The Influence of Values on E-learning Adoption

Ashwin Mehta[a],[*], Neil P. Morris[b], Bronwen Swinnerton[b], Matt Homer[b]

[a] Medical Research Council, North Star Avenue, Swindon, SN2 1FL, UK
[b] School of Education, University of Leeds, Hillary Place, Leeds, LS2 9JT, UK

ABSTRACT

As technology continues to pervade our lives, the influence of culture on technology adoption is of significant interest to researchers. However, culture, as a group-level construct may not give meaningful results when related to individual-level adoption. Although culture has been integrated into technology adoption models, values are the individual-level representation of culture, and are more appropriate to include in technology adoption models. There have been few studies attempting to explore the influence of values on adoption models, and none within the sphere of digital education. The purpose of this exploratory study is to integrate values with technology adoption models and apply the novel conceptual model to the context of digital education. In this study we investigate the influence of individual-level values on the adoption of e-learning by workers in The Gambia and the UK. Using the Unified Theory of the Acceptance and Use of Technology (UTAUT2) as a base model, we integrate values relating to conservation of the status quo and self-enhancement from Schwartz's Theory of Human Values. Taking this approach, we develop and introduce the Values-Enhanced Technology Adoption (VETA) model. We tested the VETA model on the adoption of e-learning by workers in The Gambia and the UK. Empirical results demonstrated the influence of self-enhancement values in the model via social influence, price value and performance expectancy. The UTAUT2 base model was partially validated in that performance expectancy, price value and habit primarily influenced worker intention to use e-learning. We conclude that VETA will be a useful model to researchers studying technology adoption.

1. Introduction

In recent years, there have been significant investments in digital learning technologies across all sectors. Despite such investments, learning technology might be poorly adopted, discontinued or rejected by learners (Adelé & Brangier, 2013; Recker, 2016), therefore learner motivation and engagement remain topics of interest for researchers (Jung & Lee, 2018; Zhu, Sari, & Lee, 2018). Individual acceptance of technology has been investigated within the information systems literature, indicating that intention to use technology is predicted by user perceptions of technology attributes, specifically usefulness and ease of use (Davis, Bagozzi, & Warshaw, 1989).

Technology adoption models generally explain user intention as a function of user perceptions of attributes of the target technology within the context of use (Venkatesh & Bala, 2008; Venkatesh & Davis, 2000). The latest iterations of technology adoption models include individual consumer preferences (price value, habit and intrinsic motivation) (Venkatesh, Thong, & Xu, 2012) and context (social factors and physical infrastructure) (Taylor & Todd, 1995; Venkatesh et al., 2012; Venkatesh, Morris, Davis, & Davis,

---

2003). In the context of technology adoption models, incorporating social factors requires some consideration of culture (an aggregate, group-level framework that represents societal views), or values (an individual-level framework of internally held, enduring beliefs) (Hofstede, Hofstede, & Minkov, 2010; Rokeach, 1973; Schwartz, 1992). Few studies have integrated culture or values into the technology acceptance framework (Srite & Karahanna, 2006), using group-level cultural dimensions: the effects of individual-level values on individual-level decision-making remains an area for further investigation. This paper proposes that individual-level values influence user perception of the relative importance of technology, context or consumer-focussed attributes that lead to the intention to use technology. This study surveys workers across two contexts (The Gambia and the UK) to gather technology adoption and values data to determine the influence of these values on the adoption model derived from UTAUT2. The research objective of this study is to extend the UTAUT2 model to incorporate values at the individual level. This study contributes to the literature by being amongst the first to incorporate Schwartz's values framework into technology adoption literature, to investigate the influence of values on e-learning adoption, and to develop and validate the Values-Enhanced Technology Adoption (VETA) model.

2. Literature review

The adoption of e-learning depends on a learner's decision to use the technology, expressed in the literature as *behavioural intention* (Davis et al., 1989). The Technology Acceptance Model (TAM), explains *behavioural intention* as a product of user attitude toward technology attributes: *perceived usefulness* and *perceived ease of use* (Davis et al., 1989). Venkatesh et al. empirically compared and consolidated the acceptance literature producing the Unified Theory of the Acceptance and Use of Technology (UTAUT and UTAUT2) which increased the explanatory power of prior technology acceptance models (Venkatesh et al., 2003, 2012).

Although TAM has been used to explain learner adoption of technology-enhanced learning (Abbasi, Chandio, Soomro, & Shah, 2011; Ong, Lai, & Wang, 2004; Roca & Gagné, 2008), extended models such as UTAUT (Khechine, Pascot, & Bytha, 2014; Sumak, Polancic, & Hericko, 2010) and UTAUT2 (El-Masri & Tarhini, 2017; Raman & Don, 2013; Yang, 2013) have demonstrated the role of social and physical context, and consumer judgement in determining learner behaviour with educational technology.

User attitude, based on prior experience or an individual's worldview or culture, is linked with values, which may influence perceptions of technology or contextual attributes that help form decisions (Fishbein & Ajzen, 1975b; Rokeach, 1975). Culture is a multi-layered, multi-dimensional construct that represents an aggregate value system shared by individuals within a group (Hofstede et al., 2010; Rokeach, 1968; Schwartz, 2012). (Taras, Rowney, & Steel, 2009). Values are internally held beliefs about preferred end-states or outcomes that transcend situation and may act as a standard of behaviour (Rokeach, 1973). At an individual level, values explain the motivational foundation of attitude and behaviour, while the prioritisation of value structures at a group level help determine culture (Boer & Fischer, 2013; Schwartz, 1994a). Attitudes are formed towards an object applied in a scenario, and differ as values priorities shift even if the object and scenario are kept constant (Fishbein & Ajzen, 1975a). The premise that an attitude leads to a discriminatory response links values and technology acceptance theories.

The literature contains some studies that have investigated the influence of espoused culture (as a proxy for individual-level values) on user behaviour with technology (Srite, 2006; Srite & Karahanna, 2006; Tams, Thatcher, & Srite, 2012), with comparative studies in European (Göğüş, Nistor, & Lerche, 2012; Nistor et al., 2014; Nistor, Göğüş, & Lerche, 2013) and Middle-Eastern (Tarhini, Hone, & Liu, 2013; Tarhini, Hone, Liu, & Tarhini, 2017) e-learning applications. These studies generally agree that the social environment provides a mechanism to link subjective norm to intention, with some agreement that collectivist cultures prefer to maintain normative stability. These studies, however, do not include African cultures, nor do they use theoretically derived values at an individual level to explore learner perceptions, relying instead on espoused national culture arbitrarily demarcated at geographical borders (McSweeney, 2002; Schaffer & Riordan, 2003).

Prior investigation on culture and values in technology acceptance models has used the empirically derived group-level dimensions of culture proposed by Hofstede, operationalised by Dorfman and Howell (Dinev, Goo, Hu, & Nam, 2009; El-Masri & Tarhini, 2017; Hoehle, Zhang, & Venkatesh, 2015; McCoy, Galletta, & King, 2005; Srite & Karahanna, 2006). These studies collectively have found that Hofstede's group-level cultural constructs, such as *power distance* and *individualism*, espoused at an individual level, can moderate the influence of adoption factors, such as *subjective norms* and *perceived usefulness*, on *behavioural intention* to use technology. However, these studies do not always agree on which dimensions produce an effect and demonstrate that effects differ across different countries and population groups (Nistor et al., 2014; Udo, Bagchi, & Kirs, 2012). The impact of Hofstede's cultural dimensions on the landscape of cross-cultural literature is significant, but not without critique (McSweeney, 2002). However, using group-level constructs such as culture to explain individual-level decisions potentially risks the ecological fallacy: an individual-level proxy for culture must be sought to integrate with decision models that operate at the individual level (Brewer & Venaik, 2014).

Schwartz's theoretically derived values model (Table 1) represents an individual's world-view that lies at the heart of culture (Rokeach, 1968, 1973; Schwartz, 1994b; Schwartz et al., 2012). Schwartz's theory of human values operationalizes values as a continuum (Table 1), applicable at an individual-level, as antecedents to attitude that are non-specific in how they relate to a target behaviour (Rokeach, 1973). Relatively few studies have attempted to integrate Schwartz's values with decision models (Ahmad & Sun, 2018; Diddi & Niehm, 2017; Goncalves, Oliveira, & Cruz-Jesus, 2018; Grigoryan, Lebedeva, & Breugelmans, 2018; Pahnila, Siponen, Myyry, & Zheng, 2011; Seddig & Davidov, 2018). These studies find that individual-level values and values dimensions can influence a range of attitudes, from perceptions of risk to attitudes towards interpersonal violence. These studies also demonstrate a difference between the approach taken by researchers who implement Hofstede's dimensions as moderators of attitude-behaviour relationships (Srite & Karahanna, 2006; Tarhini et al., 2017), and the approach taken by researchers who implement Schwartz's values as predictors of attitudes or intention (Diddi & Niehm, 2017; Grigoryan et al., 2018). This study extends the UTAUT2 for e-learning use intention, to form the Values-Enhanced Technology Adoption (VETA) model (Fig. 1).

Table 1

Schwartz's values framework (Schwartz et al., 2012).

| Value Dimension	Value	Conceptual Definition & Sub-Types
Openness to Change	*Following one's own intellectual interests*	
	Self-Direction	Self-direction of action and of thought. Priority of independent thought and action.
	Stimulation	Priority of variety and excitement in life.
	Hedonism	Priority of pleasure and gratification.
Self-Enhancement	*Priority of personal interests over others*	
	Achievement	Priority of personal success through the demonstration of competence.
	Power	Power over resources or dominance over people. Priority of social status, prestige and control over people and resources.
Conservation	*Preserving the status quo*	
	Security	Personal and societal security. Priority of safety, harmony and stable social relationships.
	Tradition	Priority of existing customs and ideals.
	Conformity	Interpersonal and rule-based conformity. Priority of restraint in actions and impulses.
Self-Transcendence	*Commitment to the welfare of others*	
	Benevolence	Priority of the welfare of others.
	Universalism	Priority of the welfare of the natural environment and wider society.
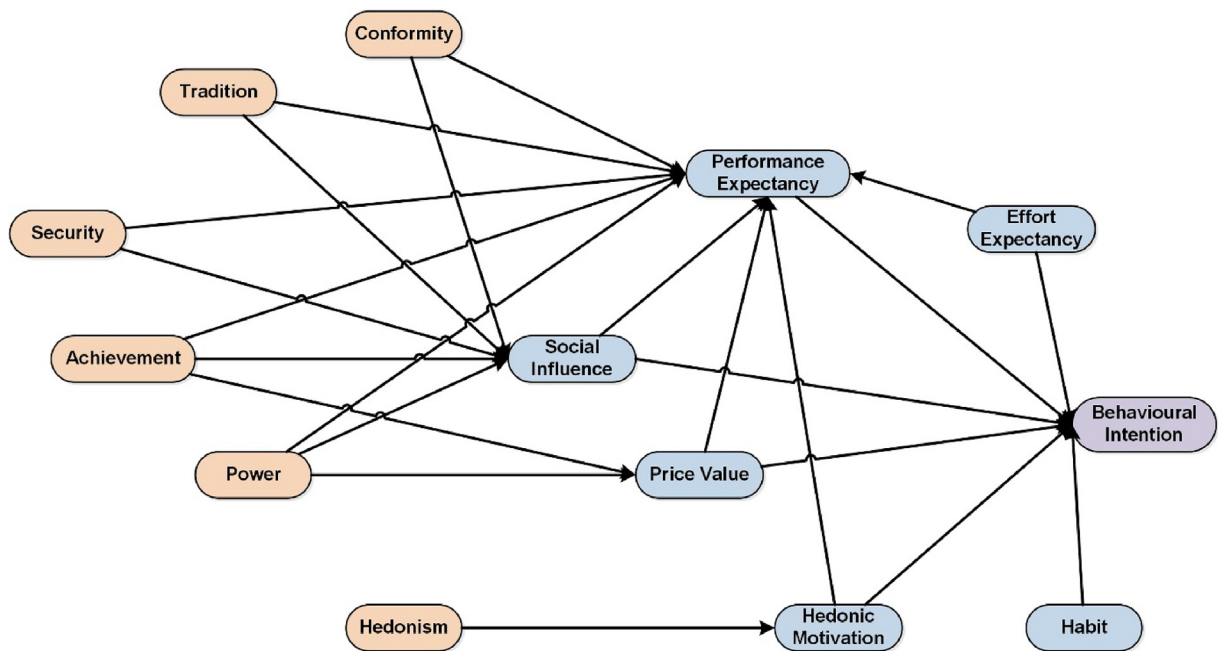
Fig. 1. Values-enhanced technology adoption (VETA) model.

3. Model development

3.1. UTAUT

3.1.1. Performance expectancy (PE)

From the primary literature on technology acceptance (Davis et al., 1989), meta-analyses (Dwivedi, Rana, Chen, & Williams, 2011), and literature specific to e-learning (El-Masri & Tarhini, 2017; Šumak, Heričko, & Pušnik, 2011), perceptions of usefulness and ease of use are important in predicting behavioural intention to use e-learning. In UTAUT, *performance expectancy* is the 'degree to which an individual believes that system use will yield gain in work performance' and is typically the strongest predictor of intention. For workplace e-learning to be perceived as useful, learners judge their ability to achieve outcomes in their working environment (Chau, 2010). Therefore, consistent with TAM, UTAUT and UTAUT2, we include *performance expectancy* (PE) as a predictor of *behavioural intention* (BI).

3.1.2. Effort expectancy (EE)

TAM and UTAUT have been used to explore the acceptance of e-learning by students and teachers in higher education settings, as well as the acceptance of vocational e-learning by employees in business settings. However, research has been conducted

predominantly in developed countries with mixed results: the relevance of *perceived ease of use* is greatest for vocational settings; the applicability of the model in developing countries is still relatively under-tested (Mbarika, Meso, Musa, Kah, & Amougou, 2007; Raman et al., 2014; Thomas, Singh, & Gaffar, 2013; Šumak et al., 2011). *Effort expectancy* is analogous to ease of use (TAM) and represents the 'degree to which system use is free from effort'. From the TAM (Davis et al., 1989), *effort expectancy* is expected to predict *performance expectancy* as users perceive a technology to be more useful when it is easy to use. Therefore, we include *effort expectancy* as both a predictor of *performance expectancy* (PE) and *behavioural intention* (BI).

3.1.3. Social influence (SI)

Social influence represents the pressure of subjective norm defined as the 'perception of group influence on an individual's decision'. In an organisation, users may perceive a technology to be more useful in helping to achieve job-related goals if referent others in the organisation, such as managers, endorse the use of such technology. The predictive influence of social factors on *performance expectancy* has been made in prior literature (Abdullah & Ward, 2016; Dwivedi, Rana, Jeyaraj, Clement, & Williams, 2017; Venkatesh et al., 2003). Similar to *performance expectancy*, research in Africa has found varying effects from *social influence* on *behavioural intention* (Kolog, 2015; Mtebe & Raisamo, 2014). Across the contexts of this study, learners who perceive e-learning as endorsed by referent others within their social environment are more likely to intend to use e-learning. Therefore, consistent with UTAUT and UTAUT2, the VETA model includes *social influence* (SI) as a predictor of *behavioural intention* (BI).

3.2. UTAUT2 extensions

The most recent iteration of UTAUT (UTAUT2) has been adapted to include three additional variables: *hedonic motivation* (HM) expressed as perceived playfulness, enjoyment, fun and reward (Agarwal & Karahanna, 2000; Koivisto & Hamari, 2014; Martocchio & Webster, 1992; Roca, Chiu, & Martínez, 2006); *price value* (PV) incorporating cost, benefit, perceived sacrifice and status gains through assumed expensiveness (S. A. Brown & Venkatesh, 2005; Chau, 2010; Chen & Sun, 2014; Zeithaml, 1988); and *habit* (HAB) (Labrecque, Wood, Neal, & Harrington, 2017; Limayem, Hirt, & Cheung, 2007; Venkatesh et al., 2012; Wood, 2017). While e-learning is not explicitly a consumer application of technology, digital education can be argued as a commodity (Chau, 2010), making concepts such as *hedonic motivation*, *price value* and *habit* relevant to learner engagement.

3.2.1. Hedonic motivation (HM)

In the context of e-learning, intrinsic, or hedonic, motivation can be linked to learner enjoyment, playfulness with e-learning, learning strategy, the flow of the learning experience, and engagement, as well as the success of online learning (Barak, Watted, & Haick, 2016; Padilla-Meléndez, Del Aguila-Obra, & Garrido-Moreno, 2013; Sánchez-Franco, Martínez-López, & Martín-Velicia, 2009; Sørebø, Halvari, Gulli, & Kristiansen, 2009). *Hedonic motivation* may link to learner perception of the usefulness of e-learning by facilitating learner exploration of information in an online environment, particularly in cultures where the extrinsic motivation focus of TAM does not explain learner behaviour (Saadé, Nebebe, & Mak, 2009). Acknowledging Ryan and Deci's Self-Determination Theory, there is likely to be a continuum of motivation for learners to use e-learning technology from purely extrinsic to purely intrinsic, with the reality likely to be a complex mixture of both (Ryan & Deci, 2000). However, e-learning courses that are engaging, well designed and interesting are likely to be perceived as useful by e-learners (Roca & Gagné, 2008). Across the contexts of this study, learners who perceive e-learning as intrinsically motivating are likely to perceive e-learning as useful; and, learners who are intrinsically motivated are more likely to intend to use e-learning, therefore, we include *hedonic motivation* (HM) in the VETA model, as a predictor of *performance expectancy* (PE) and *behavioural intention* (BI).

3.2.2. Price value (PV)

Price value is linked to a user making a cost-benefit decision, therefore a user may deem technologies more useful if the benefits are greater relative to the cost incurred (Venkatesh et al., 2012; Zeithaml, 1988). Although *price value* is often excluded from, or is found non-significant in studies where applications exclude direct monetary cost to users (El-Masri & Tarhini, 2017; Lewis, Fretwell, Ryan, & Parham, 2013; Raman & Don, 2013), for workplace learning, non-monetary costs may include time and effort required to access e-learning around work priorities, and the benefits can be linked to the extrinsic outcomes from learning, linking overall learning value to performance expectancy (Ain, Kaur, & Waheed, 2016). Therefore, we include *price value* in the VETA model applied to e-learning in this study, as a predictor of *performance expectancy* (PE) and *behavioural intention* (BI).

3.2.3. Habit (HAB)

Established routines in the workplace, for finding information and learning job-related skills can be important in determining future actions with respect to achieving work-related goals and participating in work-related initiatives, such as e-learning (Verplanken & Aarts, 1999; Wood, 2017). Prior behaviours, perceived to be automatic, can result in initial adoption and prolonged use (Kim & Malhotra, 2005; Limayem et al., 2007; Venkatesh et al., 2012), or can provide a barrier to new initiatives (Labrecque et al., 2017). Therefore, consistent with UTAUT2, we include *habit* (HAB) in the VETA model, as a predictor of *behavioural intention* (BI).

3.3. The Values-Enhanced Technology Adoption (VETA) model

A learner's perception of the technology or contextual attributes of a workplace e-learning course can be linked with the priority

that the learner places on their own interest in *self-enhancement,* and the priority they place on preserving the organisational framework around them (*conservation*). Learning, irrespective of whether technology is involved, is likely to be linked with an individual's priority for *self-enhancement*. E-learning is intended to enhance individual-level performance, and therefore intention to use e-learning should be predicted by a learner's preference for *self-enhancement* (Veiga, Floyd, & Dechant, 2001). Learner priority on *achievement* through course completion, and on the extrinsic outcomes that arise from *achievement*, such as increased status, perceived knowledge and career opportunity are linked to the values of *achievement* and *power* within the *self-enhancement* dimension. With respect to workplace e-learning, values related to Schwartz's *conservation* dimension are likely to be important in determining learner opinion. Values in the *openness-to-change* dimension, such as *hedonism*, are likely to link to learner perception of enjoyment in learning. Values in the *self-transcendence* domain link to perceptions of society and the natural environment, which are unlikely to be relevant to individual-level adoption of technology such as e-learning, and therefore not included in the VETA model for e-learning adoption, although may be considered when applying the model to technologies that have societal impact. Definitions of Schwartz's values are shown in Table 1.

This study theorises that an individual's values will predict their perception of technological, contextual or personal attributes that lead them to make decisions about using technology and are therefore best placed as antecedents to those factors in a structural model. The Values-Enhanced Technology Adoption (VETA) model is shown in Fig. 1.

3.3.1. Conservation values (security (SE), tradition (TR), and conformity (CO))

Individuals expressing high *conservation* values, both interpersonal and compliance, are likely to place great importance on meeting obligations within their social and organisational spheres including meeting the expectations of significant influencers in their social environment, both in terms of peer and organisational influence (Schwartz, 1992). *Conformity* in a workplace scenario might arise through following rules laid down by the organisation in terms of mandatory or endorsed training programmes. The value of *security* contains subtypes of personal security (personal health, safety, wellbeing) and societal security (stable social order) (Schwartz et al., 2012): for vocational training, it can be expected that workers complete basic training delivered via technology to safeguard their future employment against threat of competition from peers and through maintaining competence, therefore individuals who place importance on personal security will perceive educational technology to be useful to their job performance. The value of *tradition* indicates an individual's priority on existing paradigms within their organisation (Schwartz, 1992). Workers prioritising the importance of existing organisational norms that relate to learning, development and career progression are likely to perceive the completion of workplace e-learning as worthwhile and endorsed by their normative framework. Workers will perceive vocational e-learning as useful to their career objectives, endorsed by referent others in their organisational hierarchy and worth their time and effort to complete. Therefore, we include conservation-type values (*security*, *tradition* and *conformity*) as predictors of *performance expectancy* and *social influence*.

3.3.2. Self-enhancement and openness-to-change values (achievement (AC), power (PO) and hedonism (HE))

Workplace learning, with or without technology assistance, can be expected to link with *self-enhancement* values. The concept of *achievement* includes the demonstration of competence by the standards of one's reference groups and the pursuit of personal success (Schwartz, 1994a). The inherent worth of e-learning is linked to *self-enhancement*: learners use content to generate knowledge which improves their understanding, their social status, achievement within standardised testing, and potentially influences their extrinsically-rewarded job performance, such as career or promotion benefits (Schwartz et al., 2012; Venkatesh & Davis, 2000). Considering costs and benefits within the concept of *price value*, benefits of learning technologies may be linked to self-enhancement outcomes, while costs may be linked to context (Ain et al., 2016). The concept of dominance over resources and people are linked to both formal and informal status in an organisation: progression within the formal organisational hierarchy typically brings increased resource responsibility, as well as managerial responsibility over others; increased social status also brings informal power through perceived expertise (Schwartz et al., 2012). However, considering *achievement*-related outcomes in the light of perceived learner value (Ain et al., 2016), it is expected that learners will consider learning outcomes relative to the effort incurred to access learning materials. The value of *hedonism* overlaps with both the dimensions of self-enhancement and openness-to-change and can be considered as part of either dimension on the continuum of values proposed by Schwartz. *Hedonism*, incorporates intrinsic motivation, including novelty, challenge, excitement and pleasure (Schwartz et al., 2012), which is likely to predict user perception of e-learning enjoyment. Therefore, we include self-enhancement-type values (*achievement* and *power*) as predictors of *performance expectancy price value*, and *social influence and* the value *hedonism* as a predictor of *hedonic motivation*.

3.3.3. Excluded constructs

Demographic moderators of adoption are included in the UTAUT models as moderators of the relationships between adoption factors and behavioural intention (Venkatesh et al., 2003, 2012). Demographic moderation has been studied in western (Burton-Jones & Hubona, 2005; Venkatesh, Morris, & Ackerman, 2000), middle-eastern (Al-Ghaith, Sanzogni, & Sandhu, 2010) and Far-Eastern (Ong & Lai, 2006) environments. Overall, these studies have shown that age (Wang, Wu, & Wang, 2009; Wu, 2003), gender (Ong & Lai, 2006; Venkatesh et al., 2000), income (Al-Ghaith et al., 2010) and education can influence user intention to adopt (Li, Harris, Rossi, & Luck, 2013). However, moderator analysis requires large sample sizes, than were collected in this exploratory study combining two significant bodies of literature (values and e-learning adoption), are not included in the VETA model.

Facilitating conditions was excluded from the final VETA model because it was not possible to create a reliable construct across the countries in this study. Values relating to *self-transcendence* and *openness-to-change* were excluded from the model, with the exception of *hedonism*. Firstly, values relating to *self-transcendence* relating primarily to an individual's views on nature and society

Table 2
Demographic information.

		The Gambia (n = 160)		UK (n = 113)	
		n	%	n	%
Gender	Male	125	77.2	63	56.1
	Female	37	22.8	50	43.9
Age	Under 25	6	3.7	2	1.8
	25-29	31	19.1	7	6.1
	30-34	33	20.4	20	17.5
	35-39	29	17.9	13	11.4
	40-44	19	11.7	20	17.5
	45-49	27	16.7	16	14.0
	50-54	11	6.8	9	7.9
	55-60	6	3.7	16	14.0
	Over 60	0	0	10	9.6
Nationality	UK	1	0.6	103	91.2
	Gambia	141	88.1	–	–
	Other[a]	19[a]	10.7	10	8.8

[a] Missing country data = 2.

were not relevant to the individual-level adoption of technology. Secondly, values relating to *stimulation* and *self-direction*, while potentially relevant to learning were not reliable as constructs within the data collected in this study.

Our research question for this study is: Does the combination of Unified Theory of the Acceptance and Use of Technology (UTAUT2) and Schwartz's Theory of Human Values in a new model (Values Enhanced Technology Adoption (VETA)) explain learner intention to use e-learning in The Gambia and the UK?

4. Method

4.1. Sampling

Two organisations participated in the study, one organisation in the UK, one organisation in The Gambia. Study participants were workers in each organisation who undertook the professional e-learning courses developed for this study. The e-learning course and survey were made available to all workers in each organisation for a duration of 3 months during 2016. Workers participated in the e-learning and self-selected into the survey. Workers in the UK were involved in the collection of geological data, workers in The Gambia were involved in the collection of clinical trial data. Both UK workers and Gambian workers had a variety of educational and professional backgrounds. Ethics approval was obtained in each country. The details of each group sample are shown in Table 2.

4.2. Survey design

E-learning was created in Articulate Storyline 2 to provide training relevant to the work of the participants. Workers in the UK received training on computer use, workers in The Gambia received training on community engagement. Embedded within the e-learning introductory screens was a three-part survey (deployed through www.onlinesurveys.ac.uk) where participants answered questions about demography, UTAUT2 (as shown in Section 12) and values. UTAUT2 adapted items (Venkatesh et al., 2012) (shown in Section 12) were scored on a 7-point Likert scale (7 = Strongly Agree, 6 = Agree, 5 = Slightly Agree, 4 = Neutral, 3 = Slightly Disagree, 2 = Disagree, 1 = Strongly Disagree) such that a high score indicated high perception of the latent variable. Values items were used directly from Schwartz's Portrait Values Questionnaire (PVQ5x) on a 6-point Likert scale (6 = Very much like me, 5 = Like me, 4 = Somewhat like me, 3 = A little like me, 2 = Not like me, 1 = Not like me at all) (Schwartz et al., 2012) (shown in Section 12).

4.3. Data screening and software

Partial Least Squares (PLS) was used to test the model, using the software SmartPLS (version 3.2.6, SmartPLS GmbH) (Ringle, Wende, & Becker, 2015). Means and standard deviations were calculated in the Statistical Package for Social Sciences (SPSS version 22, IBM). Data were cleaned to remove partial responses and outliers using a z-score of 3 as a threshold for removal (Tripathy, 2013). This process yielded 160 useable responses from The Gambia, and 113 from the UK.

5. Results

5.1. The sample

Demographic information for the two country groups is shown in Table 2. The UK sample was relatively balanced in terms of

Table 3
Reliability, validity and descriptive statistics (The Gambia).

	CR	AVE	Mean	SD	AC	BI	CO	EE	HAB	HE	HM	PE	PO	PV	SE	SI	TR
AC	0.77	0.63	5.08	0.84	**0.79**												
BI	0.91	0.76	6.15	0.75	0.30	**0.87**											
CO	0.79	0.56	5.32	0.70	0.36	0.22	**0.75**										
EE	0.88	0.59	5.91	0.74	0.23	0.35	0.10	**0.77**									
HAB	0.90	0.75	5.08	1.36	0.38	0.63	0.22	0.48	**0.87**								
HE	0.80	0.50	4.66	0.89	0.37	0.10	0.14	0.22	0.30	**0.71**							
HM	0.83	0.71	5.14	1.35	0.18	0.37	0.23	0.34	0.43	0.24	**0.84**						
PE	0.86	0.67	6.21	0.65	0.33	0.59	0.26	0.50	0.63	0.27	0.37	**0.82**					
PO	0.80	0.51	3.72	1.04	0.43	−0.03	0.07	0.17	0.27	0.49	0.12	0.21	**0.72**				
PV	0.92	0.80	6.16	0.77	0.25	0.66	0.30	0.42	0.59	0.16	0.46	0.61	0.16	**0.89**			
SE	0.83	0.55	5.50	0.53	0.54	0.32	0.57	0.23	0.27	0.31	0.25	0.33	0.27	0.42	**0.74**		
SI	0.93	0.68	5.16	1.33	0.37	0.51	0.28	0.29	0.58	0.18	0.29	0.47	0.17	0.50	0.26	**0.82**	
TR	0.83	0.63	4.94	0.90	0.36	0.18	0.33	0.20	0.30	0.31	0.13	0.37	0.27	0.27	0.41	0.34	**0.79**

AC = Achievement; BI = Behavioural Intention; CO = Conformity; EE = Effort Expectancy; HAB = Habit; HE = Hedonism; HM = Hedonic Motivation; PE = Performance Expectancy; PO = Power; PV = Price Value; SE = Security; SI = Social Influence, TR = Tradition.

gender (56% male) compared to the Gambian group (77% male). Both groups were spread across the working population in terms of age, with the Gambian group reflecting a lower retirement age, with no participants over 60 years old.

Reliability and validity data for the two country groups are shown in Table 3, Table 4, with the measurement model data shown in Table 5.

5.2. The measurement model

The measurement model was constructed using UTAUT2 as a base with values as predictors of adoption factors as theoretically proposed in the model development section above. Values were constructed as per their validated inventories (Schwartz et al., 2012; Venkatesh et al., 2012). Items with outer loadings below 0.7 in both groups were considered for removal if doing so increased composite reliability (CR) or average variance explained (AVE) in the construct (Joseph F. Hair, Hult, Ringle, & Sarstedt, 2014; Sarstedt, Ringle, & Hair, 2017). Item loadings were above 0.6 in each country group with the exception of item COI1 in The Gambian group. Items removed from the final model are shown in section 12.

Tables 3 and 4 show the convergent and discriminant validity data for the VETA model for each country group. Composite Reliability (CR) for constructs in each country group was above 0.7 (Dijkstra & Henseler, 2015; Hair, Ringle, & Sarstedt, 2011; Nunnally & Bernstein, 1994). Average Variance Extracted (AVE) was above the threshold of 0.5 for all constructs in each country group (Hair, Anderson, Tatham, & Black, 1998b). Divergent validity was established by the Fornell-Larcker criterion: latent variable correlations exceeded the square root of AVE for each construct (Fornell & Larcker, 1981) (Tables 3 and 4). Outer VIF values were below the threshold of 5, indicating collinearity was not of concern (Hair, Anderson, Tatham, & Black, 1998a; Pan & Jackson, 2008; Rogerson, 2001; Venkatesh et al., 2012). Inner VIF values were below 5, indicating that common method variance was not of concern (Kock, 2015). Therefore, the data in the measurement model was sufficient to proceed with analysis in the structural model.

Table 4
Reliability, validity and descriptive statistics (UK).

	CR	AVE	Mean	SD	AC	BI	CO	EE	HAB	HE	HM	PE	PO	PV	SE	SI	TR
AC	0.84	0.72	3.46	1.06	**0.85**												
BI	0.87	0.69	4.39	0.99	0.09	**0.83**											
CO	0.84	0.65	4.27	0.94	0.14	−0.04	**0.80**										
EE	0.93	0.73	5.33	0.91	0.00	0.48	−0.07	**0.86**									
HAB	0.82	0.61	2.58	1.18	−0.04	0.50	−0.21	0.21	**0.78**								
HE	0.88	0.66	4.26	0.83	0.28	0.14	0.11	0.25	0.14	**0.81**							
HM	0.93	0.88	3.70	1.17	0.09	0.42	−0.05	0.32	0.32	0.23	**0.94**						
PE	0.92	0.78	4.59	1.01	−0.02	0.59	0.02	0.36	0.45	0.13	0.44	**0.89**					
PO	0.83	0.55	2.49	0.80	0.52	0.23	−0.09	0.12	0.19	0.28	0.17	0.10	**0.74**				
PV	0.90	0.75	4.71	0.86	0.14	0.60	−0.01	0.47	0.39	0.22	0.49	0.53	0.13	**0.87**			
SE	0.90	0.69	4.20	0.94	0.30	0.12	0.40	0.04	−0.01	0.12	0.06	0.12	0.17	0.06	**0.83**		
SI	0.88	0.55	3.41	0.88	0.35	−0.09	0.14	0.36	−0.01	0.17	0.44	0.06	0.29	0.14	**0.74**	
TR	0.91	0.77	3.07	1.22	0.24	−0.03	0.23	−0.07	−0.01	0.09	0.06	0.03	0.12	0.00	0.49	0.20	**0.88**

AC = Achievement; BI = Behavioural Intention; CO = Conformity; EE = Effort Expectancy; HAB = Habit; HE = Hedonism; HM = Hedonic Motivation; PE = Performance Expectancy; PO = Power; PV = Price Value; SE = Security; SI = Social Influence, TR = Tradition.

Table 5
Measurement model.

	Items	Item Loadings (The Gambia)	Item Loadings (UK)
Achievement (AC)	2	AC2 (0.73), AC3 (0.85)	AC2 (0.95), AC3 (0.74)
Behavioural Intention (BI)	3	BI1 (0.86), BI2 (0.86), BI3 (0.91)	BI1 (0.85), BI2 (0.74), BI3 (0.90)
Conformity (CO)	3	COI1 (0.57), COI2 (0.82), COI3 (0.83)	COI1 (0.90), COI2 (0.75), COI3 (0.76)
Effort Expectancy (EE)	5	EE1 (0.78), EE2 (0.84), EE3 (0.84), EE4 (0.70), EE5 (0.65)	EE1 (0.91), EE2 (0.91), EE3 (0.93), EE4 (0.75), EE5 (0.76)
Habit (HAB)	3	HAB1 (0.86), HAB2 (0.90), HAB3 (0.85)	HAB1 (0.90), HAB2 (0.78), HAB3 (0.64)
Hedonism (HE)	4	HE1 (0.61), HE2 (0.68), HE3 (0.87), HE4 (0.66)	HE1 (0.84), HE2 (0.69), HE3 (0.84), HE4 (0.86)
Hedonic Motivation (HM)	2	HM1 (0.73), HM3 (0.94)	HM1 (0.95), HM3 (0.92)
Performance Expectancy (PE)	3	PE1 (0.83), PE2 (0.79), PE3 (0.84)	PE1 (0.83), PE2 (0.92), PE3 (0.90)
Power (PO)	4	POD3 (0.61), POR1 (0.78), POR2 (0.86), POR3 (0.58)	POD3 (0.90), POR1 (0.62), POR2 (0.70), POR3 (0.72)
Price Value (PV)	3	PV1 (0.89), PV2 (0.90), PV3 (0.90)	PV1 (0.86), PV2 (0.84), PV3 (0.89)
Security (SE)	4	SEP2 (0.73), SEP3 (0.75), SES2 (0.77), SES3 (0.70)	SEP2 (0.79), SEP3 (0.83), SES2 (0.91), SES3 (0.77)
Social Influence (SI)	6	SI1 (0.88), SI2 (0.89), SI3 (0.87), SI6 (0.73), SI7 (0.73), SI8 (0.82)	SI1 (0.76), SI2 (0.76), SI3 (0.82), SI6 (0.67), SI7 (0.72), SI8 (0.71)
Tradition (TR)	3	TR1 (0.70), TR2 (0.80), TR3 (0.87)	TR1 (0.95), TR2 (0.85), TR3 (0.83)

5.3. The structural model

The VETA model (Fig. 2) explained similar variance (Adj. R^2) in *behavioural intention* to use e-learning in The Gambia (53%) and the UK (52%), comparable with the literature (Venkatesh et al., 2012). Variance explained was comparable across countries for *performance expectancy* (48% in The Gambia, 42% in the UK); and for *hedonic motivation* (5% in The Gambia, 4% in the UK). The variance in *price value* explained by the model differed in The Gambia (55%) and in the UK (4%), indicating a difference between groups in the perception of value from e-learning, and in *social influence* (18% in The Gambia, 4% in the UK) indicating a difference in perceptions of social context.

Influence on *behavioural intention* came from *price value*, *performance expectancy* and *habit* in both The Gambia and the UK; the predictors of *performance expectancy* were *price value* in both countries, with *hedonic motivation*, *effort expectancy* and *social influence*
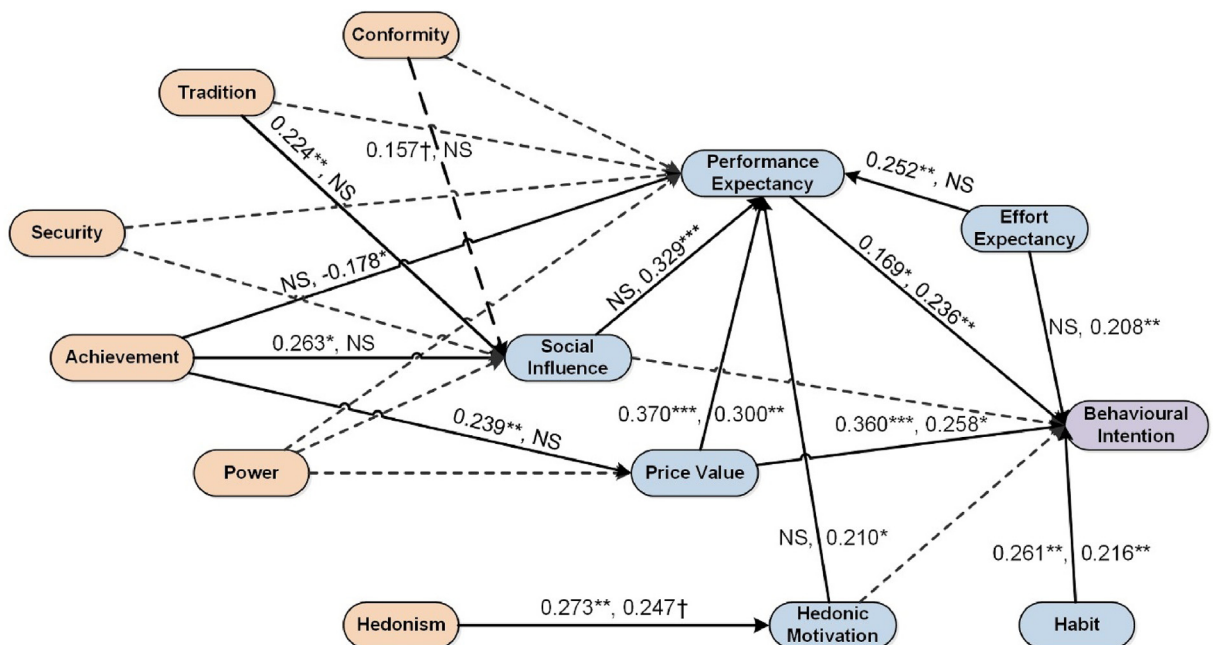
Fig. 2. VETA model, the Gambia, UK.

predicting performance expectancy in one country group only. *Social influence* and *hedonic motivation* had no direct predictive influence on *behavioural intention* in either country group. The strongest influence from values on the model came from the priority of *achievement* on *price value, social influence* and *performance expectancy;* priority of *hedonism* on *hedonic motivation*, and priority of *tradition* on *social influence*. The structural VETA model for both The Gambia and the UK is shown in Fig. 2.

For The Gambia, Composite Reliability (CR) were between 0.77 and 0.93, and Average Variance Extracted (AVE) were all between 0.50 and 0.80 and greater than squared latent variable correlations indicating adequate convergent validity and internal consistency. Mean response and standard deviation (SD) is shown. Diagonal elements (bold) are the square root of AVE; off-diagonal elements are latent variable correlations. For discriminant validity, diagonal elements should be greater than off-diagonal elements.

For the UK, Composite Reliability (CR) were between 0.82 and 0.93, and Average Variance Extracted (AVE) were all between 0.55 and 0.88 and greater than squared latent variable correlations indicating adequate convergent validity and internal consistency. Mean response and standard deviation (SD) is shown. Diagonal elements (bold) are the square root of AVE; off-diagonal elements are latent variable correlations. For discriminant validity, diagonal elements should be greater than off-diagonal elements.

5.3.1. The UTAUT2 core of the VETA model

Performance expectancy (PE) predicted *behavioural intention* (BI) in both country groups indicating that both Gambian and UK learners intended to use e-learning where it was perceived as useful in achieving their goals (Fig. 2, β[The Gambia] = 0.169, p = 0.042; β[UK] = 0.236, p = 0.006). *Price value* (PV) predicted *behavioural intention* (BI) in the both The Gambia and the UK (Fig. 2, β[The Gambia] = 0.360, p < 0.001; β[UK] = 0.258, p = 0.013), such that learners intended to use e-learning where it was perceived as worth the effort that they perceived they needed to contribute towards use. *Habit* (HAB) predicted *behavioural intention* (BI) in both The Gambia and the UK (Fig. 2, β[The Gambia] = 0.261, p = 0.005; β[UK] = 0.216, p = 0.005), indicating that prior experience with online learning was an important factor in determining learner *behavioural intention* to use e-learning irrespective of context. *Price value* (PV) predicted *performance expectancy* (PE) (Fig. 2, β[The Gambia] = 0.370, p < 0.001; β[UK] = 0.300, p = 0.004) such that learners perceived e-learning as useful if the benefits outweighed the costs.

Effort expectancy (EE) directly predicted *behavioural intention* (BI) for UK learners (Fig. 2, β[UK, EE-BI] = 0.208, p = 0.005), supporting research in developed contexts, but acted via *performance expectancy* (PE) in The Gambia (Fig. 2, β[The Gambia, EE-PE] = 0.252, p = 0.006), indicating that while UK learners intended to use e-learning where it was easy to use, Gambian learners formed a perception of e-learning usefulness which included ease of use amongst other factors. *Hedonic motivation* (HM) had no direct relationship with *behavioural intention* (BI) such that participants did not intend to use e-learning solely because they perceived it to be interesting or enjoyable (Fig. 2, β[The Gambia] = 0.019, p = 0.846; β[UK] = 0.046, p = 0.627). Similarly, *social influence* (SI) had no direct effect on *behavioural intention* (BI) in either group (Fig. 2, β[The Gambia] = 0.103, p = 0.114; β[UK] = 0.050, p = 0.526): learners did not intend to use e-learning solely because of social pressures. However, for both *social influence* (SI) and *hedonic motivation* (HM) there was an effect on the model via *performance expectancy* (PE) in the UK (Fig. 2, β[UK, SI-PE] = 0.329, p < 0.001; β[UK, HM-PE] = 0.210, p = 0.016) such that where e-learning was enjoyable, or there was endorsement of e-learning in the social environment, learners found e-learning useful in achieving tangible outcomes in their context.

5.3.2. Integrating values into the UTAUT2 model

There was no influence of *conformity, tradition* or *security* on *performance expectancy* in either country group. The value of *tradition* had a significant influence on *social influence* (TR-SI) in the Gambian group (Fig. 2, β = 0.224, p = 0.003), with the path of *conformity* on *social influence* approaching significance at the p < 0.05 level in the Gambian group (Fig. 2, β = 0.157, p = 0.053). There was an influence of *achievement* (AC) in the VETA model: the path (AC-PV) was important in The Gambia (β = 0.239, p = 0.005) but not in the UK. An individual's priority on the value of *achievement* predicted their perception of *social influence* (AC-SI) in The Gambia (β = 0.263, p = 0.013), but not in the UK. The influence of *achievement* on *performance expectancy* was negative in the UK (β = −0.178, p = 0.026), and non-significant in The Gambia. An individual's priority for the value of *hedonism* predicted learner's perception of *hedonic motivation* with a positive and significant path in the Gambian group with the path in the UK group also approaching significance at the p < 0.05 level (Fig. 2, β[The Gambia] = 0.273, p = 0.002; β[UK] = 0.247, p = 0.067).

6. Discussion

In this study, we proposed the link between Schwartz's theory of human values and the Unified Theory of Acceptance and Use of Technology (UTAUT2) to develop the Value-Enhanced Technology Adoption (VETA) model, an extended UTAUT2 model, and validated the VETA model against the context of professional e-learning in The Gambia and the UK. The study contributes to the literature through the findings that learners who prioritise self-enhancement values and therefore prioritise their own achievement perceive e-learning as worthwhile and that their social environment endorses e-learning use. The study contributes to the literature by finding no links between values associated with *security, conformity* and *power* and the adoption model for e-learning. The VETA model explained learner intention to use e-learning in The Gambia and the UK to an extent comparable with the UTAUT and UTAUT2 models. The values constructs in the VETA model explained variance in adoption variables: *performance expectancy, hedonic motivation, price value* and *social influence*. The VETA model, therefore, contributes to the literature by explaining learner intention as well as learner perception of adoption factors in The Gambia and the UK.

6.1. UTAUT2 was partially validated

This study supports the magnitude and direction of the direct relationships of: *performance expectancy*; *price value*; and *habit* on *behavioural intention*. *Performance expectancy* predicted *behavioural intention* to use e-learning, in support of findings from the primary technology acceptance literature (Davis, 1989; Davis et al., 1989; Venkatesh et al., 2003, 2012) and from previous e-learning studies (Ching-Ter, Hajiyev, & Su, 2017). Learners across The Gambia and the UK intended to use e-learning because they perceived that e-learning was useful in achieving their goals. The effect of *performance expectancy* was smaller than expected but dominant when compared with the effect of the other UTAUT constructs, *effort expectancy* or *social influence*, confirming findings from meta-analysis (Dwivedi et al., 2011; Khechine, Lakhal, & Ndjambou, 2016; Taiwo & Downe, 2013). *Price value* was the strongest direct predictor of *behavioural intention*, supporting the primary UTAUT2 literature in direction and significance (Venkatesh et al., 2012). Learners intended to use e-learning based on an evaluation of the non-financial costs, such as time and effort taken to use e-learning around work priorities, and the benefits, such as the increased competence gained from e-learning. Habit predicted behavioural intention to use e-learning supporting part of the literature that has found an effect of habit (Alawan, Dwivedi, & Williams, 2013; Venkatesh et al., 2012; Yuan, Ma, Kanthawala, & Peng, 2015). Learners intended to use e-learning where they had established routines that involved online methods of learning.

This study contributes to theory development by adding second-order relationships in the UTAUT model, bridging the gap between e-learning adoption research (Abdullah & Ward, 2016) and the technology-agnostic information systems literature (Venkatesh et al., 2012). *Performance expectancy* mediated relationships between *social influence*, *price value* and *hedonic motivation* on *behavioural intention* to use e-learning, supporting the dominant place of *perceived usefulness* in the adoption literature (Dwivedi et al., 2011; Šumak et al., 2011; Taiwo & Downe, 2013). The direct effect of social influence on learner intention was non-significant supporting prior literature (Teo, 2011; Terzis & Economides, 2011) and meta-analysis (Taiwo & Downe, 2013). In the UK, there was an indirect relationship of social influence on learner intention via *performance expectancy* implying the influence was informational in nature, rather than normative, as learners gather information on usefulness from referent others in their environment. *Hedonic motivation* was similarly only significant in the UK, indicating a potential difference in how enjoyment in workplace e-learning was perceived as effectual in helping to achieve knowledge outcomes by the two cohorts.

The influence of *effort expectancy* differed between the UK and The Gambia. *Effort expectancy* only directly predicted *behavioural intention* to use e-learning for the UK group. This finding adds to the speculation that the place of the construct of *effort expectancy* as a technology-agnostic, context-agnostic direct predictor of intention in the UTAUT paradigm is uncertain (Baptista & Oliveira, 2016). UK learners intended to use e-learning because of ease of use directly, without the mediating effect of performance expectancy, supporting the literature from developed nation contexts (Tarhini, Hone, & Liu, 2014). The influence of *effort expectancy* differed by context, acting directly on intention in the UK, and via *performance expectancy* in The Gambia, reinforcing prior claims that the literature corpus generated in developed countries cannot be readily applied in the context of sub-Saharan Africa without additional research (Brown, 2002; Musa, 2006).

6.2. Self-enhancement values predicted the adoption model

The finding that learners who prioritised *achievement* perceived e-learning as worth the cost, was supported in the Gambian group. The construct of *price value* indicates a positive balance of cost and worth perceived by the learner, leading to three possible explanations for this finding, either: UK workers did not link e-learning with *achievement*; UK workers did not place worth on the perceived *achievement* that was linked with completing the e-learning course; or did not perceive that the worth assigned to e-learning was proportional to the cost incurred. Considering that to monetary cost to participants was zero, cost was theorised *a priori* to be incurred in other ways, such as time management or the cost of internet access. There is some indication in the literature that participants in sub-Saharan Africa have difficulties accessing infrastructure such as power, networks and devices (Folorunso, Ogunseye, & Sharma, 2006; Tarus, Gichoya, & Muumbo, 2015; Touray, Salminen, & Mursu, 2013). Therefore, for Gambian learners, travelling to a place that has appropriate network, power and device infrastructure or the cost of providing such infrastructure for themselves may be perceived costs.

The argument that cost/benefit proportionality explains the negative link between *achievement* and *price value* for UK workers is unlikely to be the explanation because the costs for UK workers were small. The explanation of this finding might, therefore, be linked to the worth placed by a learner on the achievement from e-learning. In the UK workplace e-learning is relatively abundant and might not precede career advancement; in the Gambian group, e-learning was relatively scarce, and further courses might link to career advancement (Njenga & Fourie, 2010).

The finding that learners who prioritised *achievement* perceived a similar sentiment in their reference group was only supported in the Gambian group. This finding indicates that the group perception of e-learning is linked to *achievement*, and that members of the group perceive e-learning as linked to a sense of achievement. This finding supports the literature that argues that African societies are more collectivist than the UK, and therefore place more emphasis on group influence (Hofstede et al., 2010).

The finding that learners who prioritise pleasure in their lives find e-learning enjoyable may be more complex than a trivial link between value and perception. With the literature emphasis on *hedonic motivation* as perception that has a target (a technology) (Brown & Venkatesh, 2005), and the investment priority in educational technology to make engaging and interesting learning products through creative instructional design, the finding that a learner's prior interest in engagement with educational technology determines intrinsic motivation indicates that producing engaging products may be less important than previously thought.

The lack of influence of *conformity* and *security* on the model were unexpected. The theoretical link between the priority that

individuals place on maintaining a status quo of subjective norms and the influence they feel from their reference group was not apparent in the data (Schwartz et al., 2012). Potentially, a loose mandate for professional e-learning removes the link to *conformity* and job *security*: if learners perceive e-learning in their workplace as encouraged but not mandatory, and there is no explicit reward or punishment, then ideas such as conformity and security may not be important. Linking with *achievement* values, if the *achievement* accrued through e-learning has no tangible benefit associated with it in terms of job security or career structure, then *conformity* and *security* would not be important in determining e-learning adoption. The link between these values and the adoption model should be explored further in future research.

6.3. Limitations

Due to the relatively small sample collected, it was not possible to run moderator analysis, so gender and age effects were not included. A larger study, incorporating different countries, organisations or different technologies, might provide the additional experimental power and data stability to investigate moderator effects, as well as the additional values in the *self-transcendence* and *openness-to-change* values dimensions to determine their influence on adoption. Similarly, it was not possible to develop a more complex model, with constructs for *facilitating conditions*, *self-direction* and *stimulation* proving unreliable with the small sample of data collected. Additional data would add to the strength of the findings and the explanatory power of the model.

It was not possible to conduct the study on two organisations with similar worker profiles: UK workers have an infrastructure which supports technology, and as such, workers are comfortable with computing devices; Gambian workers have an infrastructure that is susceptible to power and network instability, and lack of device availability. It was not possible to conduct random sampling due to the small populations of workers in the target organisations, instead, all workers were invited to participate, resulting in self-selection, which is a limitation of this study.

6.4. Implications for practice

The importance of *achievement* has important implications for practitioners: e-learning that is perceived as yielding low *achievement* is unlikely to be linked to an intention to adopt the e-learning. Linking this to prior literature that indicates prior experience of low-value e-learning is likely to yield poor learner perception of e-learning, since users may not always separate e-learning into content, pedagogy, and the complex network of hard and soft technology, practitioners should ensure that the content, design, pedagogy, implementation, and technology are all perceived as high value to learners if a course is to be adopted.

Practitioners implementing e-learning in workplace contexts should also be mindful of the link between perceived cost and usefulness in achievement. Practical considerations for training managers should include providing adequate time and resources to complete e-learning, and providing appropriate reward following e-learning, such as a certificate of achievement and follow-on courses for further development.

Organisations can apply e-learning in similar manners in different cultures but must be mindful that what works in one might not work in another. It is therefore important to investigate what learners in each organisation deem as expected outcomes, costs and who key players in the social environment might be, before investing in an e-learning project.

6.5. Future research

To explain similarities and differences, it is important to expand the differing perceptions of UTAUT2 variables by context, therefore a qualitative study would be beneficial to deconstruct these variables. With the VETA model developed and validated in this study, further work is required to generalise findings to other contexts, to determine the breadth of applicability of the model.

Although this study uses e-learning as a vehicle to test the model, the nature of human values being scenario-agnostic, and UTAUT being technology-agnostic, mean that the VETA model could be applied to other scenarios. Although links between the dimensions of self-transcendence and individual-level adoption were not included in the VETA model for e-learning adoption, they should be considered when applying the model to technologies that have societal impact.

7. Conclusion

Schwartz's theory of human values was used to extend the UTAUT2, to develop the Values-Enhanced Technology Adoption (VETA) model, which was validated in the context of e-learning adoption in The Gambia and the UK. This exploratory study demonstrated that the VETA model partially applied in both contexts, with *behavioural intention* predicted by *performance expectancy*, *price value* and *habit*, and the value of *achievement* being an important predictor of adoption factors.

Funding and approvals

Conflicts of interest

The authors declare no conflicts of interest.

Acknowledgements

Appendix A. Survey Items

UTAUT2 Items

Item	Statement
Performance Expectancy (Venkatesh et al., 2012)	
PE1	I find e-learning useful in my daily life
PE2	Using e-learning helps me accomplish things more quickly
PE3	Using e-learning increases my productivity
Effort Expectancy (Venkatesh et al., 2012)	
EE1	Learning how to use e-learning is easy for me
EE2	My interaction with e-learning is clear and understandable
EE3	I find e-learning easy to use
EE4	It is easy to become skilful at e-learning
EE5	Using e-learning is as easy as using any other systems I have previously used
Social Influence (Nasution, 2007; Venkatesh et al., 2012)	
SI1	People who are important to me think that I should use e-learning
SI2	People who influence my behaviour think that I should use e-learning
SI3	People whose opinions that I value prefer that I use e-learning
SI4*	My organisation supports the use of e-learning
SI5*	I use e-learning because of the proportion of my co-workers who use e-learning
SI6	People in my organisation who use e-learning have a high profile
SI7	Having e-learning is a status symbol in my organisation
SI8	Using e-learning strengthens my position and influence in my organisation
Habit (Venkatesh et al., 2012)	
HAB1	The use of e-learning has become a habit for me
HAB2	I am addicted to the use of e-learning
HAB3	I must use e-learning
Hedonic Motivation (Venkatesh et al., 2012)	
HM1	Using e-learning is fun
HM2*	Using e-learning is enjoyable
HM3	Using e-learning is very entertaining
Price Value (Venkatesh et al., 2012)	
PV1	Compared to the effort I need to put in, e-learning is beneficial for me
PV2	Compared to the sacrifice I need to make, e-learning is worthwhile for me
PV3	Overall, e-learning is good value
Behavioural Intention (Venkatesh et al., 2012)	
BI1	I intend to continue using e-learning in the future
BI2	I will always try to use e-learning in my daily life
BI3	I plan to continue to use e-learning frequently

*Removed from model due to loading below 0.6 across both country groups.

Portrait Values Questionnaire (PVQ-5X)

Survey Item	Question/statement (Male version is shown) (Schwartz et al., 2012) "Here we describe some people. Please read each description and think about how much each person is or is not like you. Select the option that shows how much the person in the description is like you. How much like you is this person?"
Conformity	
COR1* COR2* COR3* COI1 C-OI2 COI3	He believes he should always do what people in authority say
	It is important to him to follow rules even when no one is watching
	Obeying all the laws is important to him
	It is important to him to avoid upsetting other people
	He thinks it is important never to be annoying to anyone
	He tries to be tactful and avoid irritating people

Tradition

TR1 TR2 TR3	It is important to him to maintain traditional values or beliefs
	Following his family's customs or the customs of a religion is important to him
	He strongly values the traditional practices of his culture

Security

SEP1* SEP2 SEP3 SES1* SES2 SES3	He avoids anything that might endanger his safety
	His personal security is extremely important to him
	It is important to him to live in secure surroundings
	It important to him that his country protect itself against all threats
	He wants the state to be strong so it can defend its citizens
	Having order and stability in society is important to him

Power

POR1 POR2 POR3 POD1* POD2* POD3	Having the feeling of power that money can bring is important to him
	Being wealthy is important to him
	He pursues high power and status
	He wants people to do what he says
	It is important to him to be the most influential person in any group
	It is important to him to be the one who tells others what to do

Achievement

AC1* AC2 AC3	He thinks it is important to be ambitious
	Being successful is important to him
	He wants people to admire his achievements

Hedonism

HE1 HE2 HE3 HE4	Having a good time is important to him
	Enjoying life's pleasures is important to him
	He takes advantage of every opportunity to have fun
	Excitement in life is important to him

*Removed from model due to loading below 0.6 across both country groups.

References

Abbasi, M. S., Chandio, F. H., Soomro, A. F., & Shah, F. (2011). Social influence, voluntariness, experience and the internet acceptance: An extension of technology acceptance model within a south-Asian country context. *Journal of Enterprise Information Management, 24*(1), 30–52. https://doi.org/10.1108/17410391111097410.

Abdullah, F., & Ward, R. (2016). Developing a general extended technology acceptance model for E-learning (GETAMEL) by analysing commonly used external factors. *Computers in Human Behavior, 56*, 238–256. https://doi.org/10.1016/j.chb.2015.11.036.

Adelé, S., & Brangier, E. (2013). Evolutions in the human technology relationship: Rejection, acceptance and technosymbiosis. *IADIS International Journal on WWW/Internet, 11*(3), 46–60.

Agarwal, R., & Karahanna, E. (2000). Time flies when you're having fun: Cognitive absorption and beliefs about information technology usage. *MIS Quarterly, 24*(4), 665–694.

Ahmad, W., & Sun, J. (2018). Antecedents of SMMA continuance intention in two culturally diverse countries: An empirical examination. *Journal of Global Information Technology Management, 21*(1), 45–68. https://doi.org/10.1080/1097198X.2018.1423840.

Ain, N., Kaur, K., & Waheed, M. (2016). The influence of learning value on learning management system use: An extension of UTAUT2. *Information Development, 32*(5), 1306–1321. https://doi.org/10.1177/0266666915597546.

Al-Ghaith, W., Sanzogni, L., & Sandhu, K. (2010). Factors influencing the adoption and usage of online services in Saudi Arabia. *The Electronic Journal on Information Systems in Developing Countries, 40*(1), 1–32.

Alawan, A., Dwivedi, Y. K., & Williams, M. D. (2013). Adoption of self-service technology by Jordanian customers. *Proceedings of business School postgraduate research conference* (pp. 47–54). Swansea University.

Baptista, G., & Oliveira, T. (2016). A weight and a meta-analysis on mobile banking acceptance research. *Computers in Human Behavior, 63*, 480–489. https://doi.org/10.1016/j.chb.2016.05.074.

Barak, M., Watted, A., & Haick, H. (2016). Motivation to learn in massive open online courses: Examining aspects of language and social engagement. *Computers & Education, 94*, 49–60. https://doi.org/10.1016/j.compedu.2015.11.010.

Boer, D., & Fischer, R. (2013). How and when do personal values guide our attitudes and sociality? Explaining cross-cultural variability in attitude–value linkages. *Psychological Bulletin, 139*(5), 1113–1147. https://doi.org/10.1037/a0031347.

Brewer, P., & Venaik, S. (2014). The ecological fallacy in national culture research. *Organization Studies, 35*(6), 1–24. https://doi.org/10.1177/0170840613517602.

Brown, I. T. J. (2002). Individual and technological factors affecting perceived ease of use of web-based learning technologies in a developing country. *The Electronic Journal on Information Systems in Developing Countries, 9*(5), 1–15.

Brown, S. A., & Venkatesh, V. (2005). Model of adoption of technology in households: A baseline model test and extension incorporating household life cycle. *MIS Quarterly, 29*(3), 399–426.

Burton-Jones, A., & Hubona, G. S. (2005). Individual differences and usage behavior: Revisiting a technology acceptance model assumption. *The DATA BASE for Advances in Information Systems, 36*(2), 58–77.

Chau, P. (2010). Online higher education commodity. *Journal of Computing in Higher Education, 22*(3), 177–191. https://doi.org/10.1007/s12528-010-9039-y.

Chen, H.-J., & Sun, T.-H. (2014). Clarifying the impact of product scarcity and perceived uniqueness in buyers' purchase behavior of games of limited-amount version. *Asia Pacific Journal of Marketing & Logistics, 26*(2), 232–249. https://doi.org/10.1108/APJML-07-2013-0084.

Ching-Ter, C., Hajiyev, J., & Su, C.-R. R. (2017). Examining the students' behavioral intention to use e-learning in Azerbaijan? The general extended technology acceptance model for E-learning approach. *Computers & Education, 111*, 128–143. https://doi.org/10.1016/j.compedu.2017.04.010.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly,* (September), 319–340.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science, 35*(8), 982–1003. https://doi.org/10.1287/mnsc.35.8.982.

Diddi, S., & Niehm, L. S. (2017). Exploring the role of values and norms towards consumers' intentions to patronize retail apparel brands engaged in corporate social responsibility (CSR). *Fashion and Textiles, 4*(1)https://doi.org/10.1186/s40691-017-0086-0.

Dijkstra, T. K., & Henseler, J. (2015). Consistent and asymptotically normal PLS estimators for linear structural equations. *Computational Statistics & Data Analysis, 81*, 10–23. https://doi.org/10.1016/j.csda.2014.07.008.

Dinev, T., Goo, J., Hu, Q., & Nam, K. (2009). User behaviour towards protective information technologies: The role of national cultural differences. *Information Systems*

Journal, 19(4), 391–412. https://doi.org/10.1111/j.1365-2575.2007.00289.x.

Dwivedi, Y., Rana, N., Chen, H., & Williams, M. (2011). A meta-analysis of the unified theory of acceptance and use of technology (UTAUT). *IFIP international working conference on governance and sustainability in information systems: Managing the transfer and diffusion of IT* (pp. 155–170). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-24148-2_10.

Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2017). Re-examining the unified theory of acceptance and use of technology (UTAUT): Towards a revised theoretical model. *Information Systems Frontiers,* 1–16. https://doi.org/10.1007/s10796-017-9774-y.

El-Masri, M., & Tarhini, A. (2017). Factors affecting the adoption of e-learning systems in Qatar and USA: Extending the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2). *Educational Technology Research & Development, 65*(3), 1–21. https://doi.org/10.1007/s11423-016-9508-8.

Fishbein, M., & Ajzen, I. (1975a). Attitude formation. *Belief, attitude, intention, and behavior, an introduction to theory and research* (pp. 216–287). Reading, MA: Addison-Wesley. https://doi.org/10.1016/B978-0-12-375000-6.00041-0.

Fishbein, M., & Ajzen, I. (1975b). *Chapter 2. Theories of attitude (EVT). Belief, attitude, intention, and behavior, an Introduction to Theory and research.* https://doi.org/10.2307/2065853.

Folorunso, O., Ogunseye, O. S., & Sharma, S. K. (2006). An exploratory study of the critical factors affecting the acceptability of e-learning in Nigerian universities. *Information Management & Computer Security, 14*(5), 496–505. https://doi.org/10.1108/09685220610717781.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39–50. https://doi.org/10.2307/3151312.

Goncalves, G., Oliveira, T., & Cruz-Jesus, F. (2018). Understanding individual-level digital divide: Evidence of an African country. *Computers in Human Behavior, 87*(May), 276–291. https://doi.org/10.1016/J.CHB.2018.05.039.

Göğüş, A., Nistor, N., & Lerche, T. (2012). Educational technology acceptance across cultures: A validation of the unified theory of acceptance and use of technology in the context of Turkish national culture. *The Turkish Online Journal of Educational Technology, 11*(4), 394–408.

Grigoryan, L. K., Lebedeva, N., & Breugelmans, S. M. (2018). A cross-cultural study of the mediating role of implicit theories of innovativeness in the relationship between values and attitudes toward innovation. *Journal of Cross-Cultural Psychology, 49*(2), 336–352. https://doi.org/10.1177/0022022116656399.

Hair, J. F., Anderson, R. E., Tatham, R., & Black, W. C. (1998a). Multiple regression analysis. *Multivariate data analysis* (pp. 141–216). (5th ed.). New Jersey: Prentice Hall.

Hair, J. F., Anderson, R. E., Tatham, R., & Black, W. C. (1998b). Structural equation modelling. *Multivariate data analysis* (pp. 577–644). (5th ed.). New Jersey: Prentice Hall.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2014). *A primer on partial Least squares structural equation modelling (PLS-SEM).* Thousand Oaks, CA: SAGE Publications, Inc.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice, 19*(2), 139–151. https://doi.org/10.2753/MTP1069-6679190202.

Hoehle, H., Zhang, X., & Venkatesh, V. (2015). An espoused cultural perspective to understand continued intention to use mobile applications: A four-country study of mobile social media application usability. *European Journal of Information Systems, 24*(3), 337–359. https://doi.org/10.1057/ejis.2014.43.

Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). *Cultures and organisations: Software of the mind* (3rd ed.). McGraw Hill.

Jung, Y., & Lee, J. (2018). Learning engagement and persistence in massive open online courses (MOOCS). *Computers and Education, 122*(February), 9–22. https://doi.org/10.1016/j.compedu.2018.02.013.

Khechine, H., Lakhal, S., & Ndjambou, P. (2016). A meta-analysis of the UTAUT model: Eleven years later. *Canadian Journal of Administrative Sciences, 33*(2), 138–152. https://doi.org/10.1002/cjas.1381.

Khechine, H., Pascot, D., & Bytha, A. (2014). UTAUT model for blended learning: The role of gender and age in the intention to use webinars. *Interdisciplinary Journal of E-Learning and Learning Objects, 10,* 33–52.

Kim, S. S., & Malhotra, N. K. (2005). A longitudinal model of continued IS use: An integrative view of four mechanisms underlying postadoption phenomena. *Management Science, 51*(5), 741–755. https://doi.org/10.1287/mnsc.1040.0326.

Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of e-Collaboration, 11*(4), 1–10. https://doi.org/10.4018/ijec.2015100101.

Koivisto, J., & Hamari, J. (2014). Demographic differences in perceived benefits from gamification. *Computers in Human Behavior, 35,* 179–188. https://doi.org/10.1016/j.chb.2014.03.007.

Kolog, E. A. (2015). Using unified theory of acceptance and use of technology model to predict students ' behavioral intention to adopt and use E-counseling in Ghana. *International Journal of Modern Education and Computer Science, 11*(November), 1–11. https://doi.org/10.5815/ijmecs.2015.11.01.

Labrecque, J. S., Wood, W., Neal, D. T., & Harrington, N. (2017). Habit slips: When consumers unintentionally resist new products. *Journal of the Academy of Marketing Science, 45*(1), 119–133. https://doi.org/10.1007/s11747-016-0482-9.

Lewis, C. C., Fretwell, C. E., Ryan, J., & Parham, J. B. (2013). Faculty use of established and emerging technologies in higher education: A unified theory of acceptance and use of technology perspective. *International Journal of Higher Education, 2*(2), 22–34. https://doi.org/10.5430/ijhe.v2n2p22.

Li, E., Harris, D. P., Rossi, D., & Luck, J. (2013). When urban meets rural: The interactive effect of location, age, and education on technology adoption. *Proceedings of 7th global business and social science research conference* (pp. 1–9). (Beijing).

Limayem, M., Hirt, S. G., & Cheung, C. M. K. (2007). How habit limits the predictive power of intention: The case of information systems continuance. *MIS Quarterly, 31*(4), 705–737. https://doi.org/10.1002/fut.10029.

Martocchio, J. J., & Webster, J. (1992). Effects of feedback and cognitive playfulness on performance in microcomputer software training. *Personnel Psychology, 45,* 553–578.

Mbarika, V. W., Meso, P., Musa, P., Kah, M., & Amougou, J. (2007). Developing a research agenda for ICT research in developing countries: A focus on sub-saharan Africa. *Proceedings of the American Society for Information Science and Technology, 43*(1), 1–8. https://doi.org/10.1002/meet.14504301184.

McCoy, S., Galletta, D. F., & King, W. R. (2005). Integrating national culture into IS research: The need for current individual-level measures. *Communications of the Association for Information Systems, 15,* 211–224. Retrieved from https://pdfs.semanticscholar.org/fc3f/a8b4a7d731ec54ec83352f5d8d6a4d11d776.pdf.

McSweeney, B. (2002). Hofstede's model of national cultural differences and their consequences: A triumph of faith - a failure of analysis. *Human Relations, 55*(1), 89–118. https://doi.org/10.1177/0018726702551004.

Mtebe, J. S., & Raisamo, R. (2014). Investigating students' behavioural intention to adopt and use mobile learning in higher education in East Africa. *International Journal of Education and Development using Information and Communication Technology, 10*(3), 4–20.

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*(3), 213–224. https://doi.org/10.1002/itdj.

Nasution, M. F. F. A. (2007). Investigating social influence on acceptance of executive information systems: A UTAUT framework approach. *Proceedings of the 2007 Southern association for information systems conference* (pp. 201–205). .

Nistor, N., Göğüş, A., & Lerche, T. (2013). Educational technology acceptance across national and professional cultures: A european study. *Educational Technology Research & Development, 61*(4), 733–749. https://doi.org/10.1007/s11423-013-9292-7.

Nistor, N., Lerche, T., Weinberger, A., Ceobanu, C., Heymann, J. O., & Heymann, O. (2014). Towards the integration of culture into the unified theory of acceptance and use of technology. *British Journal of Educational Technology, 45*(1), 36–55. https://doi.org/10.1111/j.1467-8535.2012.01383.x.

Njenga, J. K., & Fourie, L. C. H. (2010). The myths about e-learning in higher education. *British Journal of Educational Technology, 41*(2), 199–212. https://doi.org/10.1111/j.1467-8535.2008.00910.x.

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). McGraw Hill.

Ong, C.-S., & Lai, J.-Y. (2006). Gender differences in perceptions and relationships among dominants of e-learning acceptance. *Computers in Human Behavior, 22*(5), 816–829. https://doi.org/10.1016/j.chb.2004.03.006.

Ong, C.-S., Lai, J.-Y., & Wang, Y.-S. (2004). Factors affecting engineers' acceptance of asynchronous e-learning systems in high-tech companies. *Information &*

Management, 41(6), 795–804. https://doi.org/10.1016/j.im.2003.08.012.

Padilla-Meléndez, A., Del Aguila-Obra, A. R., & Garrido-Moreno, A. (2013). Perceived playfulness, gender differences and technology acceptance model in a blended learning scenario. *Computers & Education, 63*, 306–317. https://doi.org/10.1016/j.compedu.2012.12.014.

Pahnila, S., Siponen, M., Myyry, L., & Zheng, X. (2011). *The influence of individualistic and collectivistic values to UTAUT: The case of the Chinese ebay. ECIS 2011 proceedings*. Retrieved from http://aisel.aisnet.org/ecis2011/45.

Pan, Y., & Jackson, R. T. (2008). Ethnic difference in the relationship between acute inflammation and serum ferritin in US adult males. *Epidemiology and Infection, 136*(3), 421–431. https://doi.org/10.1017/S095026880700831X.

Raman, A., & Don, Y. (2013). Preservice teachers' acceptance of learning management software: An application of the UTAUT2 model. *International Education Studies, 6*(7), 157–164. https://doi.org/10.5539/ies.v6n7p157.

Raman, A., Don, Y., Khalid, R., Hussin, F., Omar, M. S., & Ghani, M. (2014). Technology acceptance on smart board among teachers in terengganu using UTAUT model. *Asian Social Science, 10*(11), 84–91. https://doi.org/10.5539/ass.v10n11p84.

Recker, J. (2016). Reasoning about discontinuance of information system use. *Journal of Information Technology Theory and Application, 17*, 41–66.

Ringle, C. M., Wende, S., & Becker, J.-M. (2015). *SmartPLS. Boenningstedt: SmartPLS GmbH.* Retrieved from http://www.smartpls.com.

Roca, J. C., Chiu, C.-M., & Martínez, F. J. (2006). Understanding e-learning continuance intention: An extension of the Technology Acceptance Model. *International Journal of Human-Computer Studies, 64*(8), 683–696. https://doi.org/10.1016/j.ijhcs.2006.01.003.

Roca, J. C., & Gagné, M. (2008). Understanding e-learning continuance intention in the workplace: A self-determination theory perspective. *Computers in Human Behavior, 24*(4), 1585–1604. https://doi.org/10.1016/j.chb.2007.06.001.

Rogerson, P. A. (2001). *Statistical methods in geography.* SAGE Publications, Inc.

Rokeach, M. (1968). *Beliefs, attitudes and values: A theory of organization and change.* Jossey-Bass Inc.

Rokeach, M. (1973). *The nature of human values (new editio).* New York: The Free Press, Macmillan Publishing Co. Inc.

Rokeach, M. (1975). The nature of attitudes. *Beliefs, attitudes and values: A theory of organization and change* (pp. 109–132). (5th ed.). California: Jossey-Bass Inc.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation. *American Psychologist, 55*(1), 68–78. https://doi.org/10.1037/0003-066X.55.1.68.

Saadé, R. G., Nebebe, F., & Mak, T. (2009). The role of intrinsic motivation in system Adoption: A cross-cultural perspective. *Journal of Information, Information Technology, & Organizations, 4*, 107–126. Retrieved from http://jiito.informingscience.org/articles/JIITOv4p107-126Saade.pdf.

Sánchez-Franco, M. J., Martínez-López, F. J., & Martín-Velicia, F. a. (2009). Exploring the impact of individualism and uncertainty avoidance in Web-based electronic learning: An empirical analysis in European higher education. *Computers & Education, 52*(3), 588–598. https://doi.org/10.1016/j.compedu.2008.11.006.

Sarstedt, M., Ringle, C. M., & Hair, J. F. (2017). *Partial Least squares structural equation modeling. Handbook of market research*https://doi.org/10.1007/978-3-319-05542-8_15-1.

Schaffer, B. S., & Riordan, C. M. (2003). A review of cross-cultural methodologies for organizational research: A best-practices approach. *Organizational Research Methods, 6*https://doi.org/10.1177/1094428103251542.

Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. *Advances in Experimental Social Psychology, 25*, 1–65. https://doi.org/10.1016/S0065-2601(08)60281-6.

Schwartz, S. H. (1994a). Are there universal aspects in the structure and content of human values? *Journal of Social Issues, 50*(4), 19–45.

Schwartz, S. H. (1994b). Beyond individualism/collectivism: New cultural dimensions of values. *Individualism and collectivism* (pp. 85–119). SAGE Publications, Inc.

Schwartz, S. H. (2012). An overview of the Schwartz theory of basic values. *Online Readings in Psychology and Culture, 2*(1), 1–20. https://doi.org/10.9707/2307-0919.1116.

Schwartz, S. H., Cieciuch, J., Vecchione, M., Davidov, E., Fischer, R., Beierlein, C., et al. (2012). Refining the theory of basic individual values. *Journal of Personality and Social Psychology, 103*(4), 663–688. https://doi.org/10.1037/a0029393.

Seddig, D., & Davidov, E. (2018). Values, attitudes toward interpersonal violence, and interpersonal violent behavior. *Frontiers in Psychology, 9*(May), 1–13. https://doi.org/10.3389/fpsyg.2018.00604.

Sørebø, Ø., Halvari, H., Gulli, V. F., & Kristiansen, R. (2009). The role of self-determination theory in explaining teachers' motivation to continue to use e-learning technology. *Computers & Education, 53*(4), 1177–1187. https://doi.org/10.1016/j.compedu.2009.06.001.

Srite, M. (2006). Culture as an explanation of technology acceptance differences: An empirical investigation of Chinese and US users. *Australasian Journal of Information Systems, 14*(1), 5–26. https://doi.org/10.3127/ajis.v14i1.4.

Srite, M., & Karahanna, E. (2006). The role of espoused national cultural values in technology acceptance. *MIS Quarterly, 30*(3), 679–704.

Šumak, B., Heričko, M., & Pušnik, M. (2011). A meta-analysis of e-learning technology acceptance: The role of user types and e-learning technology types. *Computers in Human Behavior, 27*(6), 2067–2077. https://doi.org/10.1016/j.chb.2011.08.005.

Sumak, B., Polancic, G., & Hericko, M. (2010). An empirical study of virtual learning environment adoption using UTAUT. *Second international conference on mobile, hybrid, and on-line learning* (pp. 17–22). . https://doi.org/10.1109/eLmL.2010.11.

Taiwo, A. A., & Downe, A. G. (2013). The theory of user acceptance and use of technology (UTAUT): A meta-analytic review of empirical findings. *Journal of Theoretical and Applied Information Technology, 49*(1), 48–58.

Tams, S., Thatcher, J., & Srite, M. (2012). Examining the influence of cultural values on the post-adoptive use of knowledge management systems. *Proceedings of the 50th annual conference on computers and people research* (pp. 131–136). ACM.

Taras, V., Rowney, J., & Steel, P. (2009). Half a century of measuring culture: Review of approaches, challenges, and limitations based on the analysis of 121 instruments for quantifying culture. *Journal of International Management, 15*(4), 357–373. https://doi.org/10.1016/j.intman.2008.08.005.

Tarhini, A., Hone, K., & Liu, X. (2013). Factors affecting students' acceptance of e-learning environments in developing countries: a structural equation modeling approach. *International Journal of Information and Education Technology, 3*(1), 54–59. https://doi.org/10.7763/IJIET.2013.V3.233.

Tarhini, A., Hone, K., & Liu, X. (2014). Measuring the moderating effect of gender and age on E-learning acceptance in england: A structural equation modeling approach for an extended technology acceptance model. *Journal of Educational Computing Research, 51*(2), 163–184. https://doi.org/10.2190/EC.51.2.b.

Tarhini, A., Hone, K., Liu, X., & Tarhini, T. (2017). Examining the moderating effect of individual-level cultural values on users' acceptance of E-learning in developing countries: A structural equation modeling of an extended technology acceptance model. *Interactive Learning Environments, 25*(3)https://doi.org/10.1080/10494820.2015.1122635.

Tarus, J. K., Gichoya, D., & Muumbo, A. (2015). Challenges of implementing E-learning in Kenya: A case of Kenyan public universities. *International Review of Research in Open and Distributed Learning, 16*(1), 120–141.

Taylor, S., & Todd, P. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research.* https://doi.org/10.1287/isre.6.2.144.

Teo, T. (2011). Factors influencing teachers' intention to use technology: Model development and test. *Computers & Education, 57*(4), 2432–2440. https://doi.org/10.1016/j.compedu.2011.06.008.

Terzis, V., & Economides, A. A. (2011). The acceptance and use of computer based assessment. *Computers & Education, 56*(4), 1032–1044. https://doi.org/10.1016/j.compedu.2010.11.017.

Thomas, T., Singh, L., & Gaffar, K. (2013). The utility of the UTAUT model in explaining mobile learning adoption in higher education in Guyana. *Journal of Education, 9*(3), 71–85. Retrieved from http://ijedict.dec.uwi.edu/viewarticle.php?id=1687.

Touray, A., Salminen, A., & Mursu, A. (2013). ICT barriers and critical success factors in developing countries. *The Electronic Journal on Information Systems in Developing Countries, 56*(7), 1–17.

Tripathy, S. S. (2013). Comparison of statistical methods for outlier detection in proficiency testing data on analysis of lead in aqueous solution. *American Journal of Theoretical and Applied Statistics, 2*(6), 233. https://doi.org/10.11648/j.ajtas.20130206.21.

Udo, G. J., Bagchi, K. K., & Kirs, P. J. (2012). Exploring the role of espoused values on e-service adoption: A comparative analysis of the US and Nigerian users. *Computers in Human Behavior, 28*(5), 1768–1781. https://doi.org/10.1016/j.chb.2012.04.017.

Veiga, J. F., Floyd, S., & Dechant, K. (2001). Towards modelling the effects of national culture on IT implementation and acceptance. *Journal of Information Technology,* *16*(3), 145–158. https://doi.org/10.1080/02683960110063654.

Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision Sciences, 39*(2), 273–315. https://doi.org/10.1111/j.1540-5915.2008.00192.x.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science, 46*(2), 186–204. https://doi.org/10.1287/mnsc.46.2.186.11926.

Venkatesh, V., Morris, M. G., & Ackerman, P. L. (2000). A longitudinal field investigation of gender differences in individual technology adoption decision-making processes. *Organizational Behavior and Human Decision Processes, 83*(1), 33–60. https://doi.org/10.1006/obhd.2000.2896.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Towards a unified view. *MIS Quarterly, 27*(3), 425–478.

Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly, 36*(1), 157–178.

Verplanken, B., & Aarts, H. (1999). Habit, attitude, and planned behaviour: Is habit an empty construct or an interesting case of goal-directed automaticity? *European Review of Social Psychology, 10*(1), 101–134. https://doi.org/10.1080/14792779943000035.

Wang, Y.-S., Wu, M.-C., & Wang, H.-Y. (2009). Investigating the determinants and age and gender differences in the acceptance of mobile learning. *British Journal of Educational Technology, 40*(1), 92–118. https://doi.org/10.1111/j.1467-8535.2007.00809.x.

Wood, W. (2017). Habit in personality and social psychology. *Personality and Social Psychology Review, 21*(4), 389–403. https://doi.org/10.1177/1088868317720362.

Wu, S.-I. (2003). The relationship between consumer characteristics and attitude toward online shopping. *Marketing Intelligence & Planning, 21*(1), 37–44. https://doi.org/10.1108/02634500310458135.

Yang, S. (2013). Understanding undergraduate students' adoption of mobile learning model: A perspective of the extended UTAUT2. *Journal of Convergence Information Technology, 8*(10), 969–979. https://doi.org/10.4156/jcit.vol8.issue10.118.

Yuan, S., Ma, W., Kanthawala, S., & Peng, W. (2015). Keep using my health apps: Discover users' perception of health and fitness apps with the UTAUT2 model. *Telemedicine and e-Health, 21*(9), 735–741. https://doi.org/10.1089/tmj.2014.0148.

Zeithaml, V. A. (1988). Consumer perceptions of price, quality, and value: A means-end model and synthesis of evidence. *Journal of Marketing, 52*(3), 22. https://doi.org/10.2307/1251446.

Zhu, M., Sari, A., & Lee, M. M. (2018). A systematic review of research methods and topics of the empirical MOOC literature (2014–2016). *Internet and Higher Education, 37*(January), 31–39. https://doi.org/10.1016/j.iheduc.2018.01.002.