PRE-SERVICE TEACHER'S ACCEPTANCE AND USE OF A SYNCHRONOUS AND COLLABORATIVE ONLINE TOOL TO SUPPORT TEACHING AND LEARNING AT A PRIVATE HIGHER EDUCATIONAL INSTITUTE

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ABSTRACT
New and emerging technologies continue to disrupt the teaching and learning processes and these new innovations are not always easily accepted. In this study, the researchers employed Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) in order to identify the factors that influencing the use and acceptance of a digital emerging technology called the *VIA App* at a private higher education institution in South Africa. *VIA App* is a wireless presentation and synchronous collaboration application affording multiple users access to shared content that can be review a quantitative descriptive approach wed and amended in real-time during the learning process. This qualitative study made use of a questionnaire to teste six of the UTAUT2 constructs to determine acceptance using a 5-point Likert scale. Results indicate constructs such as *performance expectancy* significantly influence the use and acceptance of VIA app. In addition, findings suggest that *effort expectancy*, *social influence, facilitating conditions, hedonic motivation* and *habit* partially influence the use of the *VIA App* during teaching and learning. Pre-service teachers' gender was also found to be significant determinant to the overall acceptance and use of the synchronous and collaborative *VIA App.*

Keywords: Acceptance and use of technology, Unified Theory of Acceptance and Use of Technology 2, UTAUT2 model, pre-service teachers, VIA App, Synchronous and collaborative learning in online spaces

INTRODUCTION

Information and Communication Technology (ICT) integration is pervasive in tertiary institutions as far as the teaching and learning process is concerned. As a result, new ICT solutions are introduced to teaching and learning spaces such as in schools and universities resulting in new pedagogical practices that are met with varying degrees of success (Ng'ambi, Brown, Bozalek, Gachago & Wood, 2016). New online applications are becoming popular in the mediation of learning resulting in various ways of engagement with content in the 21st century classrooms. An application can be seen as a software computer program or to any desktop or mobile application (Wong, 2012). To make use of such new applications, educators such as lecturers and teachers should be well equipped in terms of digital pedagogical skills to enhance their confidence in the use of technology tools in their learning spaces (Comi, Argentin, Gui, Origo & Pagani, 2017; Englund, Olofsson & Price, 2017; Nikolopoulou & Gialamas, 2016). Woodcock, Sisco, and Eady (2015) found that synchronous e-learners seem to engage in consistent communication, have greater focus on activities, and display patterns of increased participation. Discussions in concept clarification during lectures was also found to be beneficial in synchronous learning spaces such as in chat rooms, quizzes, or just as oral communication (Chen, Wei & Huang, 2013).

Berson, Berson and McGlinn-Manfra (2012) posit that the integration of different apps which are well-sequenced enables learners to improve their digital literacy skills through their collaborative and personalised experiences. Exposing pre-service teachers to new technologies, including synchronous online computer supported collaborative learning tools, can impact their ways of communication, and influence their approach to teaching and learning in the 21st century and better prepare them as future educators (Okeke, Van Wyk & Phasha 2014). Some of these applications are now specifically being developed to facilitate real-time content presentation and engagement, such as the *VIA App* used in this study.

VIA is a wireless presentation and collaboration application used in the majority of lecture rooms at a Private Higher Institution. For pre-service teachers to be able to use this application, they have to install it on their smart devices. The VIA App has a multimedia feature which is sharable through High-Definition (HD) wireless video streaming platform and can house 254 devices through the wireless connection. It has a function of sharing and reviewing of content function and can accommodate real-time messaging. For participants to enjoy the VIA app, they have to login-in using the room number and the code provided normally generated once an attempt of logging in is initiated. The main display of the VIA app can be viewed by the presenter, students or anyone present in the room. Pre-service student teachers find it difficult to see the relevance of employing technologies during the teaching and learning process in their academic discourse having had not much prior exposure before enrolling in the programme. As such, the extent to which they accept and use of these technologies impact on their actual use in future scenarios (Rikhotso, 2016). Therefore, the purpose of this study was to interrogate first year pre-service teachers' acceptance and use of the VIA App at a teacher training institution through the use of Venkatesh, Thong and Xu's (2012) UTAUT2 model.

LITERATURE PERSPECTIVES

The UTAUT model was developed by Venkatesh, Morris, Davis and Davis, (2003) to keep abreast with technology acceptance and was informed by the Technology Acceptance Model (TAM) of Davis (1989). Furthermore, Unified Theory of Acceptance and Use of Technology was further revised in 2012 by Venkatesh and colleagues resulting in the UTAUT2 (Ravangard, Kazemi, Abbasali, Sharifian & Monem 2017). Fathema, Shannon and Ross (2015) observed that the UTAUT2 model was strongly influenced by Fishbein and Ajzen's Theory of Reasoned Action (TRA) and is a natural extension of the Technology Acceptance Model (TAM). Much has been written about the usefulness and ease use of technologies including ICTs as part of determinant factors of acceptance (Cassim & Obono 2011; Nair & Das 2012). More can to be learnt about additional factors that may contribute to greater acceptance of new technologies in teaching and learning spaces.

Performance expectancy (PE) emphasises usefulness as indicated by TAM model (Miltgen, Popovič & Oliveira, 2013) and reflects the advantages normally perceived by individuals after using technology in doing certain activities (Venkatesh, et al., 2003). A variety of studies have also confirmed the significance of *performance expectancy* a construct (Chang, Ng, Sim, Yap & Yin, 2015; Raman & Don, 2013; Venkatesh, et al., 2012; Wang, et al., 2009). *Performance expectancy* has also been viewed as a predictor, in UTAUT2 and UTAUT models in the health and financial sectors and proved to be good to patients who perceived e-health as useful to the extent that they adopt it and in banking clients increasingly migrating to online banking options (Lemire, Pare, Sicotte & Harvey, 2008; Martins, Oliveira, & Popovič, 2014; Wilson & Lankton, 2004). UTAUT2 as a model of acceptance and use is employed in multiple disciplines and various industry sectors such: commerce, marketing and business lending more credibility in research.

Effort expectancy (EE) focuses on ease of use perceived as advocated by the TAM model (Miltgen, et al., 2013) also associated with how easy it seems to be to use a certain technology (Venkatesh, Morris, Davis & Davis, 2003). *Effort expectancy* as a construct verifies whether the students find it easy to use the VIA app, if so, to what extent can they can adopt it in their pedagogy during teaching or as qualified teachers. However, Hackbarth, Grover, and Yi (2003) found that as experience is gained through continuous use of a given technology, it is perceived that *effort expectancy* construct becomes less important.

Social influence (SI) is the influence by the significant other which will result in an individual making the decision to use technology or participate in a technological activity (Venkatesh, et al., 2003). *Social influence* also positively influence mobile learning adoption as reflected by lecturers and pre-service teacher survey that was conducted in at a university in Iraq (Jawad & Hassan, 2015). In this research, the s*ocial influence* construct will measure the extent to which the pre-service teachers are influenced by their peers to use the synchronous collaborative VIA App. Sharples, Taylor and Vavoula (2010) caution that modern students are more likely to make independent decisions without being influenced by people surrounding them such as family members, friends or lecturers.

Facilitating conditions (FC) is another construct that is concerned with the perception of an individual aligned to the support available in order to perform a technological activity (Venkatesh, et al., 2003). Thomas, Singh and Gaffar (2013), based on the survey conducted at the University of Guyana, posit a behavioural intention that is positively related to *facilitating conditions* in m-adoption of mobile learning. *Hedonic motivation* (HM) is having fun or pleasure from a technology activity by an individual and is viewed as part of intrinsic motivation (Venkatesh, et al., 2012). It has been found that *behavioural intention* and *hedonic motivation* are related in the use of mobile learning solutions as captured in a study of 3rd year students at a University in South Africa (Bere, 2014). In this study, the *hedonic motivation* construct is viewed as a source of entertainment, satisfaction and enjoyment to the extent that an individual student gets pleasure from using the VIA App. Lastly, *habit* (H) as a construct in UTAUT2, as a result of learning automatically triggers a certain behaviour that seems to become natural to the user (Ahmed, 2016). If we hold the view that behavioural habits exist in individuals, then also manifest in learning cycles where individuals repeat activities of how an application is used. This study aims to utilise the UTAUT2 in order to identify the factors that influence the use and acceptance of the VIA App in pre-service teachers at a private teacher training institution.

RESEARCH METHODOLOGY

This study employed a quantitative research approach making use of convenience sampling and relied on data collected from pre-service teachers who were expediently available to participate in study. Prior to sampling, respondents were exposed to the VIA App for intermittently for 10 calendar months. A survey technique through the use of an online questionnaire was deployed across the three different campuses of the particular private teacher training institution respectively Durban (X), Midrand (Y) and Pretoria (Z). According to Mathers, Fox, and Hunn, (2007), questionnaires is considered as a convenient way of collecting data from a large group. The instrument comprised of two sections. The first section covered questions related to the demographic profile. The second section comprised of 23 questions using a 5-point Likert-scale statements attesting to the level of agreement that aligned to six constructs adapted from UTAUT2 (Venkatesh, et al., 2012). Gender, academic program, age and campus encompass the demographic profile. The questionnaire was administered using the Microsoft (MS) forms platform with a link sent via email to all first year pre-service teachers after permission was granted to conduct the research at the particular institution. Data was collected over a period of twenty-five days. After the online questionnaire's due date, the collected information was downloaded and saved in an Excel spreadsheet through the MS forms platform tool in preparation for importing into the SPSS software package for statistical analysis.

RESULTS AND DISCUSSION

The reliability and validity of results measured by computing for Cronbach's Alpha should be 0.7 or above in terms of values (Mutlu, 2016). The Cronbach's Alpha of PE, EE, SI, FC, HE and H based on the constructs utilized in this study for the 23 items is 0.945. This is greater than 0.70. As such, this reflects internal consistence of reliability of the variables in relation to VIA App acceptance.

Table 1 below displays gender as an element of the demographic profile and Table 2 presents the age distribution of respondents across four various age groups.

Table 1: Gender results

	Frequency	Percent
Female	136	81.4
Male	31	18.6
Total	167	100.0

Table 2: Age results

	Frequency	Percent
18 years or less	24	14.4
19-24 years	109	65.3
25-30 years	22	13.2
31 years or greater	12	7.2
Total	167	100.0

From Table 1 and 2, it is evident that the greater majority of respondents are female (81.4%) and fall in the age bracket of between 19 – 24 years of age (65%).

Jacobs and Jacobs (2014), suggested that Mann-Whitney U test as a non-parametric technique in statistics as suitable when employed to analyse responses of two groups in line with the median differences. Kan (2016) and Jacobs and Jacobs (2014) further propounded that values measured on an ordinal scale can be compared, as they do not follow a t-distribution or the normal distribution. Kan (2016) further emphasised that the use of the Mann-Whitney U- test is to determine significant pairwise. The data in this study is not normally distributed, hence, the use of Mann-Whitney U test was appropriate. Table 3 below shows the test statistics of gender in relationship with items based on *performance expectancy* of pre-service teachers who participated in this research and displays the data generated using Mann-Whitney U test in order to test for significant differences between gender and the variables which describes *usefulness, efficiency, time consuming* as well as VIA's *helpfulness*.

Table 3 - Test statistics in relation to performance expectancy of pre-service teachers

Test Statistics[a]				
	8.1 VIA is useful in daily life	8.2 VIA is a time-consuming tool	8.3 VIA can do things more quickly	8.4 VIA helps me to learn
Mann-Whitney U	1655.000	1894.000	1763.000	1564.000
Wilcoxon W	10040.000	10150.000	10019.000	9820.000
Z	-1.564	-.409	-.443	-1.391
Asymp. Sig. (2-tailed)	.118	.683	.658	.164
a. Grouping Variable: 1. Gender				

In previous studies, *hedonic motivation* was perceived as a non-significant predictor in a College of Engineering but was only highly significant for a College of Education, (Ahmed 2016). In this case as depicted in Table 4, *hedonic motivation* was analysed in relation to age. The varied age groups perceived the VIA App as not enjoyable even though it entertained them. It might mean because they have been exposed to it for a prolonged period of time, they no longer feel motivated by it.

Table 4 - Test statistics in relation to hedonic motivation

Test Statistics[a,b]					
	12.1 I do not enjoy using VIA	12.1 Reverse coded	12.2 Using VIA is entertaining	12.3 I see little value in using VIA	12.3 Reverse coded
Kruskal-Wallis H	9.199	9.199	4.734	4.924	4.924
df	3	3	3	3	3
Asymp. Sig.	.027	.027	.192	.177	.177
a. Kruskal Wallis Test					
b. Grouping Variable: 2. Age group					

The findings indicate that the respondents perceived *effort expectance* as relatively of equal importance across the variable as displayed in Table 5.

Table 5 showing confidence interval in relation to effort expectance

Descriptives				Statistic	Std. Error
	1. Gender			Statistic	Std. Error
9.1 Learning to use VIA is easy	Female	Mean		2.57	.100
		95% Confidence Interval for Mean	Lower Bound	2.37	
			Upper Bound	2.76	
		5% Trimmed Mean		2.52	
		Median		3.00	
	Male	Mean		2.83	.228
		95% Confidence Interval for Mean	Lower Bound	2.36	
			Upper Bound	3.29	
		5% Trimmed Mean		2.81	

		Median		3.00	
9.2 Interaction with VIA is clear	Female	Mean		2.40	.094
		95% Confidence Interval for Mean	Lower Bound	2.21	
			Upper Bound	2.59	
		5% Trimmed Mean		2.36	
		Median		3.00	
	Male	Mean		2.86	.220
		95% Confidence Interval for Mean	Lower Bound	2.41	
			Upper Bound	3.31	
		5% Trimmed Mean		2.85	
		Median		3.00	
9.3 VIA is easy to use	Female	Mean		2.44	.096
		95% Confidence Interval for Mean	Lower Bound	2.25	
			Upper Bound	2.63	
		5% Trimmed Mean		2.40	
		Median		3.00	
	Male	Mean		2.83	.211
		95% Confidence Interval for Mean	Lower Bound	2.40	
			Upper Bound	3.26	
		5% Trimmed Mean		2.81	
		Median		3.00	
9.4 I am skillful at using VIA	Female	Mean		2.17	.091
		95% Confidence Interval for Mean	Lower Bound	1.99	
			Upper Bound	2.35	
		5% Trimmed Mean		2.12	
		Median		2.00	
	Male	Mean		2.52	.208
		95% Confidence Interval for Mean	Lower Bound	2.09	
			Upper Bound	2.94	
		5% Trimmed Mean		2.46	
		Median		3.00	

On this basis, it can be said that males value and believe that they are skilful as far as the use of the VIA App is concerned and partially satisfies the influence of *effort expectancy*. After calculating the median for the *Learning how to use VIA* variable, the researcher found 25-30 years Median (Mdn) =1.50, however, the rest of the age groups displayed a Median = 3. Therefore, the respondents both males and females believes that the use of VIA is easy.

Pre-service teachers *effort expectance* within various age group, indicate that the Kruskal-Wallis H test value ranges from 4.282 to 8.324 as displayed in Table 6. The degrees of freedom (d.f) is 3 across the age groups which participated.

Table 6 -Test statistics of age group in relation to Effort Expectancy of pre-service teachers

Test Statistics[a,b]				
	9.1 Learning to use VIA is easy	9.2 Interaction with VIA is clear	9.3 VIA is easy to use	9.4 I am skilful at using VIA
Kruskal-Wallis H	8.324	4.282	6.466	5.050
df	3	3	3	3
Asymp. Sig.	.040	.233	.091	.168
a. Kruskal Wallis Test				
b. Grouping Variable: 2. Age Group.				

Findings indicate that the respondents perceive *facilitating conditions* as equally important across the variable with an exception of females who had less in median value as displayed in Table 7. Male respondents perceive *facilitating conditions* as more important in comparison to female respondents. The maximum difference observed in variable 11.2 (*I have necessary knowledge to use VIA)* is 22.6% (96.75% -74.15%) and in 11.4 *(I ask for help from others when l have difficulties using VIA)* is 21.18% (96.13% - 74.95%). As such, males seem to be influenced by having VIA as a resource and they are prepared to ask for help whenever necessary.

Table 7 - Gender mean ranks in relation to facilitating conditions

Ranks					
	1. Gender	N	Mean Rank	Sum of Ranks	
11.1 I have the resources to use VIA	Female	130	78.45	10198.50	
	Male	31	91.69	2842.50	
	Total	161			
11.2 I have the knowledge to use VIA	Female	126	74.15	9343.50	
	Male	30	96.75	2902.50	
	Total	156			
11.3 VIA is compatible with other technologies I use	Female	126	76.89	9688.00	
	Male	30	85.27	2558.00	
	Total	156			
11.4 I ask for help when I have difficulties using VIA	Female	127	74.95	9519.00	
	Male	30	96.13	2884.00	
	Total	157			

The confidence interval of *Habit* in relation to gender as reflected in Table 8, indicates that female pre-service teachers' median as Mdn = 2. They regarded the use of VIA as a habit with a significant confidence level of 95%. It is interesting that the male median was Mdn=3. The male respondents perceived the use of VIA to be more important than their females counterparts. On the variable *I can get addicted to using VIA*, it indicates an equal median of 3 for both males and females and confidence level 95%.

Table 8 - Habit and gender confidence intervals

Descriptives					
13.2 I can get addicted to using VIA	Female	Mean		2.05	.094
		95% Confidence Interval for Mean	Lower Bound	1.86	
			Upper Bound	2.23	
		5% Trimmed Mean		1.99	
		Median		2.00	
	Male	Mean		2.13	.196
		95% Confidence Interval for Mean	Lower Bound	1.73	
			Upper Bound	2.53	
		5% Trimmed Mean		2.06	
		Median		2.00	

Table 9 Kruskal-Wallis Test — Campus in Relation to Habit of Pre-service teachers

Test Statistics[a,b]			
	13.1 Using VIA is a habit	13.2 I can get addicted to using VIA	13.3 I must use VIA
Kruskal-Wallis H	4.694	5.044	1.428
df	2	2	2
Asymp. Sig.	.096	.080	.490
a. Kruskal Wallis Test			
b. Grouping Variable: 4. Campus			

After calculation of median based on the data in Table 9, the median on using VIA as a habit was 2 across all campuses, with a confidence level of 95% indicating respondents to perceive VIA to be habit forming in their usage of it. In Table 10, variable 13.1 *(I can get addicted because of using VIA)*, it is clear that the median for Y is one while X and Z shared two.

Table 10 mean ranks of *Habit* in relation to campus.

Ranks			
	4. Campus	N	Mean Rank
13.1 Using VIA is a habit	X	92	83.27
	Y	51	69.22
	Z	15	91.33

	Total	158	
13.2 I can get addicted to using VIA	X	93	83.72
	Y	50	67.26
	Z	13	84.38
	Total	156	
13.3 I must use VIA	X	93	80.75
	Y	50	72.01
	Z	12	81.63
	Total	155	

CONCLUSION

This study revealed that the *performance expectancy* significantly influence the adoption, use and acceptance of VIA app. On the other hand, *effort expectancy, facilitating conditions,* and *habit* partially satisfies the influence towards the use of VIA amongst the respondents in this study through gender. It is interesting to note that, gender and age also contributes to the acceptance and use of the Via App. Furthermore, a synchronous online collaborative application such as the VIA App also contributes to the development of the 21st Century skills as the pre-service teachers prepare for teaching and learning in the future. Despite its limitations, this study provides useful insight into the factors that influence the use and acceptance towards new synchronous collaborative technology tools in teaching and learning environments and recommend that careful consideration should be given to gender and age in the implementation of new and emerging technologies in teaching and learning spaces. These findings will benefit lecturers, teachers and policy makers who seek to ensure the successful implementation and adoption of an application with similar affordances in the actual teaching and learning field.

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