Adoption of Mobile Devices in Teaching: Changes in Teacher Beliefs, Attitudes and Anxiety

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Abstract

Beliefs, attitudes and anxiety levels of schoolteachers are important factors influencing the acceptance, adoption and integration of mobile devices in teaching. To understand how to sustain device use, we need to understand what influences teachers and how such factors can change. We adopted a quasi-experimental design using pre- and post-questionnaires to investigate factors influencing the beliefs, attitudes and anxiety levels of teachers before and after using such devices to teach different subjects. Sixty-two secondary school teachers were divided into two groups –language and humanities, and mathematics and science. Repeated measures ANOVAs were used to analyze questionnaire data, and showed the mathematics and science group experienced a positive change in beliefs after use of mobile devices, but the language and humanities group did not. Both groups experienced lower levels of anxiety, but unchanged attitudes, after device use. Implications for teacher professional programs, school policies and ongoing support for mobile device integration are discussed.

Keywords: adoption of innovations, mobile learning, teacher attitudes, teacher anxiety, teacher beliefs, technology integration

Adoption of Mobile Devices in Teaching: Changes in Teacher Beliefs, Attitudes and Anxiety

Mobile technologies are widely used in many different contexts, including entertainment, commercial applications, and education (Ventola, 2014; Wu, Wu, Chen, Kao, Lin, & Huang, 2012). More individuals tend to have more than one mobile device and use them on a daily basis (Gao, Rohm, Sultan, & Pagani, 2013). In an educational context, mobile devices offer new possibilities to support teaching and learning (Evan, 2008; Wu et al., 2012). Using the devices in classrooms can offer diverse opportunities for teachers and students (Evans, 2008). Integrating personal mobile devices into teaching can shift learning processes more to students allowing teachers to spend more time with individual students as guides and coaches (Jeng, Wu, Huang, Tan, & Yang, 2010). These environments encourage individual and independent learning, learning by doing, sharing and peer-reviewing, which make teaching more effective (Godwin-Jones, 2005; Wong, 2012). Numerous studies suggest how to design materials and activities when using mobile device for the environments (e.g., Chiu & Churchill, 2015a, 2015b; Gedik, Hanci-Karademirci, Kursun, & Cagiltay, 2012; Martin & Ertzberger, 2013). However, the environments are only established after mobile devices are successfully introduced in classrooms and integrated in teaching sustainably (Strudler & Wetzel, 1999). In many settings, the adoption of mobile devices to support teaching and learning is determined by school management teams that may include some teachers (Lim & Khine, 2006; Strudler & Wetzel, 1999). School management teams typically include principals, vice-principals and ICT coordinators who develop the school's information, communications, and technology (ICT) policies and resources (Lim & Khine, 2006; Blackwell, Lauricella, & Wartella, 2014). The school management team may also consider policies pertaining to use of mobile devices (Lim & Khine, 2006; Strudler &

Wetzel, 1999), such as cyberbullying and lost or damaged mobile devices. An important but sometimes overlooked person in the scope of school ICT policy and practice is the individual teacher who will be required to implement policies and practices (Lim & Khine, 2006; Strudler & Wetzel, 1999). Teacher beliefs, attitudes and anxiety are three important factors influencing the success of teachers integrating new technologies into classrooms (Bitner & Bitner, 2002; Blackwell et al., 2014; Kim, Kim, Lee, Spector, & DeMeester, 2013; Venkatesh, 2000). Teachers' beliefs about and attitude towards mobile learning are key factors influencing successful integration of mobile learning and associated devices (Chen, 2010; Kim et al., 2013; Yuen & Ma, 2008). When teachers find mobile devices useful and supportive of teaching, they are more likely to integrate them into their classes (Kim et al., 2013, Chen, 2010; Kim, et al., 2013; Yuen & Ma, 2008). Anxiety is another factor that influences the integration process (Bitner & Bitner, 2002). Helping teachers overcome any anxiety they feel about new technologies is crucial to the success of integrating mobile devices into teaching (Bitner & Bitner, 2002). Teacher training programs and ongoing professional development should, therefore, be provided to help teachers understand how to use a new technology effectively; the result should be a reduction in anxiety and improved integration of a new technology (Bitner & Bitner, 2002).

Teacher beliefs, attitudes and anxiety typically change during and after experiencing, understanding and using new technologies and associated teaching methods (Ertmer & Ottenbreit-Leftwich, 2010; Lee, 2004). The changes in teacher beliefs and attitudes appear to follow predictable patterns (Lee, 2004). Understanding the pattern of changes can aid schools in planning their professional development and training programs and policies to increase sustainability of new technologies and teaching methods (Lim, & Khine, 2006; Strudler & Wetzel, 1999). When implementing the use mobile devices in schools, emphasis needs to be

placed on desired changes in teacher thinking (i.e., beliefs), values (e.g., attitudes) and emotions (especially anxiety) (Bitner & Bitner, 2002). The present study investigates changes in teacher beliefs, attitudes and anxiety after experiencing the use of mobile devices in schools. Results suggest that there are differences among groups of teachers and understanding these differences can inform professional development programs.

Literature Review

Teacher beliefs, attitudes and acceptance of technology

Teachers beliefs are fundamental to the acceptance of new technologies and include their views on knowledge acquisition and effective ways of teaching (Kim et al., 2013). These beliefs can be categorized into six dimensions: 1) the structure of knowledge; 2) the source of knowledge; 3) the stability of knowledge; 4) the speed of learning; 5) the ability to learn (Schommer, 1998; Schommer-Aikins, Duell, & Hutter, 2005); and 6) effective activities to support learning and instruction (Chan & Elliott, 2004). These beliefs are directly or indirectly related to performance mediated by attitudes, efforts and behaviors (Schommer, 1990), and are the most valuable factors influencing teacher acceptance (Ajzen & Madden, 1986; Kim, et al., 2013). For example, if a teacher finds it easy to learn to use a new tool, he/she is more likely to try the tool in lessons. Similarly, if a teacher believes teaching is about student reflection on what they have learned in class, then they are more likely to use a lesson reflection approach in their teaching.

In research on teacher beliefs about technology, the view, or scope, of beliefs considered seems narrower than research on teacher beliefs in general (Kim et al., 2013). Researchers often only examine those beliefs specifically related to technology and not other general beliefs about

teaching and learning, which may influence acceptance or attitudes to technology (Kim et al., 2013). Abbitt (2011) refers to beliefs about technology as self-efficacy regarding computer use; Polly and colleagues (2010) regard them as the value of technology in learning and teaching; and Davis and colleagues (1989) suggest such beliefs include perceived ease of use and perceived usefulness of a new technology. Teacher beliefs about technology are an important predictor in technology acceptance (Celik & Yesilyurt, 2013; Davis, et al. 1989; Kim et al., 2013; Teo, 2009). Teachers who perceive higher computer self-efficacy are more likely to find new technologies easy to use and useful in teaching, and tend to adopt the technologies in teaching (Celik & Yesilyurt, 2013; Teo, 2009). Moreover, teachers who hold positive attitudes towards using a new technology in teaching are more likely to use the technology in their classrooms (Blackwell et al., 2014; David et al., 1989). This shows that teacher beliefs and attitudes can affect the adoption of mobile devices.

Anxiety and technology acceptance

Anxiety is defined as an emotional state of unpleasantness, fear, frustration, rumination and apprehension (Nayak, 2014; Venkatesh, 2000), which threatens decision-making (Wray & Stone, 2005). Anxiety is an important predictor in technology acceptance. (Venkatesh, 2000; Celik & Yesilyurt, 2013; Hsu, Wang, & Chiu, 2009), which has negative influences on technology integration (Venkatesh, 2000; Celik & Yesilyurt, 2013; Hsu et al., 2009). Introducing new technologies as a teaching tool in classrooms would lead to changes in instructional methods and the use of unfamiliar technologies (Bitner & Bitner, 2002). Changes of any kind bring about anxiety, fear and concern for teachers (Bitner & Bitner, 2002). They may be worried about a possible heavier workload from learning or using the technology, or about lost control of the

classroom procedure due to a lack of familiarity with the technology. Indeed, it has been shown that teachers who feel anxious about teaching with mobile devices as a new technology are less likely to recognize them as effective teaching and learning tools (Celik & Yesilyurt, 2013; Hsu et al., 2009).

For any given individual, their anxiety is associated with their beliefs and attitudes (Celik &Yesilyurt, 2013; Hsu et al. 2009; Igbaria & Parausraman, 1989; Roberts & Henderson, 2000; Venkatesh, 2000). Anxiety can negatively affect beliefs on how easy a technology is to use (Igbaria & Parausraman, 1989; Roberts & Henderson, 2000; Venkatesh, 2000) and attitudes towards a new technology (Agbatogun, 2010). Attitudes toward using a technology also negatively affect anxiety (Celik & Yesilyurt, 2013). Teachers with positive attitudes towards using a technology have less anxiety; teachers with higher levels of anxiety have a more negative attitude towards using a technology. In other words, teachers who are more anxious about using mobile devices as learning and technology tools are less likely to find the devices easy to use and to have a positive attitude towards them.

Change in teacher beliefs and anxiety levels

Allowing teachers to experience and get familiar with new instructional methods changes their beliefs and anxiety levels about the methods (Ertmer & Ottenbreit-Leftwich, 2010; Lee, 2004; Wilkins & Brand, 2004). After taking a course on mathematics teaching methods, teachers found teaching with the methods more effective, and their beliefs about teaching and learning changed (Wilkins & Brand, 2004). Change in teacher beliefs follow a certain pattern (Lee, 2004). Teachers gradually changed their beliefs about a new instruction method when they noticed their students successfully learn with the method or see the method benefits student learning (Lee,

2004). For example, teachers started to change their beliefs about incorporating natural phenomena in science learning when they observed an improvement in student test results and classroom assessments (Lee, 2004). Similarly, once teachers observed higher student motivation levels when learning with mobile devices in classrooms, they gradually changed their views on the use of such devices. The visibility of the evidence for the usefulness of technology integration as a tool for learning and teaching is also important – when evidence of usefulness is less visible, there is greater anxiety and more feelings of reluctance to use technology (Hennessy, Ruthven, & Brindley, 2005). Visible evidence is necessary to change teacher anxiety.

Some other factors affect the degree of change in teacher beliefs, including curriculum context, subject culture/knowledge and pedagogical change (Goodwyn, Adams, & Clarke, 1997; Hennessy et al., 2005). Subject teachers develop their own perspectives on learning outcomes and objectives, and they shape their plans and actions accordingly (Firestone & Louis, 1999; Hennessy et al., 2005; Lave & Wenger, 1991). Studies by Goodwyn and colleagues (1997), and Hennessy and colleagues (2005) revealed that there is a relationship between the subject and the level of technology integration into practices. Their studies suggest that mathematics and science teachers feel more positive about the educational benefits of, and less reluctant to use, technology. However, the views of language teachers on the use of technology vary greatly, with many feeling more anxiety and greater reluctance to use classroom technology. They further showed anxiety may affect beliefs about and attitude towards educational technology use. Interestingly, their results also showed that when some teachers found a technology to be useful in teaching and learning, they felt more anxious about introducing the technology in classrooms.

In conclusion, the adoption of mobile devices in teaching allows a greater understanding of the use and value of such devices to student learning in classrooms and facilitates a change in

teacher beliefs and even anxiety levels. The nature of this change in teacher beliefs, attitudes and levels of anxiety varies and is different for different subject.

The present study

Using mobile devices as teaching and learning tools is still new to most schools. Thus, many school teachers would consider such devices to be new/unfamiliar educational technology. While some may feel confident, others may feel panicked when told to use the devices in their classroom teaching. Their initial beliefs, attitudes and anxiety levels can influence the effective adoption of the devices in classrooms, but are likely to change once the devices have been adopted. Understanding this shift in beliefs and attitudes will help schools plan, implement and sustain the successful integration of mobile technology. The present study aims to investigate how the beliefs, attitudes and anxiety levels of different subject teachers – language and humanities, and mathematics and science – change after mobile device adoption in schools.

Based on our discussion in the previous section our predictions were as follows:

Hypothesis 1: In the language and humanities group, the adoption of mobile devices in teaching and learning will not significantly change teacher beliefs about computer self-efficacy, ease of use, usefulness of, and attitude towards the devices.

Hypothesis 2: In the mathematics and science group, the adoption of mobile devices in teaching and learning will significantly change teacher beliefs about computer self-efficacy, ease of use, usefulness of, and attitude towards the devices.

Hypothesis 3: In both groups, there will be a change in the levels of anxiety towards mobile devices after their adoption.

Hypothesis 4: The change in computer self-efficacy, perceived ease of use, perceived usefulness, attitude towards and anxiety levels of the mathematics and science group will be significantly larger than that of the language and humanities group after device adoption.

Methods

Participants and design

The participants were 62 teachers from a secondary school in Hong Kong. Seventeen participants were male (27.42%) and 45 were female (72.58%). The average teaching experience was 12.8 years. The teaching subjects of the participants were English, Chinese, Chinese History, Western History, Mathematics, Junior Science, Chemistry, Biology and Physics.

In this study, we adopted a quasi-experimental design with pre- and post-questionnaires to compare different subject teacher groups. The participants were divided into two groups according to their primary teaching subject, resulting in a language and humanities group (n=29) and a mathematics and science group (n=33). The school environment supported technology in teaching – they had learning management support systems, projectors in their classrooms and wireless services.

Materials

In this study, the material comprised a self-report questionnaire and a consent form. We designed and constructed the questionnaire, and conducted a read-through with 2 experienced teachers to confirm the questionnaire format and wording were understandable and readable. The questionnaire items were designed to collect data on teacher background, and views on teaching and learning with mobile devices. In this paper, we report results from those items of the

questionnaire that addressed teacher computer self-efficacy, perceived ease of use and usefulness of mobile devices, attitude towards mobile devices in teaching, and anxiety levels towards using mobile devices in teaching. These were: (a) 3 questions about teacher background; and (b) 10 Likert-type questions (5=strongly agree, 1=strongly disagree). Questions in the questionnaire were modified from relevant research studies. The questions on computer self-efficacy were adapted from Compeau and Higgins (1995); the questions on perceived ease of use, perceived usefulness and attitude towards using were adapted from Davis (1989); the questions on anxiety were adapted from Hsu and colleagues (2009). The following are the items in the questionnaire.

Computer self-efficacy

- *I know how to use a computer to do my work.*
- *I am confident about using computers to do my work.*

Perceived ease of use

- *I find it easy to teach with mobile devices.*
- *Learning to teach with mobile devices would be easy for me.*

Perceived usefulness

- *Using mobile devices will improve my work.*
- *I would find mobile devices useful in my teaching.*

Attitude towards

- *Mobile devices make my teaching more interesting.*
- *I think it would be wise to use mobile devices in teaching.*

Anxiety

- *I feel mobile devices are a waste of effort.*
- *I feel apprehensive about using mobile devices in teaching.*

Procedure

The researchers first spoke to the principal about this study and got consent. The teachers completed the questionnaires in their school at the end of an academic year before mobile device adoption. The school purchased 40 mobile devices and introduced them in classrooms in the next academic year. The teachers received training workshops on the devices and used them in their classroom teaching. After 10 months, the teachers completed the same questionnaires in their school. We collected the completed questionnaires and captured the data in the SPSS 21 for analysis.

Results

The data collected from the pre- and post-questionnaires reflect changes in teacher beliefs, attitude and anxiety after the mobile device adoption in the school. We used mixed repeated measures ANOVAs to analyze the data collected in this study. One-way repeated measure ANOVAs were used to measure the difference in scores before and after the adoption; two-way repeated measures ANOVAs were used to compare the changes in scores between the language and humanities, and mathematics and science teacher groups.

The analyses showed that adoption significantly improved the levels of anxiety about, but not attitude towards teaching with, mobile devices in both group. For items related to computer self-efficacy, perceived usefulness and perceived ease of use mobile devices in teaching, the mathematics and science teacher group showed a significant improvement in their scores vs baseline, and this improvement was significantly larger than that of the language and humanities group.

Table 1 shows the descriptive statistics of the two groups. The mean scores of all the five measures in the pre-questionnaire were greater than 3. This indicates that participants tended to

agree that they were able to teach with mobile devices and found mobile devices useful in their teaching. In the case of anxiety, which has a negative influence, the participants' scores suggest feelings of reluctance to use mobile devices.

To further examine hypotheses 1, 2 and 3, repeated measures ANOVAs were used. The analyses for the language and humanities teacher group are presented in Table 2. As can been seen from the results, there was a significant difference in anxiety scores before (M = 3.03, SD = 0.74) and after (M = 2.74, SD = 0.59) adoption, $F(1,28) = 7.15$, $p = 0.01$, partial $\eta^2 = 0.20$. There was no significant difference in computer self-efficacy scores before (M = 3.76, SD = 0.53) and after adoption (M = 3.79, SD = 0.45) the adoption, $F(1,28) = 0.10$, $p = 0.75$, partial $\eta^2 = 0.004$. There was no significant difference in perceived usefulness scores before (M = 3.28, SD = 0.65) and after (M = 3.62, SD = 0.65) adoption, $F(1,28) = 3.50$, $p = 0.07$, partial $\eta^2 = 0.111$. There was no significant difference in perceived ease of use scores before (M = 3.62, SD = 0.76) and after (M = 3.78, SD = 0.80) adoption, $F(1,28) = 0.57$, $p = 0.46$, partial $\eta^2 = 0.02$. There was no significant difference in attitude scores before (M = 3.59, SD = 0.55) and after (M = 3.60, SD = 0.57) the adoption, $F(1,28) > 0.05$, $p = 0.83$, partial $\eta^2 = 0.002$.

In contrast, for the mathematics and science teacher group, repeated measures ANOVAs, also presented Table 2, showed there was a significant difference in anxiety scores before (M = 3.02, SD = 0.73) and after (M = 2.70, SD = 0.67) adoption, $F(1,32) = 16.68$, $p < 0.001$, partial $\eta^2 = 0.343$. There was a significant difference in computer self-efficacy scores before (M = 3.65, SD = 0.63) and after (M = 4.21, SD = 0.65) adoption, $F(1,32) = 13.61$, $p = 0.001$, partial $\eta^2 = 0.30$. There was a significant difference in perceived usefulness scores before (M = 3.47, SD = 0.67) and after (M = 4.30, SD = 0.53) adoption, $F(1,32) = 40.00$, $p < 0.001$, partial $\eta^2 = 0.56$. There was a significant difference in perceived ease of use scores before (M = 3.39, SD = 0.98)

and after (M = 4.14, SD = 0.70) adoption, $F(1,32) = 17.09$, $p < 0.001$, partial $\eta^2 = 0.35$. There was no significant difference in attitude scores before (M = 3.73, SD = 0.60) and after (M = 3.71, SD = 0.50) adoption, $F(1,32) > 0.05$, $p = 0.83$, partial $\eta^2 = 0.001$.

To compare the two groups for examining hypothesis 4, two-ways repeated measures ANOVAs, see Table 3, showed there was no significant differences in anxiety scores, $F(1,60) = 0.04$, $p = 0.85$, $\eta^2 = 0.001$, and attitude scores, $F(1,60) = 0.09$, $p = 0.76$, $\eta^2 = 0.002$, between the two groups. However, there were significant differences in computer self-efficacy, $F(1,60) = 7.58$, $p = 0.01$, $\eta^2 = 0.11$, perceived usefulness, $F(1,60) = 4.82$, $p = 0.03$, $\eta^2 = 0.07$, and perceived ease of use, $F(1,60) = 4.69$, $p = 0.03$, $\eta^2 = 0.07$, scores between the two groups.

Discussion, Limitations, and Conclusion

The main goal of this study was to investigate how secondary school teachers who teach different subject matter change their beliefs (e.g., computer self-efficacy, perceived ease to use, perceived usefulness), attitudes and anxiety levels after using mobile devices in their classrooms.

The pre-questionnaire results revealed that the teachers reported having good computer and technology skills, suggesting that they were capable of using mobile devices in teaching. The results further showed that the teachers found mobile devices easy to use and useful in teaching and that they held positive attitude, although some felt strong anxiety even after using the mobile devices. This finding is in line with the studies of Goodwyn and colleagues (1997), and Hennessey and colleagues (2005) who also found that use tended to improve beliefs and attitudes. The findings suggest that the teachers acquired the knowledge and skills to use mobile

devices in their classrooms; however, not all teachers are free the anxiety of using the new technology as the language and humanities teachers still felt some anxiety.

Practical experience may change teacher beliefs, attitudes and anxiety levels (Ertmer & Ottenbreit-Leftwich, 2010; Lee, 2004). The adoption of mobile technologies allowed teachers to experience the uses of mobile devices in classrooms, and in most cases had a positive effect on their beliefs, attitudes and anxiety levels. It appears from this study that the subject matter involved has some impact on the degrees of the changes (Goodwyn et al., 1997; Hennessy, 2005). Our results agreed with the studies of Goodwyn and colleagues (1997), and Hennessy and colleagues (2005), and revealed that there can be differences in effects among teachers of different subjects. This finding is only tentative or suggestive and deserves further investigation. It is important to understand such differences in order to plan, implement and support the integration of new technologies. The integration of mobile devices and new teaching methods changed beliefs about computer self-efficacy, perceived ease of use and usefulness of mobile devices of teachers involved in different subject matter areas. In this study, the mathematics and science teacher group significantly improved their views on their computer skills, ease of use and usefulness, but the language and humanities group did not experience similar changes. The analyses further suggested that differences of the improvements between the two groups. . These changes appear to be influenced by subject matter culture and learning objectives in different subject areas (Firestone & Louis, 1999; Hennessy et al., 2005; Lave & Wenger, 1991). The mathematics and science group in this study found that the adoption of mobile technologies can help them achieve their teaching goals; the language and humanities group in this study found that mobile devices were not especially appropriate teaching and learning tools although they managed to make use of those devices.

The results also revealed the two groups differed significantly with regard to changes in their anxiety levels. The positive conclusion is that as teachers gain familiarity with and experience using mobile devices in their teaching that anxiety levels will eventually be reduced. On the other hand, some teachers will have higher anxiety levels at the beginning and probably require longer periods of adjustment. One of the plausible explanations is that unfamiliarity can cause anxiety (Roger, 2010). More research with regard to differences among teachers in different subject areas is required to support this finding.

With regard to attitudes, the results suggest that changes in attitude towards teaching with mobile devices were not significant between the two groups; this finding suggests that adoption and use are not key factors in improving teacher attitudes. What then are the key factors affecting teacher attitudes. While more research focused on this specific question is needed, it is possible that school support and policies influence teacher attitude (Blackwell et al., 2014; Teo, 2009). Teachers may be worried about the lack of adequate and ongoing school support, or that new technologies will increase their workload or responsibilities. More research in this area is needed to draw more definitive conclusions.

Adopting mobile technologies in classroom teaching can provide different teachers with practical experience and training opportunities to acquire knowledge and stimulate thinking. However, the knowledge and thinking cannot effectively motivate all teachers to integrate mobile devices into their teaching practice. The underlying beliefs of teachers about the potential for a new technology to improve learning enhance their productivity. Moreover, students were less likely to receive teaching strategies using mobile devices from the language and humanities teachers.

Implications

This study offers four implications for implementing teacher professional programs and school policies for mobile teaching and learning. First, the programs should be tailored to the different subject teachers in a school, and focus on how to use mobile devices to deliver teaching goals. Second, since the adoption that offers practical teaching experience change some teacher beliefs and anxiety, the programs should offer teachers practical teaching opportunities. Third, school management teams should take teacher anxiety seriously when planning mobile device integration into classrooms (Bitner & Bitner, 2002). The teacher processional programs should focus not only on developing teacher knowledge and thinking, but also on how to reduce teacher anxiety, and drive or motivate teachers to apply new knowledge and thinking. Four, schools should suggest how to reduce possible extra workload when integrating mobile devices in classrooms. For example, they can hire teacher assistants to help in-service teachers in the beginning stages when implementing plans of mobile device integration, which the teachers would feel more comfortable or confident.

Limitations and suggestions for future studies

There are limitations in this study as in any study. A larger and more varied sample could be involved. Performance data in addition to survey data could be collected and analyzed to increase confidence in findings. . Also, this study considered learning areas instead of individual teaching subjects. Chinese and English language teachers may think differently from each other about their teaching and how their students learn, and they may also have different beliefs that humanities teachers. Future studies might investigate in a serious and systematic manner the beliefs that teachers at different levels teaching different subjects in different context have with

regard to the general potential of new technologies to improve learning and enhance productive teaching as well as the potential of specific technologies to do so. Future studies should focus on the relationship between the time using a new technology and the rate of decreasing levels of anxiety. Moreover, future studies should involve a longer period of time as well as focus on levels and types of technological and pedagogical support offered. In summary, to properly prepare and support teachers in effective integration of a new technology, their beliefs, attitudes, and anxieties must be understood and addressed throughout the process.

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Tables

Table 1

Descriptive statistics of the two teacher groups

		Language and humanities group (n=29)		Mathematics and science group (n=33)	
		Mean	S.D.	Mean	S.D.
Anxiety	Pretest	3.03	0.74	3.02	0.73
	Posttest	2.74	0.59	2.70	0.67
Computer self-efficacy	Pretest	3.76	0.53	3.65	0.63
	Posttest	3.79	0.45	4.21	0.65
Perceived usefulness	Pretest	3.28	0.65	3.47	0.67
	Posttest	3.62	0.65	4.30	0.53
Perceived ease of use	Pretest	3.62	0.76	3.39	0.98
	Posttest	3.78	0.80	4.14	0.70
Attitude	Pretest	3.59	0.55	3.73	0.60
	Posttest	3.60	0.57	3.71	0.50

Table 2

One-way repeated measure ANOVA results of the two groups

Group	Variable	N	F	η^2
Language and humanities group	Anxiety	29	7.15**	0.20
	Computer self-efficacy	29	0.10	0.004
	Perceived usefulness	29	3.50	0.111
	Perceived ease to use	29	0.57*	0.02
	Attitude	29	0.05	0.002
Mathematics and science group	Anxiety	33	16.68***	0.343
	Computer self-efficacy	33	13.61***	0.30
	Perceived usefulness	33	40.00***	0.56
	Perceived ease to use	33	17.09***	0.35
	Attitude	33	0.83	0.001

*p<0.05, ** p<0.01, ***p<0.001

Table 3

Two-ways repeated measure ANOVA results of the two groups

Variable	F	η^2
Anxiety	0.04	0.001
Computer self-efficacy	7.58**	0.11
Perceived usefulness	4.82*	0.07
Perceived ease to use	4.69*	0.07
Attitude	0.09	0.002

*p<0.05, ** p<0.01, ***p<0.001