Teachers' Perceptions of Factors Affecting Their Adoption and Acceptance of Mobile Technology in K-12 Settings

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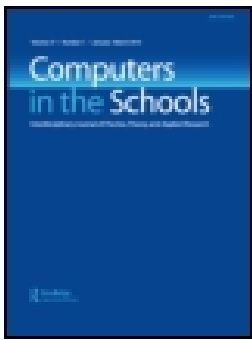**30** PUBLICATIONS   **143** CITATIONS

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ABSTRACT

Factors influencing the adoption and acceptance of tablets as a mobile technology were explored one year after their integration in middle schools in Palestine. Semi-structured interviews were conducted with 15 teachers. The participants held a variety of attitudes toward accepting mobile technologies in their instruction. The findings revealed that teachers' attitudes are an important factor in accepting or rejecting tablet use in classrooms. Many factors influenced teachers' attitudes such as technical support, instructional assistance, and infrastructure. A teacher's prior experience with tablets was also important for integrating technology into the classroom.

With rapid advances in technology, mobile technologies have risen as innovative tools for educators and learners in both K-12 and higher education (Harper & Milman, 2016; Roberts & Rees, 2014). A variety of advanced technologies have been introduced into education including wearable technology (Vallurupalli et al., 2013), smart boards (Gursul & Tozmaz, 2010), mobile devices (El-Gayar, Moran, & Hawkes, 2011; Eristi, Haseski, Uluuysal, & Karakoyun, 2011; Williams & Pence, 2011), and smart classrooms (Sevindik, 2010). Furthermore, educators are motivated to use these innovations in their teaching, believing it will improve learning outcomes (Domingo & Gargante 2016; Vu, McIntyre, & Cepero, 2014). However, some previous studies have indicated that, although the use of technology has increased, the integration of technology into classrooms has not matched the availability (Ditzler, Hong, & Strudler, 2016; Groff & Mouza, 2008; Levin & Wadmany, 2008). Many studies have indicated that the impact of mobile technology is in increasing learning engagement and facilitating access to information (Domingo & Gargante, 2016; Ifenthaler & Schweinbenz, 2013; Ifenthaler & Schweinbenz, 2016).

For the purpose of this study, *mobile technology* is defined as any small devices with an Internet connection and edit functionality. In this study, tablets are an excellent example of mobile technology because they are relatively new in the Palestinian education system, and they have been there long enough to make it possible to conduct this study.

In Palestine, the instability and conflict have negatively impacted the educational system in different ways. There are mobility restrictions because of barriers and checkpoints, making it difficult for students and teachers to get to school. Qualified teachers have needed to be relocated, and there is a lack of educational resources (Shraim & Khlaif, 2010). As a result of the conflict situation, the Ministry of Education (MoE) introduced the one-to-one tablet initiative in 10 rural middle schools to reduce the difficulties experienced by teachers and students in rural areas. It was expected that teachers would accept and use the tablets to help reduce these challenges (MoE, 2014). These schools are the first stage of tablet distribution as part of a national plan to cover all schools in Palestine (MoE, 2014). An additional goal of the project is to improve learning outcomes in four topic areas: English, Arabic, math, and science (MoE, 2014). There is a need to better understand why teachers accept or reject the use of technology in their classroom instruction (El-Gayar et al., 2011; Ertmer & Ottenbreit-Leftwich, 2010; Hew & Brush, 2007), which is the main contribution of this study.

This, in turn, will help decision makers in the Ministry of Education in Palestine create initiatives for adopting tablets and design suitable infrastructure, an important first step. Without any prior investigation or exploration, it is difficult to predict factors influencing teachers' adoption and acceptance of tablets in conflict zones. Studies indicated that these factors have not yet been sufficiently investigated in the Palestinian context. Therefore, this was my motivation for focusing on this area and exploring the gaps that have not been covered. Furthermore, the findings of this study might help decision makers in developing nations find answers to questions on implementing tablets in their education system.

Consequently, the purpose of the present research was to explore, in-depth, the factors influencing the adoption and acceptance of mobile technologies in a specific conflict zone from the perspective of teachers in middle schools in Palestine. In the literature, conflict is seldom considered. Previous research on effects of violence on education in conflict zones provides evidence of the negative impact of conflict on an educational system: in relocating qualified teachers among schools (Nelson & Appleby, 2015; Shraim & Khlaif, 2010), lower school enrollment (Justino, 2014), increased dropout rates among students (Buvinic, Das Gupta, & Shemyakina, 2013; Justino, 2014), children deprived of education (Justino, 2014; UNESCO, 2011), interrupted school schedules (Leon, 2012; Shraim & Khlaif, 2010), school infrastructure issues (Justino, 2014), lack of educational resources (Shraim & Khlaif, 2010), and low attendance among teachers due to mobility restrictions (Justino, 2014; Shraim & Khlaif, 2010; UNESCO, 2011). Shraim and Khlaif (2010) ascertained in their study that girls' education in a conflict zone has been negatively influenced by parents worried about the dangers their daughters face traveling to school.

Kollmann (2004) defined the *adoption of technology* as the use of technology for the first time, and *technology acceptance* as the continued use of technology. In this case, I adapted Kollmann's definitions (2004) of adoption and acceptance because they give a better picture of progress toward the full adoption of technologies. Furthermore, Kollmann (2004) described technology acceptance as taking place in three phases: attitude, adoption, and acceptance.

The theoretical framework

The unified theory of acceptance and use of technology (UTAUT) developed by Venkatesh, Morris, Davis, and Davis (2003) was the theoretical framework for this study. The followings paragraphs clarify how UTAUT was used.

Many theories and models have been developed to better understand the factors that influence the adoption and acceptance of new technologies. The technology acceptance model (TAM) is a well-known approach developed by Davis (1989) and based on the theory of reasoned action (TRA). This model has been used in many studies to examine the adoption and acceptance of new technology in various contexts such as e-learning paradigms, learning management systems, and WebQuests (El-Gayar et al, 2011; Ifenthaler & Schweinbenz, 2013). Scholars have mentioned that TAM has a shortcoming due to its poor ability to predict technology acceptance, which it fails to do in nearly 40% of cases (Ifenthaler & Schweinbenz, 2013; Ifenthaler & Schweinbenz, 2016).

Because of shortcomings in the TAM model, Venkatesh et al. (2003) developed the unified theory of acceptance and use of technology (UTAUT) based on a combination of previous models and theories that have been used to study acceptance of technology, one being the theory of reasoned action (TRA). According to Venkatesh et al. (2003), UTAUT proposes four main constructs that impact the intention and use of a new information technology system (see Figure 1):

Performance expectancy

In terms of mobile technologies, performance expectancy is the degree to which an individual believes that using mobile technology in classroom instruction is beneficial for teachers and students, and assists the teacher to achieve the goals of the lesson and improve his/her performance.

Effort expectancy

With mobile technology, effort expectancy can be thought of as the degree to which an individual believes that it is easy to use a device and learn how it works.

Social influence

Social influence can be thought of as the degree to which an individual perceives that important others believe he or she should use a mobile technology. Important
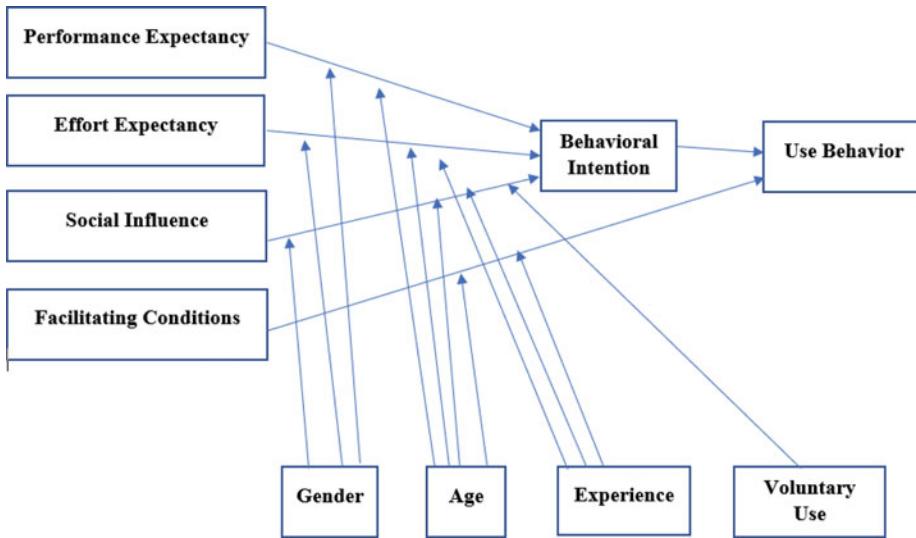
Figure 1. The suggested relationships between the four constructs and the variables. Copyright © 2003, Regents of the University of Minnesota. Reprinted by permission.

others in this study include school administrators, supervisors, peers (other teachers in the same school), students, and teachers from other schools.

Facilitating conditions

Facilitating conditions can be thought of as the degree to which an individual believes there is sufficient organizational infrastructure, resources, technical infrastructure, and technical support to support the use of a mobile technology in classroom instruction.

In addition to these constructs, Venkatesh et al. (2003) added four other variables. Three are based on the individual use characteristics of age, gender, and experience. The fourth is voluntary use. These variables moderate the relationship between the four constructs and the behavioral intention to adopt and accept new technology. Due to the small population in the current study, the data are not well suited for running comparisons across demographic and individual characteristics like age and gender. Therefore, the current study excludes the exploration of the possible effects of age, gender, and voluntary use as factors on the four main constructs.

Factors influencing adoption and acceptance of technology

Previous studies have revealed that several factors affect the adoption and use of technology in classroom instruction. Teachers who use technology in their classroom instruction are also influenced by attitudes toward technology, organizational factors, and learning environment factors (Lim & Chai, 2008; Tondeur, Valcke, & van Braak, 2008). Other scholars have classified the factors into system-level, school-level, and teacher-level (Balanskat, Blamire & Kefalla, 2006). Sherry and Gibson

(2002) developed a framework for factors that influence adoption and integration of technology in education, and claimed that institutional, technological, individual, and organizational factors should be considered when examining technology integration in teaching. There is a need for further investigation into factors influencing teachers' integration of mobile technology in classroom instruction.

Research related to adopting and accepting mobile technology using UTAUT

Researchers have mentioned that mobile technology has potential for use in education because it has helped to transfer electronic learning to wherever and whenever learning takes place (Hussain & Adeeb, 2009; Martin et al., 2011). Inan and Lowther (2010a, 2010b) empirically investigated the interrelations between a variety of factors influencing teachers' technology integration in their practice. In their developed path model, Inan and Lowther (2010a) included teacher-level and school-level factors, investigating the complex process of technology integration. Based on the model, teacher-level factors included computer proficiency, age, teacher readiness, and teaching experience. Furthermore, school-level factors and teachers' beliefs included computer availability, technical support, and overall support. The findings of Inan and Lowther (2010a) indicated that teachers' beliefs were influenced by school-level factors as well as computer proficiency. Furthermore, Inan and Lowther (2010b) conducted another study to investigate factors affecting teachers' laptop integration into classroom instruction. The findings revealed that teachers' beliefs about integrating laptops and their readiness to do so affected laptop integration.

Karaca, Can, and Yildirim (2013) examined the relationship between technology integration in middle schools and a defined set of teacher- and school-related factors by using mixed-methods design. The findings indicated that teachers' technology competencies are the most influential factor for using technology and, furthermore, that technology competencies have a significant influence on teachers' attitudes and beliefs. Moreover, the study revealed a variety of factors that impacted teacher's technology competencies such as teaching experience, colleague support, principal support, time, and years using computers. These authors also concluded that social support (principals' and colleagues' support) fosters teachers' positive attitudes and beliefs toward technology integration.

As described in the previous studies there is a lack of consistency in the literature about the role of the UTAUT model in the adoption and acceptance of mobile technologies used in education. The results of these studies could not be applied in the Palestinian Educational System because of differences among participants' experience with mobile technologies, their cultural background, and their mobility restrictions due to the conflict. Therefore, by investigating teachers' perspectives based on factors that influence their adoption and acceptance of mobile technologies in teaching, this study hopes to contribute to a deeper understanding of these factors. Thus, the purpose of this study was to answer the following research questions:

1. What self-reported factors seem to influence teachers' adoption and acceptance of tablet PCs in their classroom instruction?
2. What factors do teachers perceive as important to the successful adoption of technological innovations, specifically for tablet PCs?

Methods

A descriptive case study approach was used for this study. This type of case study is used to describe an intervention or phenomenon in the real-life context in which it occurred (Yin, 2003). The study was carried out after one year of implementing the tablet project in five middle schools.

Description of the context

The Ministry of Education in Palestine distributed tablets (Galaxy) to 10 schools. The criteria for distributing these devices were that the schools be middle schools located in rural areas having specifically seventh and eighth grades (MoE, 2014). Middle schools in Palestine are from fifth to ninth grade. The main purpose of the project was to facilitate the learning process and improve the learning outcomes for teaching Arabic, English, science, and math. The number of students in the schools was between 220 and 350; whereas, the number of the students in the seventh and eighth grades was between 50 and 80. After receiving permission from the Ministry of Education in Palestine to conduct the study in the schools, I visited all the schools involved in the project to meet with the principals and describe the study and its purpose, as well as to invite them to participate. Five of 10 schools agreed. Therefore, the study was conducted in five rural middle schools from different regions in Palestine that had introduced tablets on a 1:1 basis in two classes (seventh and eighth grades).

Despite all these schools being controlled by the Ministry of Education in Palestine and benefitting from the project, there were some differences between them. Two schools did not have electricity all day, although the school's administration collaborated with the local community to provide their schools with electricity for two hours each day in order that electronic devices could be used. Lack of electricity influenced the use of tablets in classrooms, as reported by the teachers. Furthermore, the budget of two other schools was low, which limited the improvement of their Internet connection. In terms of similarities the Ministry of Education trained teachers (two days, face to face, mainly theoretical in focus) to use these devices in all their schools (MoE, 2014). Likewise, using tablet PCs is mandatory in the Palestinian education system. In the teacher's performance annual report, there are items about using technology in classroom instruction and these affect the teacher's compensation. The annual performance report was completed at least twice each semester by the principal of the school and the teacher's supervisor in the Directorate of Education.

Table 1. Number of teachers from each school.

School	No. of Teachers
School 1	5
School 2	3
School 3	2
School 4	2
School 5	3

Participants

Participants of this study were 15 teachers (6 males, 9 females) from five rural middle schools in different regions teaching different topics (see Table 1).

The main criterion for recruiting participants was that the teachers have used tablets in their classrooms teaching for at least one year while teaching seventh/eighth grade. All participated in the interviews on a voluntary basis and had different prior experience with using technology in their teaching practices. Table 2 provides demographic information about the participants in the study.

Data collection

Two sources of data collection were used: teacher's weekly lesson plans and individual interviews. Interviews were the primary source of data in order to encourage teachers to tell their stories. According to Seidman (1998), stories are a way of knowing, and telling a story is essentially a meaning-making process in a study. I conducted and recorded between 25 and 35 semi-structured interviews with each participant in June and August 2015. These were all done in their schools with the exception of two participants who chose different locations (a university and a public library).

Data coding and analysis

Data analysis started by transcribing the recorded interviews manually and then translating the text from Arabic into English to facilitate data analysis. A thematic analysis, defined as a qualitative analytic method for categorizing, analyzing, and

Table 2. Participants demographic description.

Demographic description	
Gender	
Female	9
Male	6
Background	
Bachelor's degree	9
Master's degree	6
Teaching experience	
1-5 years	4
6-10 years	8
> 10 years	3
Weekly load	18–20 hours

reporting patterns (themes) within data (Braun & Clarke, 2006), was used. After several readings of the interview transcriptions, I highlighted and coded repeated words, phrases, and patterns. This strategy helped to divide and assign text under each main theme. In this case, the main themes were the four constructs of the research theoretical framework and one theme, attitude toward tablets, from the data. I reread the text under each theme for coding and highlighting patterns to divide and assign it into subthemes.

Trustworthiness

Upon completion of the interview transcriptions, I sent all written transcripts to participants for member checking, asking that they verify the content for accuracy. Furthermore, participants were asked to rewrite, add, or write notes on the transcripts. Some participants added additional information, but none altered their original statements.

With the final themes and subthemes established, a professor in educational technology was asked to take a small portion of the data and apply the codes of the themes and subthemes to check the reliability and accuracy of the coding.

Findings

The findings of the study comprised four major themes: performance expectancy, effort expectancy, social influence, and facilitating conditions. These themes came from the theoretical research framework. An additional one came from the interviews on attitudes toward tablets. Participants' attitudes toward adopting and accepting tablets in education was influenced by many factors such as availability of technical support, infrastructure of the schools, ease of using tablets, and the benefits of using them in education. All of these factors are subthemes of the original themes that emerged from the interview transcripts. Based on these findings, the teachers reported that their attitudes were affected by the four constructs of the UTAUT model: performance expectancy, effort expectancy, social influence, and facilitating conditions.

In addition, the previous experience variable in the UTAUT model was discussed with regard to how it influenced the themes. I divided it into two parts: previous experience with information and communications technology (ICT) and previous experience with tablets. In the interviews, participants stressed that their previous experience with ICT and tablets assisted them with integrating the devices in classroom instruction. Figure 2 represents the relationship between the themes and subthemes with attitudes as reported by the participants.

Teachers' attitudes

The participant attitudes toward tablets fell into two subthemes: positive and negative. It was immediately clear that these attitudes varied among the participants. Of
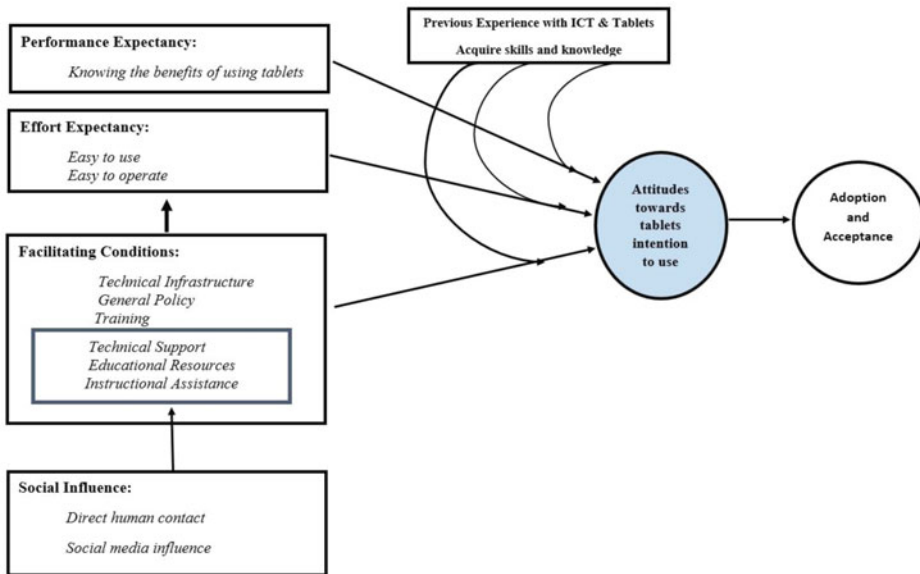
Figure 2. The relationships between the themes and subthemes with attitudes as reported by the participants.

those interviewed, 60% asserted that their previous experiences with ICT and tablets had a positive influence on their current attitudes toward adopting and accepting tablets in their teaching practices.

Positive attitudes toward tablets

The majority of the respondents (11, 73%) expressed a positive attitude toward tablets and voiced various factors that influenced their attitude. Three factors emerged that directly impacted the participants' positive view: portability, accessibility, and multimedia features. About half of the participants (6 out of 11) mentioned that the tablets' lightweight and small size played an important role in their positive attitude toward using them as compared to other devices.

> Using tablet PCs in class activities is a good idea. … From my experience with ICT my students were excited when I used it in class activities. [NS]
> I used it [TPC] many times for personal purposes. … I am enthusiastic to use it in my class activities. … It is easy to integrate into my class. [SM]

Negative attitudes toward tablets

A minority of interviewees (less than one-third) reported that they confronted various challenges while using the tablet in their classroom activities. According to their experiences, these challenges negatively influenced their adoption and acceptance of tablets in classroom instruction. Therefore, I categorized these themes into hardware, software, and environmental learning factors. Environmental learning factors will be discussed in the facilitating conditions section. These factors are hardware and software challenges.

Performance expectancy

Usefulness for teachers

The top three benefits mentioned by participants for using tablets in the classroom were

1. Getting higher scores on their annual performance reports which helped increase their salaries, as administrators consider the use of tablets in teachers' promotion review (mentioned by 80% of participants).
2. Improving their teaching and helping them to achieve their lesson goals (mentioned by 73% or 11 participants).

> When I took the devices to my class, I felt that students were excited, paid more attention to the activities. … My performance in the class was more effective through creating collaborative activities and dividing students into groups. [JS]

3. Facilitating their teaching through providing access to additional resources to enrich the curriculum.

Usefulness for students

Using mobile devices in teaching helped students access additional resources and use technology in their learning (mentioned by 80% of participants). In regard to the usefulness of tablets for students for instructional activities, the majority of respondents (73%) emphasized the usefulness of tablets for in-class activities. Most of the interviewees' responses (60%) indicated that tablets facilitated and supported collaboration, allowing discussions and debate among their peers. Furthermore, students used tablets in different ways to accomplish their assignments (mentioned by 60% of the participants).

> It makes accessibility to information easy for my students and me. … I stayed connected with my friends from different schools. … It is easy to take it with me to any place. [TM]

Effort expectancy

Ease of use and operation

Of those interviewed, 60% considered that using the tablets was easy for them. The use of tablets for in-class activities was easy when technical support, technical infrastructure, and instructional support were maintained (mentioned by 40% of participants). Whereas, a number of interviewees (one-third) said that their previous experience and knowledge helped them to use the tablets.

Two-thirds of interviewees indicated they were able to operate the tablets without help. Half were familiar and comfortable when using devices during classroom instruction. In contrast, two respondents were less assertive about making the effort required to use the tablets in their classroom instruction. Additionally, another respondent mentioned that the use of tablets for in-class activities needed more

preparation. One-third of the participants faced difficulties because the interface of the device was in English. These teachers asked for help to change the interface into Arabic.

Social influence

Positive influence of direct human contact

When questioned about what influences their colleagues had on their use of tablets in the classroom, a majority of the respondents (73%) indicated a positive impact, with about 40% saying they were influenced by their supervisors. A number of interviewees (one-third) said they received technical and instructional assistance on using the devices from different schools.

The power of social media

Of those interviewed, 60% mentioned that they were members of a social media group that exchanged ideas about using tablets in class activities. One respondent declared that she was active in a group that shared activities and success stories on using tablets in their classrooms. About 40% of participants received technical support and instructional assistance on using the tablets in classroom instruction from the social media group members.

> I shared my stories on the group page. … Sometimes I share ideas on how to use TPC in math class. … This group is important to exchange our ideas about using the devices in classroom activities. [SS]

Facilitating conditions

Environmental learning factors

The majority of interviewees (85%) underlined the impact (positive/negative) of the environmental learning factors on the adoption and acceptance of tablets in classroom instruction. The technical and instructional assistance services provided in their school enhanced teachers' adoption and acceptance of tablets in their classrooms (mentioned by 80% of the participants). Participants raised various subthemes that could influence teachers' acceptance of tablets in classroom instruction, these being instructional assistance/resources and the infrastructure in schools.

Technical infrastructure

All respondents considered the availability of technical infrastructure in schools as a prerequisite for adopting and accepting tablets. According to the technical infrastructure factors, the foremost obstacles were lack of technical support, lack of Wi-Fi, lack of a local network, and lack of a reliable system to ensure the devices are

recharged before each use. Solutions to these problems can have a positive impact on the adoption and acceptance of tablets because they assist teachers in using these devices for their in-class activities (mentioned by 73%).

About 60% of the teachers admitted that their schools supported the use of tablets in classroom instruction. About one-third of participants said a lack of technical support in schools hindered them from continuing to use tablets in their classes. All mentioned the challenges of charging them after use.

Technical support

Not only is the infrastructure important to accepting tablets in teaching, but technical support is also important to enhance teachers' tablet use. All interviewees admitted the positive influence of available technical support on adopting and accepting tablets in classroom instruction. Participants were asked whether their school provided technical support to enhance the use of tablets in classroom activities. Seventy-three percent mentioned that schools provided them with technical support through the Directorate of Education. Three of the teachers mentioned that they stopped using the devices temporarily because they were challenged by technical problems when using the tablets in their classrooms.

Lack of instructional assistance

Few of the respondents (less than one-third) were not familiar with the educational value of the applications. They expressed the need for instructional assistance to help them choose appropriate applications for the curriculum.

> I have no idea about the applications that are in Arabic language or have Arabic language Support. … You know thousands of applications are available on mobile device. I do not know how to choose the appropriate one for my class. [JS]

Intervention design factors

In terms of intervention design factors, several subthemes emerged that influenced the adoption and acceptance of tablets in classroom instruction. All emphasized the impact of intervention design factors, which could be positive or negative. The subthemes that emerged related to the general policy of using tablets in education and training teachers, and the availability of appropriate resources.

Mixed influence of general policy

All interviewees reported that school policy in regard to using tablets does not allow students to take the devices home. During the beginning of a school day, the teachers distribute the devices to students and they remain with them until the end of the day. All of the interviewees said that the schools provided them with a device to take

with them outside the classroom so they could explore its features and prepare class-room activities. This procedure helped teachers become familiar with the devices and allowed them to better prepare for classroom activities (mentioned by 40%).

Teacher training

Most interviewees (60%) underscored the positive effect of teacher training on using these devices in classroom instruction. Some participants (40%) denied that train-ing sessions had any impact on their adoption and acceptance of tablets in the class-room. Furthermore, two-thirds of the participants criticized the training sessions because they felt that trainers did not provide trainees with training materials on using the applications.

Role of pre-experience with ICT and tablets: One of the UTAUT variables

The majority of respondents (60%) said that previous experience with ICT and tablets was important for them in adopting and accepting tablets in their teaching. In addition, experience and knowledge on using tablets assisted teachers in using tablets smoothly in classroom instruction (60%).

Roughly 80% of participants were able to use ICT to support their in-class activ-ities through online resources and video files two or three times weekly. However, few teachers (30%) used ICT daily by using a computer lab or laptop, as their need depended on the topic covered in the class. Of those interviewed, half mentioned that more students were engaged during activities that used ICT tools in class. All teachers mentioned that they attended at least one workshop on using ICT in teach-ing. There was agreement among the respondents that training sessions helped them to use different ICT tools in the classroom. Sixty percent mentioned that access to ICT tools was available in schools and they were encouraged to use tools in class-room activities by school leaders and their supervisors.

In terms of their previous experience using tablets in their teaching practice, the interviewees had a diversity of experience using tablets in their teaching practices. One third of all participants owned a tablet and had used it for things like taking pictures, email, social media, and Internet research prior to the project's imple-mentation at their school. In these cases, they were able to access the Internet from different locations such as homes, universities, and schools. However, about 40% had never used a tablet in their daily life or professionally, which raised concerns about integrating tablets into their teaching practice. All participants who owned a device mentioned that they found tablets easy to use and often used them for non-academic purposes.

Discussion

By analyzing the factors influencing the adoption and acceptance of mobile technologies into middle-school classes in Palestine in a conflict zone, from the

teachers' perspective, several findings emerged that may be useful to teachers and decision makers in the Ministry of Education. These factors were categorized into five main themes including teachers' attitudes, performance expectancy, effort expectancy, social influence, and facilitating conditions. In addition, teachers reported that previous experience with ICT plays a significant role.

In terms of the first research question about the factors influencing teachers' adoption and acceptance of tablets, the findings draw attention to the factors reported by teachers such as technical support and infrastructure in the schools. Likewise, findings show that the availability of technical support, training, suitable infrastructure, and educational resources have a positive impact on effort expectancy, which reflects positively on the intention to use the devices in classroom instruction. Teo (2008) mentioned that people are inclined to use technology less frequently when they perceive it as a complex tool. Congruent with Teo (2008) and despite the high professional risk, teachers stopped using tablets in their classes if they became too difficult to operate. Congruent with Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, and Sendurur (2012) and Hew and Brush (2007) studies, teachers reported that they sought support from multiple resources in order to integrate these devices in their practice.

Results of the study indicate that low effort expectancy was the strongest predictor of the behavioral intention to adopt and accept mobile technologies. Teachers with low effort expectancy believed that tablets are easy to use and that they will not need a lot of instruction to do so, supporting previous research (Venkatesh & Morris, 2000). Venkatesh et al. (2003) agreed that users are more inclined to adopt new technology when they know they have the necessary skills and believe in its feasibility.

Facilitating conditions such as infrastructure in the schools, the learning environment, technical support, and the availability of resources were found to be important factors for the adopting and accepting mobile technology. This suggests that teachers will not be inclined toward tablet adoption and acceptance in the absence of these facilitating conditions. Also, limited access to wireless Internet may prohibit ready access to mobile content (Lawrence et al., 2008).

In terms of the second research question about the factors that teachers perceive as important to adopting tablets in their teaching, the majority of teachers participating in this study reported that their attitude was an important factor that affected their use of tablets in the classroom. Most teachers had a positive attitude about using the mobile technologies in their practice in the past year, believing that this technology improves the quality of and equal access to education in rural areas. However, this cannot be generalized to apply to schools in all areas of Palestine because this study included schools from only five of 10 areas and only one school from each area. In general, teachers liked teaching with tablets and were happy to use technology in their classrooms. As per participant interviews, the underlying reason for their positive attitude was the ease in which tablets can be used in schools. There was a difference between teachers' attitudes toward adopting and accepting tablets in teaching, based on their experience with tablets.

Therefore, performance expectancy and effort expectancy constructs have a positive influence on attitudes toward technology, congruent with previous studies that found that effort expectancy and performance expectancy are significant factors on the intention to use mobile learning (Celik & Yesilyurt, 2013; Wang, Wu, & Wang, 2009). This study revealed that performance expectancy is positively associated with the intention to use mobile technologies in teaching. This construct is associated with the teachers' knowledge of the benefits of tablets. Previous studies have indicated that teachers' perceptions about the usefulness of technologies affect whether and how they will use them (Ertmer & Ottenbreit-Leftwich, 2010; Hew & Brush, 2007; Liu, Lin, Tsai, & Paas, 2012). In this study, teachers used technology more when they knew the benefits. The top benefits stated by the teachers were to get high scores in their annual performance reports, establish connections with teachers from different schools, and improve their teaching strategies. Teachers knew the benefits of using mobile technologies from their peers in school and the social media group, and the training sessions.

Previous experience with ICT and tablets had an indirect positive impact on adopting and accepting tablets in teaching, which is congruent with previous studies (e.g., Moran, Hawkes, & El-Gayar 2010; Sommerich, Ward, Sikdar, Payne, & Herman, 2007). For example, Moran et al. (2010) showed that experience with a desktop computer plays a key role in progress toward technology adoption and use, concluding that prior experience has a direct impact on effort expectancy. Findings of the study showed that a minority of interviewees had no idea how to use tablets in their instruction, leading to negative attitudes about their lack of experience and skills that could be improved by professional development (Ertmer et al., 2012; Hew & Brush, 2007).

Several studies support the positive impact of social influence on the adoption and acceptance of tablets (El-Gayar & Moran 2006; Moran et al., 2010; Wang & Lei, 2012). The majority of interviewees were influenced by their peers and social media through getting technical support, educational resources, and instructional assistance—all having a positive impact on their adopting and using new technology. Social connections that provide teachers with technical support as well as instructional assistance in integrating tablets in classroom instruction are congruent with Ertmer et al.'s 2012 study, where social influence was determined to play a significant role in accepting tablets in K-12 settings. This factor was generally represented by instances where leaders in schools and in the Ministry of Education exert control, primarily through deploying success stories and incentives for teachers who contributed to efforts to use tablets. These findings are congruent with the study by Lewis, Fretwell, Ryan, and Parham (2013) that found that social influence could positively affect the acceptance of new technology in education.

Positive attitude toward using tablets was influenced by many factors, including instructional assistance and technical infrastructure, as well as technical support as a prerequisite for using devices in teaching. These factors are linked with facilitating conditions. Findings in many studies linked the intention to use tablets with

performance expectancy, effort expectancy, social influence, and facilitating conditions (El-Gayar et al., 2011; Venkatesh et al., 2003). Participants reported that social influence has an indirect impact on their attitude and intention to adopt and accept tablets in their teaching.

The main reasons for negative attitudes toward tablet use in classroom instruction were the technical challenges related to hardware and software problems, lack of infrastructure, the unavailability of appropriate resources, and a lack of teacher experience and knowledge. The greatest challenges to overcome before using tablets in classroom activities were technical support and factors related to availability of educational resources. Moreover, these factors play a vital role in determining whether teachers will accept or reject the innovation, although school leaders in Palestine cannot directly control these challenges because providing technical support and preparing infrastructure are the responsibility of the Ministry of Education.

This study revealed that attitudes play an important role in adopting and accepting new technology and do not affect social influence. The literature indicated that violence in conflict zones caused inequity in education and a lack of access to educational resources. In the context of this study, however, most participants reported that mobile technology enhances equality in education among students by providing them with opportunities to use technology and educational resources like their peers in big cities. It also facilitates teaching in this conflict zone where mobility restrictions have impacted teacher's attendance.

Conclusion

In Palestine, instability and conflict have negatively impacted the educational system in different ways. Due to this situation, the Ministry of Education in Palestine distributed tablets to selected rural schools to facilitate teaching and to improve the learning outcomes in four subjects.

Implications and future research

The primary implication of this study is that teachers should continue to learn and understand the benefits of using tablets, which might be accomplished through continuous support/training, improving school infrastructures, and providing schools with appropriate resources. Compared with studies conducted on non-mandated technology integration, the study shows that the mandated integration of technology has the same problems as the non-mandated initiatives. Therefore, the need to see teachers as legitimate actors whose opinions should be sought when making policy decisions on integrating technology exists in this context as it does in others. It is hoped that the decision makers in the Palestinian context will be informed of these findings and by future studies on using mobile technologies that include all stakeholders, students, and supervisors as well as teachers. Further research is needed to examine the level of use of tablets and how the students are using the tablets in

the classroom. In addition, further research needs to explore the role of culture in adopting and accepting mobile technology in a conflict zone.

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