Investigating Secondary Teachers' Perceptions toward Mobile Learning

Abstract

Nowadays, the daily activities of the productive members of modern societies are structured around smart mobile devices and their applications, which support the delivery of public services and goods, such as health and education. Since smartphones and tablets are increasingly widespread throughout the world, the educational, research, and academic community has carefully focused on examining methods of utilizing and integrating smart mobile devices into the educational process, aiming to upgrade the learning experience. An important factor that enables the prediction of the speed and degree of successfully integrating mobile technology in the educational process is teachers' attitudes and beliefs toward mobile learning (m-learning). Pertinent research studies are of particular importance since they serve to identify the strengths and weaknesses of the m-learning model and facilitate the development of mobile technology infrastructure. This article reports on the results of a relevant research study conducted in Greece, under the umbrella of a robust ethical framework and within the context of quantitative methodology for data collection. The purpose of the study was to examine the perceptions of teachers in Vocational High Schools regarding the integration of mobile technology in the educational process, as well as potential factors that might shape these perceptions. The statistical analysis of the research data revealed that teachers recognize the benefits of exploiting educational aspects of mobile technology, although they have serious concerns regarding the appropriate integration of smart mobile devices in formal educational settings. These results can form the basis of future studies regarding deploying smart mobile devices in Secondary Education, in the context of formal learning.

Keywords: *mobile learning, m-learning, mobile devices, teachers' perceptions, Secondary Education.*

1. Introduction

Nowadays, the impressive development of technology has strongly influenced numerous aspects of human lives, reshaping the delivery of public goods and services, such as health and education [1]. Over the last few years, teaching and learning methods are gradually moving away from traditional teacher-centered techniques to modern approaches, such as e-learning and m-learning [2], [3]. The establishment of exploiting smart mobile devices for educational purposes amplifies teaching and learning potentials and adapts the educational process according to the needs and preferences of todays' students, who are all digital natives [2], [3].

Nevertheless, the speed and degree of successfully integrating mobile technology in the educational process depends to a great extent on teachers' attitudes and beliefs toward m-learning [4]. Examining teachers' perceptions gives insight to the strengths and weaknesses of the m-learning model and facilitates the identification of demands regarding the development of relevant technology infrastructure [4], [5], [6]. Within this concept, the present research study investigates Vocational High School teachers' perceptions toward m-learning. It also examines gender differences in the acceptance of m-learning. Therefore, the research questions that drive this paper are RQ1. "What are Vocational High School teachers' perceptions toward m-learning?" and RQ2. "Is there significant difference between male and female teachers' perceptions toward m-learning?"

2. Theoretical framework

The evolution of mobile Internet communications and the wide use of smart mobile devices have dramatically affected the way modern people interact and communicate with each other [2]. Mobile technology reshaped several aspects of everyday lives, with education to be one of them.

Important parameters that shape teachers' attitudes and beliefs toward m-learning are their relevant experience and training [7], self-efficacy, subjective norm, enjoyment, mobile anxiety, facilitating conditions, social influence, innovativeness, and satisfaction [8]. Teachers also give

special importance to the technical characteristics of mobile technology i.e., portability, accessibility, and multimedia features of the devices [7]. They pay great attention to the availability of technical infrastructure, technical support and appropriate learning resources [7].
According to teachers' perceptions, the major benefits of m-learning include stimulating students' learning interests, meliorating students' concentration, augmenting the curriculum content, and improving learning convenience [9]. Educators who integrate mobile technology into the educational process focus on the facilitated access to information, and the introduction of a new way of learning that increases learners' participation [10]. They also appreciate the entailed pedagogical advantages, since the appropriate use of mobile devices can support innovative pedagogical approaches and strategies, such as collaborative learning, blended learning, interactive learning, experiential learning (learning in context), and problem-based learning [11].
On the other hand, major barriers in the integration of mobile technology in the learning process are reported to be the lack of Internet security literacy by many educators, and the lack of sufficient competences to effectively introduce m-learning in the classroom [9]. A notable concern of teachers regarding the integration of m-learning in the educational process is related to the potential distraction of the learners, the classroom management challenges, and the quality of learning provided [12]. Another serious inhibiting factor for the adoption of m-learning is the effort and time required by teachers to get trained in order to fully exploit mobile devices, and to become familiar with the new teaching model [5], [13], [14]. Finally yet importantly, the lack of appropriate hardware and network infrastructure, the unreliability of Internet connections, the structure of traditional classrooms in a way that does not facilitate learners to collaborate using mobile devices, and the obligation not to deviate from the curricula hampers the implementation of innovative teaching practices in m-learning contexts [14].

3. Research methodology

3.1 Sample, study instrument and survey structure

This article reports on the results of a research study conducted in Greece, which is still on progress. The data currently available are limited in number and have been obtained only from the city of Heraklion, and, more precisely, from three different Vocational High Schools [15]. By the starting day of writing this article, 53 teachers participated in the study. The sample was gender balanced - 27 men and 26 women.
Data collection was materialized via a questionnaire, which was distributed and filled out using a Google Form. The questionnaire consists of two sections. The first section focuses on gathering participants' personal information such as gender, age, specialty, type of degree they hold, etc. The second section focuses on assessing teachers' perceptions toward m-learning, exploiting the Mobile Learning Perception Scale (MLPS) [6]. MLPS consists of 26 statements (Table 1) and adopts a five-point Likert scale with the following possible answers "strongly disagree", "disagree", "neutral", "agree", and "strongly agree" [6].
The creators of MLPS determined three sub-dimensions: 'Aim-Mobile Technologies Fit' (Factor I - Q1, Q2, Q5, Q8, Q11, Q13, Q20, Q23), 'Appropriateness of Branch' (Factor II - Q4, Q9, Q10, Q14, Q15, Q17, Q18, Q21, Q24), and 'Forms of M learning Application and Tools' Adequacy of Communication' (Factor III - Q3, Q6, Q7, Q12, Q16, Q19, Q22, Q25, Q26). In the present research study, this classification was maintained, leading to the examination of the relevant three groups (factors).

4. Results

We tested the hypotheses set at a 5% level of significance, and, thus, with the alpha level of 0.05. Table 1 presents teachers' mean scores and standard deviations on the three factors. For each factor, the average of the mean score of its items was calculated. The results indicate teachers' positive perceptions regarding Factor I and Factor II – the average of the mean scores were found to be 3.528302 and 3.90566, respectively. On the contrary, Factor III brought out teachers' concerns regarding forms of m-learning application and adequacy of communication – average of the mean score = 2.924528.

Table 1. The Mobile Learning Perception Scale, mean and standard error for each item.

The Mobile Learning Perception Scale	Mean	SD
Q1. M-learning tools remove the limitation of time and space.	3.53	0.93
Q2. M-learning applications do not generate effective learning-teaching Environments.	2.77	0.89
Q3. Teaching–Learning process should be performed any with M-learning Technologies.	2.92	0.98
Q4. I can use M-learning applications as a good discussion tool with my students in the learning activities.	3.91	0.81
Q5. Programs such as Messenger and Skype which are used through M-learning tools, provide opportunity for discussions on subject without the limitation of time and space.	3.58	1.15
Q6. M-learning applications can be used to supplement the traditional education.	3.89	0.87
Q7. Learning activities can be realized by means of M-learning applications in e-learning.	3.75	0.87
Q8. An effective learning environment could be produced by sending lecture notes via M-learning tools such as e-mail.	3.79	0.95
Q9. M-learning applications facilitate teaching the subjects in my branch.	3.36	1.02
Q10. M-learning applications is a good method in learning my specialized subject.	3.21	1.13
Q11. M-learning technologies is an effective method in exact transmission of knowledge in learning activities.	3	0.98
Q12. Teacher-student communication is facilitated by means of M-learning tools.	3.49	1.14
Q13. Utilization of m-learning technologies increases students' motivation.	3.42	1.1
Q14. I can have a prompt access to materials that I need which is related to my branch by means of mobile technologies.	4.06	0.72
Q15. M-learning applications are reliable for personal use.	3.55	0.85
Q16. Communication is possible in chat programs by means of mobile technologies.	3.96	0.68
Q17. M-learning applications is a good method for the interaction, which is necessary in my class.	3.15	1.03
Q18. M-learning applications are convenient to share my specialized knowledge with my colleagues.	3.60	0.97
Q19. Course materials could be sent to students via MMS messages.	3.04	1.24
Q20. M-learning systems increase the quality of lesson.	3.17	0.99
Q21. I would like to supplement my classes in future with M-learning method.	3.30	1.01
Q22. Student-student communication is facilitated by means of M-learning tools.	3.64	1.08
Q23. M-learning technologies can be used as a supplement in all classes on all subjects.	3.32	0.98
Q24. M-learning applications provides a convenient environment to do discussions on my specialized subject.	3.49	0.95
Q25. Learners can access the instructional websites with mobile technologies.	3.74	0.88
Q26. Students can have more effective communication with mobile technologies than traditional methods.	3.66	1.05

In order to investigate potential significant differences between male and female teachers' perceptions, we set the hypotheses H1. "There is no association between gender and teachers' perceptions toward Aim-Mobile Technologies Fit", H2. "There is no association between gender and teachers' perceptions toward Appropriateness of Branch", and H3. "There is no association between gender and teachers' perceptions toward Forms of M learning Application and Tools' Adequacy of Communication". Then, we employed the multivariate hypothesis testing for each

factor (Table 2, 3, 4). All multivariate tests (Pillai, Wilks, Hotelling-Lawley, Roy) gave the same results, confirming the validity of the results. In the cases of Factor I and Factor II, p-value (last column in Tables 2, 3) is greater than 0.05. Therefore, the deviation from each hypothesis set is not statistically significant, and hypotheses H1 and H2 are not rejected. On the contrary, in the case of Factor III, p-value is less than 0.05. Thus, the hypothesis H3 is rejected, meaning that there are significant differences in the group mean vectors. Nevertheless, the summary of the analysis of variance revealed that only the item Q16 showed significant gender differences (p-value = 0.003485, male mean score = 4.222222, female mean score = 3.692308). Finally, the value we got performing the metric of Partial Eta Squared was 0.38. This value indicates that gender's effect size is large, since the value is greater than 0.14.

Table 2. Multivariate tests for the 'Aim-Mobile Technologies Fit' factor

	Df	test stat	approx F	num Df	den Df	Pr(>F)
Pillai	1	0.0715237	0.4236837	8	44	0.90054
Wilks	1	0.9284763	0.4236837	8	44	0.90054
Hotelling-Lawley	1	0.0770334	0.4236837	8	44	0.90054
Roy	1	0.0770334	0.4236837	8	44	0.90054

Table 3. Multivariate tests for the 'Appropriateness of Branch' factor

	Df	test stat	approx F	num Df	den Df	Pr(>F)
Pillai	1	0.2585891	1.666392	9	43	0.12717
Wilks	1	0.7414109	1.666392	9	43	0.12717
Hotelling-Lawley	1	0.3487798	1.666392	9	43	0.12717
Roy	1	0.3487798	1.666392	9	43	0.12717

Table 4. Multivariate tests for the 'Forms of M learning Application and Tools' Adequacy of Communication' factor

	Df	test stat	approx F	num Df	den Df	Pr(>F)
Pillai	1	0.3794637	2.921655	9	43	0.0086004
Wilks	1	0.6205363	2.921655	9	43	0.0086004
Hotelling-Lawley	1	0.6115091	2.921655	9	43	0.0086004
Roy	1	0.6115091	2.921655	9	43	0.0086004

5. Discussion and Future Work

M-learning has led to a new era of learning, aligned with the increasing growth of users' preferences for mobile technology [2], [3]. The contribution of this study concerns the examination of an uninvestigated field i.e., Vocational High School teachers' perceptions toward m-learning.

The results of this study are confirmed by the relevant literature. Teachers face the injection of mobile technology in the classroom with restrained optimism regarding the impact on the educational process [3]. As far as the influence of teachers' gender on their perceptions toward m-learning, there are contradicting evidence in the relevant literature. For example, there are studies, which report that male teachers face m-learning more positive than female teachers [4], [6], while other studies did not detect teachers' preferences toward m-learning by gender [16], [17].

Although this study yielded significant results regarding Vocational High School teachers' perceptions toward m-learning, it also has some limitations. To begin with, it has focused on determining if gender has an impact on teachers' perceptions toward m-learning. Thus, our research plans include the examination of other factors, such as age, teachers' specialty, education level, etc. Moreover, the sample size is quite small since the research process is on progress. Finally, we intend to broaden our research study, adopting the mixed-method research methodology.

6. Conclusion

Introducing m-learning in compulsory education entails significant changes in learning and teaching [2], [3]. Since the role of teachers in this process is indisputable [16], it is important to understand their perceptions in order to fully exploit the benefits of m-learning [4].

The purpose of this study was to examine the underexplored field of Vocational High School teachers' perceptions toward m-learning and investigate potential differences by gender. Although the data gathered so far are limited, since the research process is still on progress, the results obtained provide a solid base for relevant studies of broader extent, since they bring out teachers' both positive viewpoints and concerns toward m-learning, that appear not to be correlated with gender.

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