Sumaya Laher*
Department of Psychology,
University of the Witwatersrand
**corresponding author:*
sumaya.laher@wits.ac.za

Emma Boshoff
Department of Psychology,
University of the Witwatersrand

DOI: http://dx.doi.org/10.18820/2519593X/pie.v35i1.15
ISSN 0258-2236
e-ISSN 2519-593X
Perspectives in Education
2017 35(1): 200-213

Understanding learner attitudes towards the use of tablets in a blended learning classroom

Abstract

In 2004, the South African Department of Education (DoE) published the White Paper on E-Education. The aim of the E-Education White Paper was to ensure that South African learners could use education communication technologies (ECT) skilfully by 2013. However, these goals have not been met and a significant digital divide exists between learners with and without access to ET. The lack of consideration of intra- and inter-personal factors such as attitudes in the rollout of ET has often been cited as one of the reasons for the present lack of ET integration and uptake in schools. Hence, this study contributes to this gap in research by exploring attitudes towards the use of iPads in a sample of South African learners in a blended learning environment. A demographic questionnaire and the ET Attitudes Scale were administered to a convenience sample of 285 learners from a private school in the Johannesburg area. Descriptive statistics, ANOVAs and thematic analysis were used to analyse the results. From the findings, it was evident that overall learners were more positive than negative about the integration of iPads in school. However, this pattern differed across the grades with lower grades demonstrating better attitudes towards the use of iPads in terms of enjoyability, ease of use and usefulness. These results suggest that ET attitudes do have a role to play in order to ensure the successful implementation and adoption of ET by learners and should be considered in policy and practice.

Keywords: *Attitudes; educational technology; iPads; ET attitudes scale*

1. Introduction

In recent years, the demand for the inclusion of Information and Communications Technology (ICT) in education, that is, Educational Communications Technology (ET), has increased rapidly (Hepp, Hinostroza, Laval & Rehbein, 2004). At present, the findings regarding the ability of ET to improve learning are mixed, with this field being continuously investigated. While it is logical that the first step in technology acceptance is access to technology, Musa (2006) argues that the value that individuals attach to a technology is of utmost importance in determining how the technology will be received and used. Studies have noted the significance of considering both teacher and learner attitudes toward ET, in order to determine the success of

how it has been and should be implemented (Aesaert & van Braak, 2014; Bovée, Voogt, & Meelissen, 2007). Liaw, Huang and Chen (2007) argue that the use of ET in and of itself is inconsequential, unless ET users are positively disposed towards the use of ET. Therefore, it is crucial to explore learner and instructor attitudes toward ET, in order to make the integration of this medium into the classroom as efficient and appealing as possible. Courtois, Montrieux, De Grove, Raes, De Marez and Schellens (2014) suggest that learners are in fact the primary stakeholders in the issue of user acceptance of ET. If there is not bottom-up support for the continued use of ET from learners, it is unlikely that learners will adopt ET regardless of whether the school and teachers have adopted ET. Learner attitudes towards ET have not been adequately explored in the South African context. Thus this study explored learner attitudes towards the use of iPads in blended learning classrooms (classrooms that use a combination of face-to-face teaching and iPad-based learning).

1.1 Understanding attitudes and iPad usage

Attitudes can be defined in various ways (Fishbein & Ajzen, 2010). However, across definitions, two aspects are common in that attitudes have direction and attitudes are associated with behaviour (Daya & Laher, in press). Thus, an attitude can be either positive or negative and will influence the person's behaviour in relation to the object, group, event or symbol that is being perceived (Fishbein & Ajzen, 2010). This understanding of attitudes concurs with that proposed by Rogers' Diffusion of Innovations Theory (2003). According to the diffusion of innovations theory, there are five steps towards successful integration of technological innovations, namely: knowledge, persuasion, decision, implementation and confirmation. The knowledge phase involves knowing what the innovation does, and how to use it. The persuasion phase follows the knowledge phase, and it is here that positive or negative perceptions or attitudes are formed. According to Rogers (2003) attitudes in the persuasion phase could be affected by how useful an individual perceives the innovation to be in terms of how it compares to other previous innovations, how complex it is, its compatibility with existing practices and whether there are any tangible changes brought about by the innovation. The possibility for experimentation with the innovation and the need for the innovation to conform to social norms also lead to attitudes that are more positive and ultimately persuade one to use the innovation. Thus once the knowledge and persuasion criteria are met, the Decision phase will follow, which should lead to a positive choice resulting in implementation and ultimately confirmation for the innovation. Using Rogers Diffusion of Innovations Theory as the theoretical framework for this study, attitudes towards the use of iPads are explored using the educational technology (ET) attitudes scale. The ET attitudes scale measured the learners' overall attitude towards the iPad in the classroom, as well as their perceptions of the usefulness of the iPad, their enjoyment of ET and perceived ease of use or competence in using the iPad.

Perceived ease of use is the extent to which the use of technology is regarded as free of effort (Davis, 1989). It is suggested that the more the user perceives technology to be easy to use, the more positive his or her attitude towards technology will be (Sun, Tsai, Finger, Chen & Yeh, 2008). Research has demonstrated the substantial impact of perceived ease of use on computer attitudes (Aesaert & van Braak, 2014; Liaw *et al.,* 2007) but as technology becomes more prevalent in society, this aspect is becoming less important in determining attitudes towards technology. Liaw et al. (2007) and Bovée *et al.* (2007) found that students are adept at using computers and have a high degree of experience with technology suggesting

that competence is not as prevalent a factor in understanding learner attitudes towards ET in schools.

Perceived usefulness is the cognitive component of attitudes toward computers (Liaw *et al.,* 2007). It refers to the degree to which the individual perceives the computer to be important for current and future work (Davis, 1989). This influences how the individual will perceive using the computer to enhance work performance and achieve success (Teo, 2008). Yeha and Teng (2012) suggest that perceived usefulness is the most influential predictor of the intention to use technology. Bovee *et al.* (2007) supported this in a study on the computer attitudes of 240 South African learners from low- to high-resourced schools. Perceived usefulness was a significant positive predictor of computer attitudes as learners agreed that it is important to learn how to use a computer and that a computer is useful and presents one with opportunities to learn new things.

Perceived enjoyment in the case of ET is concerned with the individual's inherent pleasure derived from working with ET (Lee, Cheung & Chen, 2005). Therefore, if an individual perceives engaging in ET-related activities as enjoyable, he or she will have a stronger intention to undertake them. It is a crucial determinant of a positive computer attitude because it affects the extent to which the individual will continue to use the computer (Teo, 2008). Many studies have supported the significant contribution of perceived enjoyment to positive computer attitudes (Dündar & Akçayır, 2014; Lee *et al.,* 2005; Liaw *et al.,* 2007; Teo, 2008). In Dündar and Akçayır's (2014) study on 206 high school learners' attitudes toward tablets, perceived enjoyment was positively related to tablet attitudes, with the learners noting that tablets made learning fun and increased the learners' interest in and enjoyment of their subjects.

There is currently little research on the use of ET in primary and secondary schools in South Africa. It is clear that the implementation of ET in South African schools has been a slow process and it is therefore essential to examine any factors that may be influencing the slow uptake of ET. Hence, this study explores learners' attitudes to a single type of ET – the iPad – in a blended learning environment. To do this, two research questions were explored:

- What are learners' attitudes toward iPads in school?
- Will learners want to continue using iPads in school?

2. Methods

2.1 Participants

The sample for this study consisted of 285 learners from an all-girls private school in the northern Johannesburg area – 42 learners from Grade 7, 74 learners from Grade 8, 59 learners from Grade 9, 64 learners from Grade 10, and 46 learners from Grade 11. The ages of the learners ranged from 12 to 17 years, with a mean age of 14 years (SD = 1.34). The school was selected primarily for convenience and because it is one of the only schools in the area that makes use of a one-to-one iPad initiative in teaching (L. Kaplan, personal communication, January 22, 2015). Using this sample ensures that all learners have access to the same tablet device – often a confounding factor in this type of research. Further, it is well established in the literature that access to ET must be present before exploring attitudes towards ET (Aesaert & Van Braak, 2014; Bovée *et al.,* 2007; Tsai & Tsai, 2010). Thus the sample for this study is a non-probability purposive sample (Gravetter & Forzano, 2011).

Learners' access to ET was determined by 12 indicators of access both at home and school (see Table 3.1). In terms of access to the internet at home, only 3.2% of the learners did not have access to internet at home, while 4.9% of the learners did not have a computer at home. On the other hand, by virtue of being included in this study, 100% of the learners had access to an iPad at home and all the participants owned mobile phones.

With regard to the access to iPads at school, only 2.5% of the learners did not use their iPads for school-related assignments, while 11.2% of the learners did not use their iPads for homework. Using the iPad to study was the least popular school-related function, with only 54.7% of the learners responding that they did use their iPads to study as evidenced in Table 1. From Table 1 it is also evident that the use of the iPad to contact classmates at school and socially was fairly evenly split. Fifty-three per cent of learners used their iPad to contact classmates at school and 48.1% used the iPad for social engagement with peers, but this was not necessarily via social media, as only 33% of learners accessed social media from their iPads. Conversely, 82.1% of the learners used their iPads to contact teachers.

Table 1: Learners' access to ECT at home and at school

Access to ECT	Frequency (n)	Percentage (%)
Internet at home	276	96.8
Computer at home	271	95.1
iPad at home	284	99.6
Mobile phone	281	98.6
Uses iPad in class	285	100
Uses iPad for assignments	277	97.2
Uses iPad for homework	252	88.4
Uses iPad to study	156	54.7
Uses iPad to contact classmates at school	151	53
Uses iPad to contact classmates socially	148	51.9
Uses iPad for social media	190	66.7
Uses iPad to contact teachers	234	82.1

2.2 Research Design

This study was descriptive in nature and was therefore not concerned with a cause-and-effect relationship characteristic of an experimental design (Rovai, Baker, & Ponton, 2013). Neither the groups nor the variables in this study were manipulated or randomly assigned in any way. Therefore, the design used was a non-experimental research design (Rovai *et al.,* 2013). The data were collected at one point in time only, therefore the design was cross-sectional (Babbie, 2009).

2.3 Instruments

A questionnaire including a demographics section and the ET attitudes scale was used. The demographics section asked for information including age and grade. This was followed by 12 closed-ended (*Yes* or *No*) questions to attain an indication of participants' computer access and use at home and school. At the end of the questionnaire, participants were asked to provide reasons for whether or not they would like to continue to use the iPad at school

2.3.1 The ET attitudes scale

The ET attitudes scale in this study consisted of three sub-scales: perceived enjoyment, perceived ease of use and perceived usefulness. The perceived enjoyment sub-scale was adapted from the computer attitude questionnaire (CAQ) (Teo, 2008), and the perceived ease of use and perceived usefulness sub-scales from the computer attitude measure for young students (CAMYS) (Teo & Noyes, 2008). Given that the scale was adapted from many scales, it was piloted on a sample of 24 learners in the same grades as the sample in this study. The information reported here on the scale is for the scale as it was adjusted based on the results and feedback from the pilot study, for which the overall Cronbach alpha coefficient was .82. Thus, the final scale consisted of 23 items. Items 1-5 measure perceived enjoyment; items 6-12 measure Perceived ease of use; and items 13-23 measure perceived usefulness. The internal consistency reliability coefficients for the ET attitudes scale and subscales ranged from .73 to .85 and were all similar to or higher than the values in the original samples.

2.4 Research procedure

Ethical clearance was obtained from the Human Research Ethics Committee (HREC) at the University of the Witwatersrand (Protocol number: H15/05/16). Permission for this study was obtained from all the relevant parties including the principal of the school and the director of ET at the school. Consent was also obtained from the parents of the participants via a consent form prior to the questionnaire being administered, and assent was obtained from the participants themselves. Thereafter, the learners from Grades 7 to 11 completed the questionnaire. Questionnaires were administered to the learners during lessons at a time when it was convenient for their teachers. Questionnaires took approximately 20 minutes to administer and were collected from learners at the end of the lessons. Data were entered on MS Excel and analysed using SPSS (Version 23, 2015).

2.5 Data analysis

Descriptive statistics were obtained by means of frequencies for the demographic variables' age as well as the 12 questions considering iPad access and use. Descriptive statistics (mean, standard deviation, minimum and maximum values, and skewness coefficients) for each of the attitudinal variables in this study were calculated. At the end of the questionnaire, the learners were asked to give their opinions regarding whether they would like to continue to use iPads at school. Frequencies were obtained for these responses and reasons and were analysed using content analysis as specified by Braun and Clarke (2006).

3. Results

3.1 What are learners' attitudes toward ET?

Learners' overall attitudes towards ET, their perceptions of the usefulness of ET, enjoyability and ease of use were all generally neutral with mean scores ranging between 3.20 and 3.50 (see Table 2).

Table 2: Descriptive statistics for learners' attitudes towards ECT and related factors

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness
Learners' attitudes	279	1.29	5	3.3580	.6018	-.269
Perceived usefulness	285	1	5	3.4298	.7428	-.225
Perceived ease of use	281	1	5	3.5069	.7718	-.287
Perceived enjoyment	283	1	5	3.3498	.8503	-.159

3.2 Will learners want to continue to use ET?

Respondents' desire to continue to use iPads at school was examined by their responses to an open-ended question at the end of the questionnaire. These responses were especially relevant considering that 100% of the learners indicated that they own an iPad and use it in class. Ninety-seven percent (n=279) of learners answered the question. Of these, 68.85% (n=252) were *Yes* responses and 31.15% (n=114) were *No* responses. Thus, the responses in favour of continuing to use the iPads in class were more than double the number of responses that were not in favour. Of those who responded, 14.69% (n=41) were from Grade 7, 26.16% (n=73) were from Grade 8, 20.78% (n=58) were from Grade 9, 21.86% (n=61) were from Grade 10, and 16.49% (n=46) were from Grade 11.

Tables 3 and 4 show the themes and sub-themes for the *Yes* and *No* responses across Grades. The frequencies and percentages in these tables do not reflect the number of learners who responded *Yes* or *No* in each Grade, but rather the number of types of *Yes* or *No* responses per Grade. For example, in a *Yes* answer from a single learner, there may have been multiple themes or sub-themes.

3.2.1 Themes in favour of using iPads

From Table 3, the Perceived Usefulness of iPads for the learners' futures and the importance for the environment constituted 29.23% (n=107) of responses and was the most prevalent reason for continuing to use an iPad. 26.50% (n=97) of these responses concerned the iPad being a helpful tool for current and future work. Respondent 180 from Grade 10 commented, "If you don't use an iPad or tablet, you will find yourself at a disadvantage because the times are changing and the iPad is very useful to find information."

Table 3: Themes and sub-themes for Yes responses for Grades 7 to 11

	Grade 7		Grade 8		Grade 9		Grade 10		Grade 11			
	Number of types of Yes responses										TOTAL	
	57		94		52		46		34		252	68.85
Theme	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**% of responses**
Perceived usefulness	**19**	**5.19**	**35**	**9.56**	**16**	**4.37**	**15**	**4.01**	**22**	**6.01**	**107**	**29.23**
For the future	19	5.19	32	8.74	11	3.00	14	3.83	21	5.74	97	26.50
Environmentally-friendly	-	-	3	0.82	5	1.37	1	0.27	1	0.27	10	2.73
Practical ease of use	**17**	**4.64**	**23**	**6.28**	**23**	**6.28**	**9**	**2.46**	**7**	**1.91**	**79**	**21.58**
Technical ease of use	**7**	**1.91**	**22**	**6.01**	**21**	**5.74**	**15**	**4.1**	**10**	**2.73**	**75**	**20.50**
Easy to use	6	1.64	21	5.74	9	2.46	6	1.64	3	0.82	45	12.30
Access	1	0.27	1	0.27	12	3.28	9	2.46	7	1.91	30	8.20
Perceived enjoyment	**14**	**3.83**	**9**	**2.46**	**5**	**1.37**	**7**	**1.91**	**2**	**0.55**	**37**	**10.11**
Innovative	14	3.83	7	1.91	3	0.82	3	0.82	1	0.27	28	7.65
Interactive	-	-	2	0.55	2	0.55	4	1.09	1	0.27	9	2.46

Practical ease of use was the second most cited reason for continuing to use an iPad, with 21.58% (n=79) of responses being from this theme. The majority of these responses came from Grade 8 and 9 learners. The quick pace at which research and assignments can be completed on the iPad was the primary reason for it being convenient. For example, Respondent 102 from Grade 8 commented, "If you need to do research or work on the spot you can just pull out your iPad and do it, you don't have to wait until you get home." Learners also commented on the practical convenience of using the iPad. Respondent 100 from Grade 8 commented, "It makes the weight of the school bag a lot less which prevents back problems."

Technical ease of use followed, with 20.50% (n=75) of responses indicating that the iPad makes learning easier and provides easier access to the internet and information. Respondent 119 from Grade 9 summarised the reasons for the iPad being easy to use: "Research is easier, it is easier to translate words, you can contact teachers when outside of school, and it is easier to receive work."

Finally, Perceived Enjoyment was the least cited *Yes* response for continuing to use iPads, with 10.11% (n=37) of responses constituting this theme and its sub-themes. Learners commented that they enjoy using the iPad in class because it is "fun" and makes class "more exciting."

3.2.2 Themes against the use of iPads

Table 4 shows the frequencies of *No* responses to the question of continuing to use the iPads in class. Grade 7 has not been included in this table, as 100% of Grade 7 respondents indicated that they *would* like to continue to use their iPads in class. This contrasted greatly with the Grade 10 and 11 responses that constituted the majority of *No* responses.

Table 4: Themes and sub-themes for No responses for Grades 8 to 11

	Grade 8		Grade 9		Grade 10		Grade 11			
	Number of types of No responses								TOTAL	% of responses
	18		15		40		41		114	31.15
Theme	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**
Prefer traditional methods of learning	**9**	**2.46**	**6**	**1.64**	**12**	**3.28**	**17**	**4.64**	**44**	**12.02**
Textbooks/hard copies of notes	4	1.09	2	0.55	3	0.82	2	0.55	11	3.01
Prefer learning from teacher	2	0.55	-	-	1	0.27	4	1.09	7	1.91
Prefer writing notes	3	0.82	4	1.09	8	2.19	11	3.01	22	6.01
Too distracting	**3**	**0.82**	**3**	**0.82**	**11**	**3.01**	**4**	**1.09**	**21**	**5.74**
Technological issues	**3**	**0.82**	**1**	**0.27**	**4**	**1.09**	**7**	**1.91**	**15**	**4.10**
Not used effectively	**2**	**0.55**	**1**	**0.27**	**7**	**1.91**	**2**	**0.55**	**12**	**3.28**
Dislike using iPad (no further explanation)	**1**	**0.27**	**3**	**0.82**	**1**	**0.27**	**4**	**1.09**	**9**	**2.46**
Prefer using laptop/ cell phone	**-**	**-**	**-**	**-**	**3 (laptop)**	**0.82**	**4 (cell phone)**	**1.09**	**8**	**2.19**
It is anti-social	**-**	**-**	**1**	**0.36**	**1**	**0.27**	**2**	**0.55**	**4**	**1.09**
Target for theft	**-**	**-**	**-**	**-**	**1**	**0.27**	**1**	**.027**	**2**	**0.54**

The most frequent reason for discontinuing the use of iPads in the classroom related to a preference for more traditional methods of learning. 12.02% (n=44) of responses were categorised in this theme. A preference for traditional learning included a preference for textbooks instead of e-textbooks, handwritten notes and hard copies of notes to write on, as well as a focus on student-teacher interaction instead of the iPad as a teaching tool. For example, Respondent 95 in Grade 8 commented, “I learn more from books and learn better from writing notes.” Respondent 192 in Grade 10 agreed: “I prefer the traditional way of [using] paper and pen and find it easier.” Respondent 259 in Grade 11 commented, “I think iPads take away the traditional necessity of communication with peers and teachers.”

Learners further pointed to the distracting nature of the iPad. The majority of the responses that made up this 12.02% (n=44) came from Grade 10 learners. Respondent 186 from

Grade 10 commented, "I hate iPads for school … They distract me and I do not focus …" Respondent 238, also in Grade 10, further reported, "It can be quite distracting, especially when learners don't feel like doing work so they utilise social media."

The discontinuation of using iPads because of technological issues constituted 4.10% (n=15) of responses. These included issues such as Wi-Fi connection problems, technological malfunctions and the unreliability of the iPad. Furthermore, 3.28% (n=12) of responses suggested that the iPad is not used effectively in class but no further explanations were provided. 2.19% (n=8) of responses indicated that it is preferable to use a cell phone or laptop instead of an iPad, with the suggestion that iPads are useful for social media and games but not for schoolwork and fast access to information. Finally, 1.09% (n=4) of responses pointed to the iPads creating anti-social tendencies amongst peers. 0.54% (n=2) would not like to continue to use an iPad because its value increases the chance of it being stolen.

4. Discussion

This study investigated attitudes towards ET among 285 learners from a private all-girls school in the Johannesburg area. Learners' attitudes towards iPads were in the neutral range (see Table 2). In the only longitudinal study on the acceptance of a tablet as a learning device at home and school, Courtois et al. (2014) found that at the outset of tablet implementation, positive attitudes were the strongest explanation for tablet usage. Six months later, results showed that the effects of attitude towards and perceived behavioural control of tablet usage were no longer significant.

Owing to the similar nature of the sample from Courtois et al.'s (2014) study, perhaps the neutral attitudes in this study can also be explained by other factors that were not considered, such as the habit formation of using the iPad in class and, more importantly, subjective norms. Whereas the learners' attitudes may have been positive at the beginning of the iPad implementation, it is likely that, after three years of using the devices, their habitual use of them is more influential on their intention to use them than attitudes or perceived behavioural control alone. In fact, the authors suggest that subjective norms about the acceptance or rejection of technology may explain user acceptance of technology more than attitudes or perceived behavioural control because subjective norms become internalised over time (Courtois et al., 2014). Therefore, initial attitudes, whether positive or negative, are influenced by subjective norms at a later stage. Additionally, obligatory use of technology does not foster positive attitudes, which could explain the neutral attitudes of the learners in this sample. Thus, it may be the case that learners are still assessing the merits and drawbacks of using ET in the classroom.

The qualitative responses provided a more nuanced picture of the attitudes towards iPads. The qualitative results also pointed to potential differences across grades. Hence, ANOVAs were used to assess whether overall attitudes, perceived usefulness, enjoyment and ease of use would differ across grades.

An analysis of ET Attitudes across grades revealed that the differences in attitudes across grades were significant for all aspects of ET Attitudes: Perceived Enjoyment (p=.000), Perceived Ease of Use (p=.000), Perceived Usefulness (p=.002), and overall ET Attitudes (p=.000) as evidenced in Table 5. Table 6 provides the mean values for each grade for comparison purposes.

Table 5: One-way ANOVA for ECT attitudes per grade

		Sum of Squares	Df	Mean Square	F	Sig.
Perceived enjoyment	Between Groups	26.218	4	6.555	14.144	**.000**
	Within Groups	128.834	278	.463		
	Total	155.052	282			
Perceived ease of use	Between Groups	18.574	4	4.643	8.648	**.000**
	Within Groups	148.193	276	.537		
	Total	166.767	280			
Perceived usefulness	Between Groups	6.354	4	1.588	4.485	**.002**
	Within Groups	97.759	276	.354		
	Total	104.112	280			
ECT attitudes	Between Groups	14.134	4	3.533	11.290	**.000**
	Within Groups	85.129	272	.313		
	Total	99.263	276			

Table 6: Learners' attitudes towards ECT per grade

		N	Minimum	Maximum	Mean	Std. Deviation	Skewness
Perceived enjoyment	**Grade 7**	42	2.25	5	4.149	.61143	-1.045
	Grade 8	73	2.20	5.00	3.6247	.72644	.225
	Grade 9	73	2.00	5.00	3.5808	.71815	-.155
	Grade 10	74	1.80	4.60	3.3243	.64507	-.278
	Grade 11	45	1.00	5.00	3.1600	.71044	-.111
Perceived ease of use	**Grade 7**	41	2	5	3.930	.65708	-.733
	Grade 8	73	1.43	5.00	3.5577	.74883	-.191
	Grade 9	72	1.71	5.00	3.5972	.69752	.049
	Grade 10	74	1.71	4.86	3.3494	.71688	-.161
	Grade 11	46	1.00	4.71	3.0839	.77815	-.440
Perceived usefulness	**Grade 7**	42	2.86	4.86	3.724	.43422	.405
	Grade 8	73	1.71	4.86	3.7006	.63895	-.578
	Grade 9	73	2.57	4.86	3.7593	.52644	-.451
	Grade 10	72	1.29	4.71	3.4405	.65212	-.461
	Grade 11	46	1.14	4.57	3.4317	.65879	-.788

		N	Minimum	Maximum	Mean	Std. Deviation	Skewness
Learners' ECT attitudes	**Grade 7**	41	2.49	4.55	3.582	.46916	-.325
	Grade 8	72	1.91	4.73	3.3507	.54106	-.184
	Grade 9	71	2.28	4.34	3.3817	.47828	-.108
	Grade 10	72	1.82	4.24	3.1255	.50403	-.073
	Grade 11	45	1.49	4.01	3.0350	.55951	-.418

In terms of perceived enjoyment, it was clear that lower grades had higher levels of enjoyment, which decreased as learners progressed from grade to grade. A similar pattern was observed for ease of use, usefulness and overall attitudes that mirrored these results where learners from lower grades perceived the iPad as easier to use, perceived the iPad as more useful and had more favourable attitudes toward ET, which lessened as they progressed from grade to grade.

The literature reviewed has demonstrated the considerable importance of Perceived Ease of Use and Perceived Usefulness in the adoption of positive attitudes towards ET (Aesaert & Van Braak, 2014; Davis, 1989; Govender, 2012). However, these variables were significantly different between grades, which suggests that, at grade level, the attitudes toward Perceived Ease of Use and Perceived Usefulness are perhaps more favourable in lower grades (7, 8, and 9), which may not be reflected in the overall neutral attitudes.

In contrast to the emphasis placed on Perceived Enjoyment being a significant predictor of positive ET Attitudes in the literature (Lee et al., 2005; Mohammadi, 2015; Teo, 2007), in this sample, Perceived Enjoyment was the least cited reason for continuing to use iPads. Grade 7 produced the most responses for Perceived Enjoyment while only two responses from Grade 11 respondents cited Perceived Enjoyment as a reason for continuing to use iPads. Although a larger sample would be needed to test this hypothesis, it may be the case that, for learners who have now used the iPads in class for three years, the novelty of the experience has diminished and, as a result of this, so too has the learners' enjoyment, perceived ease of use and usefulness of using iPads in class.

Courtois *et al.* (2014) have suggested that attitudes toward technology can undergo changes from the pre-adoption phase to post-adoption phases. It is therefore apposite to conduct future research on ET attitudes longitudinally, as the results of cross-sectional studies can be misleading and it is not always clear in which phase of the technology implementation to situate a cross-sectional study. This could be achieved by conducting measures at different stages of technology adoption. For example, a pre-adoption measure, a post-adoption measure once ET has been used for an appropriate amount of time, and a final measure after learners' examinations which would give insight into the relationship between ET attitudes and academic achievement (Courtois *et al.,* 2014).

In terms of the reasons for not continuing to use the iPad in class, the most frequent reasons cited were that learners prefer traditional pen-and-paper resources and writing notes and that the iPad is too distracting. These results correlate with those from Dündar and Akçayir's (2014) study, in which learners suggested that it is more difficult to take notes on iPads and that the iPads distract them from the lesson topic. Furthermore, literature has also suggested

that learners prioritise face-to-face teaching over the use of ICT in the classroom (Chen, 2012; López-Pérez, Pérez-López and Rodríguez-Ariza, 2011) and this was echoed in the qualitative responses in this study. Wuensch, Aziz, Ozan, Kishore, and Tabrizi (2006) compared student satisfaction with online learning and face-to-face learning. Results showed that students found online learning to be more convenient and accommodating of students working at an individual pace. However, the students perceived online courses as disadvantageous in terms of providing less opportunity for communication with teachers and fellow students.

These findings are interesting but a larger and more diverse sample size should be used in future research. The sample should include low and middle resourced schools in conjunction with high resourced schools. These samples should be drawn from schools across South Africa in order to make meaningful comparisons about learners' attitudes towards ET. Studies also need to focus on ET more broadly, not just the use of iPads,

5. Conclusion

ET is an important tool for enhancing learners' performance and equipping them with the skills to function in an increasingly technologically driven society (Teo, 2008). In South Africa, ET is important for providing learners with skills needed for their personal benefit, as well as to ensure that they are globally competent in terms of their ICT skills (Department of Education, 2004). However, to date, the implementation of ET in schools has not been successful because of infrastructural issues, connectivity costs, and the 'digital divide' amongst learners with and without access to ICT at home and school (Pasensie, 2010). Although less frequently researched than teachers' attitudes toward ET, learners' attitudes toward ET have a substantial influence on the implementation of ET and it is therefore important for them to have positive attitudes toward ET if it is to be implemented and maintained effectively (Dündar & Akçayır, 2014; Lee et al., 2005; Rogers, 2003; Teo & Noyes, 2008). The results of this study have demonstrated the importance of attitudes in effective ET uptake. Therefore, in order for the integration of ET to be effective over and above its physical implementation, it is essential to develop learners' positive attitudes toward ET in order to ensure that it is adopted. Programmes to facilitate the successful implementation and adoption of ET by learners should consider inerventions within the intrapersonal space, more specifically, as they pertain to learner attitudes.

References

Aesaert, K. & van Braak, J. 2014. Exploring factors related to primary school pupils' ICT self-efficacy: A multilevel approach. *Computers in Human Behavior*, 41, 327–341. https://doi.org/10.1016/j.chb.2014.10.006

Fishbein, M. & Ajzen, I. 2010. *Predicting and changing behavior: The reasoned action approach*. New York, NY: Psychology Press.

Babbie, E. 2009. *The practice of social research*. Belmont, CA: Thomson Wadsworth.

Bhuasiri, W., Xaymoungkhoun, O., Zo, H., Rho, J.J. & Ciganek, A.P. 2012. Critical success factors for e-learning in developing countries: A comparative analysis between ICT experts and faculty. *Computers & Education,* 58(2), 843–855. https://doi.org/10.1016/j.compedu.2011.10.010

Bovée, C., Voogt, J. & Meelissen, M. 2007. Computer attitudes of primary and secondary students in South Africa. *Computers in Human Behavior*, 23(4), 1762–1776. https://doi.org/10.1016/j.chb.2005.10.004

Braun, V. & Clarke, V. 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Chen, W.F. 2012. An investigation of varied types of blended learning environments on student achievement: an experimental study. (Report). *International Journal of Instructional Media*, 39(3).

Courtois, C., Montrieux, H., De Grove, F., Raes, A., De Marez, L., & Schellens, T. 2014. Student acceptance of tablet devices in secondary education: A three-wave longitudinal cross-lagged case study. *Computers in Human Behavior*, 35, 278–286. https://doi.org/10.1016/j.chb.2014.03.017

Davis, F.D. 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. http://doi.org/10.2307/249008

Department of Education. 2004. Draft e-Education White Paper. Available at http://www.education.gov.za/LinkClick.aspx?fileticket=D7qR18o9N2o%3D&tabid=187&mid=482

Dündar, H. & Akçayır, M. 2014. Implementing tablet PCs in schools: Students' attitudes and opinions. *Computers in Human Behavior,* 32, 40–46. https://doi.org/10.1016/j.chb.2013.11.020

Govender, D.W. 2012. A model to predict educators' attitudes towards technology and thus technology adoption. *Africa Education Review*, 9(3), 548–568. https://doi.org/10.1080/18146627.2012.741101

Gravetter, F. & Forzano, L.B. 2011. *Research methods for the behavioral sciences*, 4th ed. Belmont, CA: Wadsworth Cengage Learning.

Hepp, P., Hinostroza, J.E., Laval, E. & Rehbein, L. 2004. Technology in schools: Education, ICT and the knowledge society. World Bank, Distance & Open Learning and ICT in Education Thematic Group, Human Development Network, Education. Available at http://www.sca2006.ticeduca.org/archivos/modulo_1/sesion_1/ICT_report_oct04a_Pedro_Hepp.pdf

Hogg, M.,& Vaughan, G. 2005. *Social psychology*, 4th ed. London: Prentice Hall

Lee, M.K.O., Cheung, C.M.K. & Chen, Z. 2005. Acceptance of internet-based learning medium: The role of extrinsic and intrinsic motivation. *Information & Management*, 42, 1095–1104. https://doi.org/10.1016/j.im.2003.10.007

Liaw, S.S. Huang, H.M. & Chen, G.D. 2007. Surveying instructor and learner attitudes toward e-learning. *Computers & Education*, 49. https://doi.org/10.1016/j.compedu.2006.01.001

López-Pérez, M.V., Pérez-López, M.C. & Rodríguez-Ariza, L. 2011. Blended learning in higher education: Students' perceptions and their relation to outcomes. *Computers & Education,* 56(3), 818–826. https://doi.org/10.1016/j.compedu.2010.10.023

Mohammadi, H. 2015. Investigating users' perspectives on e-learning: An integration of TAM and IS success model. *Computers in Human Behavior,* 45, 359–374. https://doi.org/10.1016/j.chb.2014.07.044

Moos, D.C. & Azevedo, R. 2009. Learning with computer-based learning environments: A literature review of computer self-efficacy. *Review of Educational Research,* 79, 576–600. https://doi.org/10.3102/0034654308326083

Musa, P.F. 2006. Making a case for modifying the technology acceptance model to account for limited accessibility in developing countries. *Information Technology for Development*, 12. https://doi.org/10.1002/itdj.20043

Pasensie, K. 2010. Briefing Paper 245: e-Education: How far down the information superhighway is SA's education? *South African Catholic Bishops' Conference*, Cape Town, South Africa.

Rogers, E.M. 2003. *Diffusion of innovations*, 5th ed. New York: Free Press.

Rovai, A.P., Baker, J.D. & Ponton, M.K. 2013. S*ocial science research design and statistics: A practitioner's guide to research methods and IBM SPSS*. Chesapeake, VA: Watertree Press LLC.

Sun, P.C., Tsai, R. J., Finger, G., Chen, Y.Y. & Yeh, D. 2008. What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers & Education*, 50, 1183–1202. https://doi.org/10.1016/j.compedu.2006.11.007

Teo, T. 2008. Assessing the computer attitudes of students: An Asian perspective. *Computers in Human Behavior*, 24, 1634–1642. https://doi.org/10.1016/j.chb.2007.06.004

Teo, T. & Noyes, J. 2008. Development and validation of a computer attitude measure for young students (CAMYS). *Computers in Human Behavior*, 24, 2659–2667. https://doi.org/10.1016/j.chb.2008.03.006

Tsai, M.J. & Tsai, C.C. 2010. Junior high school students' Internet usage and self-efficacy: A re-examination of the gender gap. *Computers & Education*, 54, 1182–1192. https://doi.org/10.1016/j.compedu.2009.11.004

Wuensch, K.L., Aziz, S., Ozan, E., Kishore, M. & Tabrizi, M. 2006. Pedagogical characteristics of online and face-to-face classes. *Presented at the World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education*.

Yeha, R.K.-J. & Teng, J.T.C. 2012. Extended conceptualisation of perceived usefulness: Empirical test in the context of information system use continuance. *Behaviour & Information Technology*, 31, 525–540. https://doi.org/10.1080/0144929X.2010.517272