been reported in another paper (Kousloglou et al., 2021); the only differences revealed regards that female teachers are expressing more positive views for the *Specialization* factor.

Table 1 shows that Factors 3 (*Specialization*) and 4 (*Teaching & Learning*) have higher values of Mean, in comparison to the other two. This finding indicates that secondary school teachers trust m-Learning adequacy for teaching lessons of their specialization more than for communication and delivery of teaching materials. This may be due to lack of experience of the teachers in using m-Learning in their practice, though it should not be excluded a concern of the teachers for an improper use of the mobile devices by their students.

Table 1. Factor Loadings, Mean values and Std Deviations on the four subscales(N=208)

Question	Loading	M	SD
Factor 1: Communication (Cronbach-a = 0.855)			
22. Student-student communication is facilitated by means of M-learning tools	.815	3.94	0.67
12. Teacher-student communication is facilitated by means of M-learning tools	.709	3.94	0.68
26. Students can have more effective communication with mobile technologies than traditional methods	.699	3.49	0.85
13. Utilization of m-learning technologies increases students' motivation	.572	3.87	0.75
04. I can use M-learning apps (viber, messenger, sms etc.) as a good discussion tool with my students in the learning activities	.521	3.86	0.78
17. M-learning apps is a good method for the interaction, which is necessary in my class	.505	3.71	0.73
02. M-learning apps generate effective learning-teaching environments	.443	3.79	0.65
23. M-learning technologies can be used as a supplement in all classes on all subjects	.417	3.80	0.81
*Factor 2: Delivery of teaching materials (Cronbach-a = 0.355)**			
19. Course materials could be sent to students via MMS messages	.685	3.42	0.98
08. An effective learning environment could be produced by sending lecture notes via M-learning tools such as e-mail	.532	3.70	0.85
01. M-learning tools remove the limitation of time and space	-.430	3.74	0.87
Factor 3: Specialization (Cronbach-a = 0,897)			
10. M-learning applications is a good method in learning my specialized subject	-.938	3.81	0.76
09. M-learning applications facilitate teaching the subjects in my specialization	-.921	3.97	0.73
11. M-learning is effective in exact transmission of knowledge in learning activities	-.749	3.74	0.73
07. Learning activities can be realized by means of M-learning apps in e-learning	-.573	3.86	0.67
03. Teaching–Learning process should be performed any with M-learning tech.	-.545	4.01	0.65
06. M-learning applications can be used to supplement the traditional education	-.451	4.13	0.66
21. I would like to supplement my classes in future with M-learning method	-.423	3.94	0.67
Factor 4: Teaching & Learning (Cronbach-a = 0.819)			
25. Learners can access the instructional websites with mobile technologies	.786	4.09	0.60
15. M-learning applications are reliable for personal use	.748	3.81	0.67
14. I can have a prompt access to materials that I need which is related to my specialization by means of mobile technologies	.688	4.11	0.62
16. Communication is possible in chat programs by means of mobile technologies	.681	3.98	0.60
18. M-learning apps are convenient to share specialized knowledge with my colleagues	.624	3.91	0.72
05. Apps such as Messenger which are used through M-learning tools, provide opportunity for discussions on subject without the limitation of time and space	.505	4.06	0.63

Ungrouped questions		
M-learning apps provides a convenient environment to do discussions on my specialized subject	3.72	0.72
M-learning systems increase the quality of lessons	3.58	0.76

** The small value of Cronbach-a compared to other ones is due to the low number of items for this factor.*

In order to investigate the impact on teachers' views the actual use of m-Learning in classroom, a t-test analysis was performed, between two groups of teachers, the ones who use it frequently and the others who have never or rarely used it. Significant differences ($p<0.01$) were found in two factors (Communication & Specialization), as shown in Table 2.

Table 2. Means per factor according to m-learning usage in classroom

Use in classroom		*Factor 1*	*Factor 2*	*Factor 3*	*Factor 4*
Never, rarely	Means:	3.70	3.55	3.79	3.94
Daily, many times/day		4.07	3.87	4.27	4.10
Sig.		**0.001**	**0.017**	**0.000**	0.089

In order to elucidate the reasons of the differences in the two factors, a t-test analysis was performed for each individual question between the two groups. Results are shown in Table 3 for the questions with the larger difference in the mean value. It seems that a greater impact on Factor 1 (Communication) have the questions 4, 12 and 17, which concern teacher-student communication, while on Factor 3 (Specialization) the questions 3, 7, 9 and 10, which highlight mobile technology as a key tool in the teaching process. It seems that the more teachers implement m-learning in the classroom, the more they trust their communication with students via mobile devices, and the more they perceive the appropriateness of mobile technology for their specialization.

Table 3. Mean differences/question according to m-learning usage in classroom

	Factor 1			Factor 3			
Question No.	4	12	17	3	7	9	10
Mean differences	0.60	0.44	0.46	0.52	0.69	0.53	0.62
sig.	.000	.002	.003	.000	.000	.001	.000

Conclusions

This study investigated Greek secondary school teachers' mobile learning views, by using the MLPS survey. Teachers' views were in general positive, and this is in line with earlier research (e.g. Uzunboylu & Ozdamli, 2011; Montrieux et al., 2014). We identified 4 factors, namely, F1: Communication, F2: Delivery of teaching materials, F3: Specialization and F4: teaching & Learning. F3 and F4 have higher values of Mean, in comparison to the other two. This finding indicates that secondary school teachers in Greece trust m-Learning adequacy for teaching lessons of their specialization more than for communication and delivery of teaching materials. The more the teachers use mobile technology in their classroom, the more they express positive perceptions. Significant differences existed for Factors 1 and 3. This is a work/study in progress, and besides the quantitative approach, a qualitative analysis is also planned. Future research is planned to investigate teachers' willingness in using m-Learning in different subjects, the type of mobile devices used and the educational activities carried out.

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