Nikou, S.A. and Economides, A.A. (2019), Factors that influence behavioral intention to use mobile-based assessment: A STEM teachers' perspective. Br J Educ Technol, 50: 587-600. doi:10.1111/bjet.12609

Factors that influence Behavioral Intention to Use Mobile-Based Assessment: a STEM teachers' perspective

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ABSTRACT

Although there are previous studies on mobile learning acceptance, there is limited evidence about the acceptance of mobile-based assessment. Furthermore, there is not any study that examines the factors that influence the acceptance of mobile-based assessment from the teachers' perspective. This paper aims at exploring STEM teachers' acceptance of Mobile-Based Assessment (MBA). The proposed model, Teachers' Acceptance of Mobile-Based Assessment (TAMBA) is based on the Technology Acceptance Model (TAM). The variables of Perceived Ease of Use, Perceived Usefulness, Social Influence, Facilitating conditions, Mobile self-Efficacy and Output Quality were used to explain and predict Behavioral Intention to Use mobile-based assessment from the teachers' perspective. Self-reported data were gathered from 161 STEM teachers from 32 European countries. Structured equation modeling was used for the analysis. All hypotheses proposed for the study were supported, with the model to explain about 50% of the total variance in Behavioral Intention to Use. Implications for teacher professional development and integration of mobile-based assessment in the wider context of mobile learning adoption are discussed.

Keywords

Technology acceptance; mobile learning; mobile-based assessment; secondary education; Perceived Ease of Use; Perceived Usefulness; Social Influence; Facilitating conditions; Mobile self-Efficacy; Output Quality; Intention to Use; STEM

Introduction

Mobile learning is an emerging trend that it has a great potential in education (Sung, Chang, & Liu, 2016). It facilitates and enhances learning process via mobile devices anytime and anywhere (Baydas & Yilmaz, 2016). Mobile technologies also provide new and enhanced opportunities to access learning through Mobile-Based Assessment (MBA), the computerized means of assessment that is delivered through mobile devices. In the wider context of Bring Your Own Device (BYOD) emerging trend the topic of mobile-based assessment is increasingly important for educators. Mobile-based assessment can be administered either inside or outside the classroom boundaries. Furthermore, MBA can be part of a pure mobile learning teaching and learning strategy or a blended approach complementing paper-based or other traditional forms of teaching and assessment. Mobile devices replace clicker technologies for classroom polling (Stowell, 2015). They facilitate mobile-based assessments blended into learning managements systems (Bogdanovic, Barac, Jovanic, Popovic, & Radenkovic, 2013). They can support ubiquitous and context-aware assessments (Chu, Hwang, Tsai, & Tseng, 2010). They facilitate formative assessments providing personalized feedback and enable peer-and self-assessments (Nikou & Economides, 2013). They can support performance-based (Campbell & Main, 2014) and competency-based assessments (Coulby, Hennessey, Davie, & Fuller, 2010). Therefore, it is worthwhile to study MBA adoption separately from mobile learning adoption in general.

However, effective implementation of an information system depends on user acceptance (Davis, 1989). Moreover, teacher beliefs and attitudes are always critical factors that influence the successful integration of new technologies into classrooms (Kim et al., 2013). Teachers not only are the primary agents that introduce new technologies into the classrooms but they can also influence students' perceptions. Therefore, for the successful implementation of mobile-based assessment the investigation of the teachers' perceptions is of great significance.

Although research provides some evidence about mobile learning acceptance from the teachers' perspective (El-Gayar, Moran, & Hawkes, 2011), no study exists that examines teachers' acceptance of mobile-based assessment. The current study is

aiming at filling this gap in the literature by investigating the factors that influence Science Technology Engineering and Mathematics (STEM) teachers' behavioral intention to use mobile-based assessment. With the growing popularity of mobile learning and the spreading of BYOD policies, there is a need to facilitate K-12 STEM teachers to adopt mobile technologies in their classes (Hu, & Garimella, 2014). Effective technology integration into STEM teaching does not only promote teacher professional development but it also has a positive effect on student learning outcomes as well (Elliot & Mikulas, 2012).

The study is organized as follows. The next section presents a literature review about mobile learning acceptance from the teachers' perspective. Next, the study presents the research model with the hypotheses to be tested. Methodology section (participants, instruments and procedure) follows with the data analysis and results section to come afterwards. Discussions and conclusions for the impact in education follow next along with the study limitations and future work.

Literature review

Mobile learning and assessment are still new to many schools and therefore teachers self-report varying degrees of willingness to adopt these technologies (Chiu & Churchill, 2016). There are studies reporting positive teachers' perceptions about mobile teaching and learning (Baran, 2014; Uzunboylu, & Özdamli, 2011). However, other studies report that teachers either do not support the use of mobiles in classroom or they acknowledge uncertainty (Gao, Yan, Wei, Liang, & Mo, 2017; Thomas, O'Bannon, & Britt, 2014). Teacher beliefs and attitudes can affect the adoption of mobile devices into teaching (Chiu & Churchill, 2016). Furthermore, technology acceptance research in the mobile learning context investigated various extensions to TAM in order to explain behavioral intention to use from the teachers' perspective. Mac Callum, Jeffrey and Kinshuk (2014) added the variables of digital literacy, ICT anxiety and ICT teaching self-efficacy. Sánchez-Prieto, Olmos-Migueláñez, & García-Peñalvo (2017) incorporated also the constructs of self-efficacy and mobile anxiety. Self-efficacy has a positive impact while anxiety negatively influences behavioral intention to use. Baydas and Yilmaz (2016) proposed a model where teachers' attitudes and cognitive needs have an influence on their behavioral intention while their affective and social needs do not. O'Bannon and Thomas (2014) suggested that teachers'

perceptions regarding the beneficial mobile features for school related work depends on the teachers' age. The following Table 1 summarizes the aforementioned studies about teachers' acceptance and perspectives on mobile learning.

While studies exist that investigate teachers' perceptions of mobile-based learning, no study exists that particularly focuses on the teachers' acceptance of mobile-based assessment.

Table 1. Teacher's acceptance and perspectives on mobile learning

Study	Subjects	Country	Findings
Sánchez-Prieto, Olmos-Migueláñez, & García-Peñalvo (2017)	678 pre-service primary school teachers	Spain	Extends TAM with the constructs of self-efficacy and mobile anxiety
Mac Callum, Jeffrey, & Kinshuk (2014)	196 secondary teachers	New-Zealand	Perceived usefulness, ease of use, digital literacy, anxiety, and teaching self-efficacy were critical factors in lecturers' behavioral intentions to use mobile learning
Baydas & Yilmaz (2016)	276 pre-service teachers	Turkey	Attitudes and cognitive needs influence intention to adopt mobile learning
Chiu & Churchill (2016)	33 science and 29 humanities in-service teachers	Hong Kong	Positive perceptions and attitudes
Uzunboylu, & Özdamli (2011)	1529 in-service teachers	Turkish Republic of Northern Cyprus.	
Gao, Yan, Wei, Liang, & Mo, (2017)	356 teachers	China	Negative perceptions and attitudes
Thomas, O'Bannon, & Britt (2014)	1,121 secondary teachers	Kentucky and Tennessee	

The Research Model

The current study uses TAM (Technology Acceptance Model) as its theoretical framework (Davis, 1989) to investigate STEM teachers' acceptance of Mobile-Based Assessment. TAM is a valid and robust model (King & He, 2006). TAM has already been successfully used to explain and predict teachers' adoption of mobile learning (Sánchez-Prieto, Olmos-Migueláñez, & García-Peñalvo, 2017; Mac Callum, Jeffrey, &

Kinshuk, 2014). In-line with previous research, our model about teachers' acceptance of mobile-based assessment proposes the following hypotheses:

Perceived Usefulness (PU)

Perceived Usefulness (PU) is defined as "the degree to which a person believes that using a particular system will enhance his/her job performance" (Davis, 1989). When teachers consider technology as valuable and beneficial for teaching and learning they are more likely to use it (Miranda & Russell, 2012). The same holds for mobile learning as well (Liu, Li, & Carlsson, 2010). Therefore, in the context of mobile-based assessment we hypothesize:

H1: Perceived Usefulness (PU) has a positive effect on Behavioral Intention to Use (BIU).

Perceived Ease of Use (PEOU)

Perceived Ease of Use (PEOU) is defined as "the degree to which a person believes that using a system would be free of effort" (Davis, 1989). Previous research on technology acceptance (Venkatesh, Morris, Davis, & Davis, 2003) and mobile learning acceptance (Nikou & Economides, 2017; Mac Callum, Jeffrey, & Kinshuk, 2014; Park, Nam, & Cha, 2012) has shown that Perceived Ease of Use positively affects Perceived Usefulness (PU) and Behavioral Intention to Use (BIOU). Therefore, for mobile-based assessment we hypothesize that:

H2a: Perceived Ease of Use (PEOU) has a positive effect on Perceived Usefulness (PU).

H2b: Perceived Ease of Use (PEOU) has a positive effect on Behavioral Intention to Use (BIU).

Social Influence

Social Influence (SI) is defined as the "degree to which an individual perceives that important others believe he or she should use the new system" (Venkatesh, Morris, Davis, & Davis, 2003). Previous research has shown that Social Influence has a positive effect on Perceived Usefulness of computerized assessments (Terzis & Economides,

2011). The same holds for mobile-learning as well (Nikou & Economides, 2017; Wang, Wu, & Wang, 2009). Furthermore, for mobile-based assessment we hypothesize that:

H3: Social Influence (SI) has a positive effect on Perceived Usefulness (PU).

Output Quality

Output Quality is defined as "the degree to which an individual believes that the system performs his or her job tasks well" (Venkatesh & Davis, 2000). Perceptions of output quality in the context of our study consider the administration benefits and enhanced assessment opportunities offered with the MBA tasks as well. Research has shown that output quality has a positive effect on perceived usefulness (Venkatesh & Bala, 2008; Venkatesh & Davis, 2000). Therefore we hypothesize that:

H4: Output quality will have a positive effect on perceived usefulness.

Mobile Self-Efficacy

We define Mobile Self-Efficacy (MSE) as an individual's perceptions of his or her ability to use mobile devices to accomplish particular tasks, based on a similar definition of computer self-efficacy by Compeau & Higgins (1995). Self-efficacy is one necessary factor for teacher adoption of new technologies (O'Bannon & Thomas, 2014). The impact of mobile self-efficacy on perceived ease of use has been confirmed in the context of mobile learning (Nikou & Economides, 2017; Sánchez-Prieto, Olmos-Migueláñez, & García-Peñalvo, 2017). In the context of our study we hypothesize that:

H5. Mobile Self-Efficacy (MSE) has a positive effect on Perceived Ease of Use (PEU).

Facilitating Conditions

Facilitating Conditions (FC) have been defined as "the degree to which users believe that the necessary infrastructures exist to support the use of a technological system" (Venkatesh, Morris, Davis, & Davis, 2003). These can be administrative, organizational or technical support, knowledge and other resources. Previous research has shown that Facilitating Conditions significantly influence Perceived Ease of Use (Venkatesh, et al., 2003). The same holds for mobile learning as well (Nikou & Economides, 2017; Wang, Wu, & Wang, 2009). In the context of our study, we hypothesize that:

H4: Facilitating Conditions (FC) have a positive effect on Perceived Ease of Use (PEOU).

Methodology

Participants and Procedure

The participants in the study were 161 STEM teachers randomly selected from 32 different European countries as table 2 shows. A total of 215 STEM teachers were contacted to participate in the survey and 161 completed it (response rate 74.8%). The basic inclusion criteria for our study were the participants' teaching major to associates to STEM subjects. All participating teachers were active members of science education communities with experience in technology-supported approaches to science and maths education and high engagement in science education EU funded projects. Teachers were contacted either through their personal emails or through education related social media channels. Teachers were informed in advance about the research procedure and were asked to fill-in an on-line survey. Participation was voluntarily and all the data collected anonymously.

Table 2. Countries of the participating teachers (n=161)

Country	f	Country	f	Country	f	Country	f
Austria	2	Finland	4	Israel	2	Portugal	9
Belgium	4	France	4	Italy	9	Romania	10
Bulgaria	7	FYROM	2	Latvia	2	Slovakia	3
Croatia	3	Germany	3	Lithuania	3	Slovenia	3
Cyprus	8	Greece	14	Malta	2	Spain	12
Czech Reb.	5	Hungary	5	Netherlands	3	Sweden	4
Denmark	2	Iceland	3	Norway	3	Turkey	7
Estonia	3	Ireland	4	Poland	10	UK	6

Demographical information for the sample group is presented in Table 3. There were 73 males (45.3%) and 88 females (54.6%). Almost half of the teachers (52.17%) were in the age range of 35-50. The majority of the teachers (66.45%) had a quite extensive science teaching experience (more than 10 years). Participating teachers' subjects taught were Mathematics (11%), Physics (14%), Chemistry (9%), Biology

(10%), ICT (11%), Technology (3%) and their combinations. e.g. Physics and Chemistry (15%), Physics, Maths and ICT (25%), other (2%). Only 31.67% of the teacher participants had already used mobiles in their classes and 18% of them had used mobile devices for assessment purposes (mostly as clickers for classroom polling).

Table 3. Demographical information of the sample group (n=161)

	f	%
Gender		
Male	73	45.30
Female	88	54.60
Age Range (in years)		
20-35	42	26.08
35-50	84	52.17
50 - 65	35	21.70
School		
Primary	45	27.9
Secondary	116	72.10
Teaching Experience (in years)		
Less than 5		
5 - 10	54	33.54
10 - 20	89	55.27
over 20	18	11.18
Used mobiles in courses		
Yes	51	31.67
No	110	68.33
Mobiles experience period (in years)		
0 - 2	15	9.32
2 - 5	32	19.87
5 or more	114	70.81

Instruments

In order to develop the instrument for our research about the acceptance of Mobile-Based Assessment (MBA), we have adapted some items of the constructs from previously validated instruments. For Perceived Usefulness (PU), Perceived Ease of

Use (PEOU), Behavioral Intention to Use (BIU), Social Influence (SI), Facilitating Conditions (FC), we have adopted items from Venkatesh, Morris, Davis and Davis (2003). For Mobile Self-Efficacy (MSE) we adapted items from Compeau and Higgins (1995), properly modified for the context of mobile-based assessment. For the Output Quality (OQ) we used items from Venkatesh and Davis (2000) appropriately adapted for mobile-based assessment. Cronbach's a for all constructs were above 0.70, ensuring the internal consistency of the instrument.

Our measurement instrument consists of 7 constructs making a total of 25 items. The questionnaire was developed and distributed in English. All items were measured on a seven point Likert-type scale with 1 corresponding to "strongly disagree" and 7 to "strongly agree". The questionnaire used is shown in Table 7 (Appendix).

Data Analysis and Results

The analysis technique used to predict the factors affecting mobile-based assessment adoption from the teachers' perspective was Partial Least-Squares (PLS) with Smart PLS 2.0 (Ringle, Wende, & Will, 2005). Our sample size exceeds the recommended value of 40, i.e. 10 times larger than the number of items for the most complex construct (Chin, 1998).

Instrument validation

Internal consistency, convergent and discriminant validity of the proposed research model need to be verified to ensure its quality. All criteria for convergent validity are satisfied: all factor loadings on their relative construct exceed 0.70, composite reliability of each construct exceed 0.70 and all average variance extracted (AVE) values range from 0.594 to 0.773 (AVE > 0.50) exceeding the variance due to measurement error for that construct (Table 4). Discriminant validity is also supported since the square root of the average variance extracted (AVE) of a construct is higher than any correlation with another construct (Table 5). Thus both convergent and discriminant validity for the proposed research model are verified.

Table 4. Descriptive statistics and results for convergent validity for the measurement model (acceptable threshold values in brackets)

Construct Items	Mean (SD)	Factor Loading (>0.70)	Cronbach's a (>0.70)	Composite Reliability (>0.70)	Average Variance

					Extracted (>0.50)
Perceived Ease of Use	5.09 (1.28)		0.851	0.910	0.773
PEOU1		0.811			
PEOU2		0.864			
PEOU3		0.957			
Perceived Usefulness	3.95 (1.26)		0.730	0.845	0.647
PU1		0.801			
PU2		0.753			
PU3		0.857			
Social Influence	4.95 (1.25)		0.799	0.859	0.604
SI1		0.731			
SI2		0.836			
SI3		0.808			
SI4		0.730			
Facilitating Conditions	4.96 (1.18)		0.819	0.880	0.648
FC1		0.813			
FC2		0.802			
FC3		0.822			
FC4		0.783			
Output Quality	4.63 (1.20)		0.827	0.884	0.657
OQ1		0.829			
OQ2		0.836			
OQ3		0.784			
OQ4		0.798			
Mobile Self-Efficacy	3.78 (1.19)		0.774	0.853	0.594
MSE1		0.776			
MSE2		0.737			
MSE3		0.827			
MSE4		0.738			
Behavioural Intention to Use	4.80 (1.25)		0.724	0.844	0.645
BIU1		0.811			
BIU2		0.812			
BIU3		0.787			

Test of the structured model and hypotheses

Figure 1 and table 6 summarize the structural model and the hypothesis testing results. Figure 1 shows the path coefficient for each path along with its significance (as asterisks, **p<0.05, ***p<0.01) and the R^2 for each endogenous variable. Table 6 shows the statistical significance of the relations in the model.

Table 5. Discriminant validity for the measurement model (values in bold: the square root of the average variance extracted for each construct)

	BIU	FC	MSE	OQ	PEOU	PU	SI
BIU	**0.80**						

FC	0.79	**0.81**					
MSE	0.60	0.61	**0.77**				
OQ	0.64	0.74	0.65	**0.81**			
PEOU	0.65	0.65	0.58	0.65	**0.87**		
PU	0.60	0.62	0.57	0.65	0.57	**0.80**	
SI	0.52	0.51	0.65	0.55	0.45	0.54	**0.77**

BIU - Behavioural Intention to Use , PEOU - Perceived Ease of Use , PU - Perceived Usefulness , SI - Social Influence, FC - Facilitating Conditions , OQ – Output Quality, MSE - Mobile Self-Efficacy

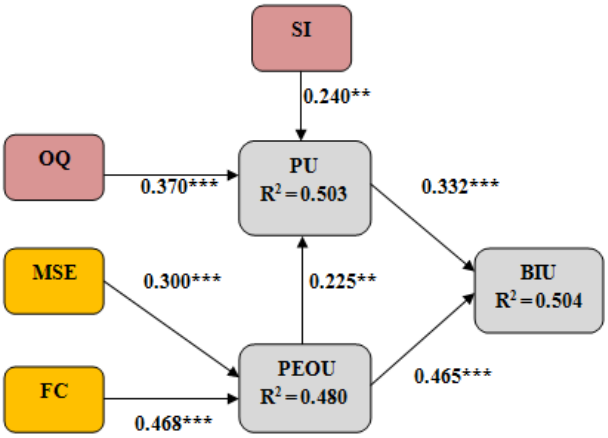

Fig. 1. Structured Equation Modeling analysis of the research model

Table 6. Hypothesis testing results

Hypothesis	Path	Path Coefficient	t value	Results
H1	PU → BIU	0.332***	8.289	support
H2a	PEOU → PU	0.225**	4.907	support
H2b	PEOU → BIU	0.465***	10.152	support
H3	SI → PU	0.240**	6.771	support
H4	OQ→ PU	0.370***	7.660	support
H5	MSE → PEOU	0.300***	6.608	support
H6	FC → PEOU	0.468***	9.334	support

**p<0.05, ***p<0.01

The results from the PLS analysis support all seven hypotheses. All standardized path coefficients have values between 0.240 and 0.468. These values are considered medium to large (Cohen, 1988).

Perceived Usefulness has a direct positive effect on Behavioral Intention to Use (0.332). Perceived Ease of Use has a positive effect on Perceived Usefulness (0.225) and Behavioral Intention to Use (0.465). Teachers are willing to use a technological

system when it is perceived as easy and useful (Davis, 1989). Social Influence (SI) has a positive effect on Perceived Usefulness (0.240). Teachers perceive MBA as useful, when they know that their school management, colleagues and educational policy in general approve and value the use of mobile devices in assessment. Output quality (OQ) also has a positive effect (0.370) on Perceived Usefulness. When teachers consider MBA to be of high quality (offering new assessment opportunities and administrative benefits) they also perceive it as useful. The above findings are in-line with previous research (Venkatesh, & Davis, 2000).

Mobile Self-Efficacy (MSE) was found to significantly relate (0.300) to Perceived Ease of Use. Teachers with proficiency in using mobile devices consider MBA as easy to use. This is in line with previous research regarding the impact of computer self-efficacy in the adoption computer-based testing (Lu, Hu, Gao, & Kinshuk, 2016). Facilitating Conditions (FC) also has a positive effect on Perceived Ease of Use (0.468). The appropriate technical and administrative infrastructure enhances teachers' perceptions of the ease of use. The above findings are in-line with technology acceptance research (Davis, 1989; Venkatesh, Morris, Davis, & Davis, 2003).

The construct of Perceived Ease of Use has the highest mean value (5.09) showing that teachers perceive mobile-based assessment as a rather easy task. Also, the mean values of Facilitating Conditions (4.96), Social Influence (4.95) and Output Quality (4.63), reveal that teachers consider the role of the necessary infrastructure, normative beliefs and MBA suitability and effectiveness as important determinants towards using mobiles in assessments. MBA usage intention among STEM teacher is also notable (4.80).

The values of R^2 for the three endogenous variables of our model are: i) for Perceived Usefulness 0.503, ii) for Perceived Ease of Use 0.480 and iii) for Behavioral Intention to Use 0.504. According to the model, Social Influence and Output Quality explain about 50% of the total variance in Perceived Usefulness, with Output Quality to be the most important factor. Facilitating Conditions and Mobile Self Efficacy explain about 48% of the total variance in Perceived Ease of Use, with Facilitating Conditions to be the most important factor. Also, Perceived Ease of Use and Perceived Usefulness explain about 50% of the total variance in Behavioral Intention to Use. The

above value is comparable with other TAM related studies about mobile leaning adoption (Wang, Wu &Wang, 2009).

Discussions and conclusions

The aim of the current study is to provide insights about the factors that affect STEM teachers' acceptance of mobile-based assessment in K-12 education settings. Previous studies have already investigated teachers' acceptance of mobile learning (Sánchez-Prieto, Olmos-Migueláñez, & García-Peñalvo, 2017; Mac Callum, Jeffrey, & Kinshuk, 2014). However, mobile-based assessment can be administered in a context of its own, in a blended learning approach complementing traditional paper-based assessment. The current study focuses on MBA and proposes the Teachers' Acceptance Mobile-Based Assessment (TAMBA) model.

The study findings suggest that STEM teachers, under certain conditions, are willing to adopt MBA in their classes. Factors found to positively affect behavioral intention to use MBA are: Perceived Ease of Use, Perceived Usefulness, Social Influence, Facilitating Conditions, Output Quality and Mobile Self-Efficacy. The most influential factor of MBA adoption found to be Perceived Ease of Use. Furthermore, the study suggests that some challenges need to be overcome in order for teachers to use MBA: appropriate resources need to be developed for use in mobiles, adequate technical, administrative and management support should be provided, teachers need to be positive about the output quality of the mobile-based system and also have the knowledge and experience necessary to use these technologies. Similar behavioral, control and normative beliefs issues found that need to be resolved from previous technology-enhanced assessment research as well (Chien, Wu, & Hsu, 2014). The findings regarding Perceived Ease of Use, Perceived Usefulness and Mobile Self-Efficacy are in line with previous research about teachers' acceptance of mobile learning (Sánchez-Prieto, Olmos-Migueláñez, & García-Peñalvo, 2017; Mac Callum, Jeffrey, & Kinshuk, 2014). Our model extends previous models in the context of teachers' MBA acceptance with the proposed constructs of Social Influence, Facilitating Conditions and Output Quality. The construct of Output Quality is introduced for the first time in the context of technology-based assessment in general. Moreover, investigating MBA integration in science classes by STEM teachers may enable a better understanding of the use and added value of mobile devices in science

education. The proposed TAMBA model explains and predicts about 50% of the teachers' behavioral intention to use MBA. This is an acceptable value since it is in the range of 22-68% that is usually found in the mobile learning acceptance research (Baydas & Yilmaz, 2016). Research in the context of students' acceptance of mobile-based assessment also provided us with similar results (Nikou & Economides, 2017).

One limitation of the current study is its small sample size. Future studies should consider larger cohorts. Also, future studies should include other external variables as well, e.g. ubiquity, autonomy, security, personalization, enjoyment, satisfaction. Previous research has shown that Science and Mathematics teachers possess more positive attitudes towards mobile devices compared to language and humanities teachers (Chiu & Churchill, 2016). Therefore, generalization of the study findings to teacher groups with different backgrounds should be made with caution and future studies should include teachers with other backgrounds as well. It would be interesting also to investigate the relation between MBA adoption and culture or other factors e.g. gender, age, teaching experience. Also it would be helpful to distinguish between different assessments types (e.g. formative, summative) and separately study teachers' adoption.

The use of mobile devices for assessing students belongs in the wider context of mobile learning. According to UNESCO, mobile learning has a great potential in student learning and motivation and also provides a serious opportunity to support teachers and improve their ongoing professional development (West, 2012). Application of technology to assessment can be a major driver for change throughout teaching and learning (Farell & Rushby, 2016). However, in order for mobile learning and assessment to be successfully integrated in education, teachers' perceptions and the factors affecting their acceptance should be determined (Kim et al., 2013). Therefore, school management and policy makers should take into their consideration the results of the mobile learning acceptance research in order to motivate and support teachers to adopt mobile-based assessments. Our study findings can be used to improve administrative, pedagogical and technical support in order to encourage teachers to use mobile devices for assessment purposes.

APPPENDIX

Table 7. *Questionnaire Items used*

Constructs	Items	Descriptions	Sources
Behavioural Intention to Use	BIU1 BIU2 BIU3	I indent to use MBA in the future. I plan to use MBA in the future. I predict I would use MBA in the future.	Venkatesh, Morris, Davis, & Davis (2003)
Social Influence	SI1 SI2 SI3 SI4	People who influence my behaviour think that I should use MBA. People who are important to me think that I should use MBA. School management has been helpful in the use of MBA. In general my educational institution policy has supported the use of MBA.	Venkatesh, Morris, Davis, & Davis (2003)
Facilitating Conditions	FC1 FC2 FC3 FC4	I have the resources necessary to use MBA. I have the knowledge necessary to use MBA. MBA is not compatible with other systems I use. Someone is available for assistance with system difficulties.	Venkatesh, Morris, Davis, & Davis (2003)
Perceived Ease of Use	PEOU1 PEOU2 PEOU3	My interaction with MBA is clear and understandable. It is easy for me to become skilful at using MBA. I find the system easy to use.	Venkatesh, Morris, Davis, & Davis (2003)
Perceived Usefulness	PU1 PU2 PU3	Using MBA enhances my effectiveness. MBA is useful for my teaching. Using MBA increases my productivity.	Venkatesh, Morris, Davis, & Davis (2003)
Output Quality	OQ1 OQ2 OQ3 OQ4	The quality of the output I get from MBA is high. Mobile devices enhance assessment output by offering administrative benefits. Mobile devices enhance assessment output by promoting new assessment opportunities. I have no problem with the quality of the MBA output.	Venkatesh, V., & Davis, F. D. (2000)
Mobile Self-Efficacy	MSE1 MSE2 MSE3 MSE4	I can complete a job or task using a mobile-device. I could complete a job or task using a mobile device if someone showed how to do it first. I am fully able to use a mobile device before I begin using it in my teaching. I can navigate easily through the Web using a mobile device to find any information I need.	Compeau & Higgins (1995)

Statement on open data, ethics, and conflict of interest

The data can be obtained by request, by contacting the corresponding author.

Participation was voluntarily and all the data collected anonymously. Appropriate permissions and ethical approval for the participation requested and approved.

There is no potential conflict of interest in this study.

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