

Examining the Integration of ICT in Teaching and Learning among Educators in Public Teacher Training Colleges in Tanzania using the Theory of Planned Behaviour: A Concept Paper

A. N. Luhamya, F. E. K. Bakkabulindi, P. B. Muyinda
Makerere University

J. B. Mpoza
University of Swaziland

Abstract. *The integration of ICT in teaching and learning (IITL) brings about a powerful learning environment in which students deal with knowledge in active, self-directed and constructive ways. Thus all avenues to foster IITL have to be explored. One such avenue is to isolate the factors underpinning IITL. Hence, in this concept paper, it is proposed that a teacher educator's IITL can be explained using the Theory of Planned Behaviour (TPB). This paper highlights the background; the problem; the objectives and significance; related literature and the hypotheses to be tested and finally the proposed methodology to be used in the study.*

Keywords: ICT; Pedagogy; Tanzania; Teacher Training; Theory of Planned Behaviour.

Background

Historical Perspective

Studies (e.g. Andersson, Nfuka, Sumra, Uimonen & Pain, 2014; Kafyulilo, Fisser, Pieters & Voogt, 2015; Kihoza, Zlotnikova, Bada & Kalegele, 2016a, b; Mtebe, Dachi & Raphael, 2011; Mtebe & Raphael, 2013; Mwalongo, 2011; Ndibalema, 2014; Sife, Lwoga & Sanga, 2007) have been done in relation to the integration of ICTs in teaching and learning (IITL) in the context of Tanzania. However, as their details in the Related Literature section (first subsection) show, apart from only two of the cited studies (Kafyulilo et al., 2015; Kihoza et al., 2016b), other studies were short on theorization and hence frameworks on which their findings were based. Yet Ellis and Levy (2008) opine that the findings of any study without a firm theoretical/ conceptual foundation/ framework, are more of random luck than scholarly work and hence make little or no contribution to the pertinent body of knowledge (BoK). In order to narrow the above theoretical/ conceptual gap, the study proposed in this paper will examine whether the theory of planned behaviour (TPB) can serve as a framework to explain the

integration of ICT in teaching and learning (IITL) among the educators in public teacher training colleges in Tanzania.

Theoretical Perspective

The proposed study will be underpinned by the Theory of Planned Behaviour (TPB). The TPB model proposed by Ajzen (1991) as shown in Figure 1, has actual behaviour (AB) as the main variable. Ajzen defined AB as an individual's observable response in a given situation with respect to a given target. According to Figure 1, TPB theorizes that AB is predicted by both behavioural intention (BI) and perceived behavioural control (PBC). Ajzen defined BI as an indication of person's readiness to perform a given behaviour and PBC as the perceived ease or difficulty of performing the behaviour and is assumed to reflect past experience as well as anticipated impediments and obstacles.

As per Figure 1, BI is in turn, determined by attitude toward behaviour (ATB), subjective norm (SN) and PBC. Ajzen (1991) defined ATB as the degree to which a person has a favourable or unfavourable evaluation or appraisal of the behaviour in question (e.g., using technology), and SN as the perceived social pressure to perform or not to perform the behaviour. Ajzen observes that "the more favourable the attitude and subjective norm with respect to a behaviour, and the greater the perceived behavioural control, the stronger should be an individual's intention to perform the behaviour under consideration" (p. 181). The TPB (Figure 1) theorizes that ATB is influenced by behavioural beliefs and outcome evaluations (bboe). Ajzen (1991) defined behavioural beliefs (bb) as an individual's subjective probability that performing the target behaviour will result in consequences, and outcome evaluation (oe) as rating of the desirability of the outcome.

As per Figure 1, SN is influenced by normative beliefs and motivation to comply (nbmc). Ajzen defined normative beliefs (nb) as the likelihood that important individuals or group approve or disapprove of performing a given behaviour, and motivation to comply (mc) as the extent to which the person wants to comply with the wishes of the referent others. According to Figure 1, the TPB model posits that PBC is determined by control beliefs and perceived facilitation (cbpf). Ajzen defined control beliefs (cb) as perception of the availability of skills, resources, and opportunities, and perceived facilitation (pf) as the individual's assessment of the importance of those resources to the achievement of outcomes.

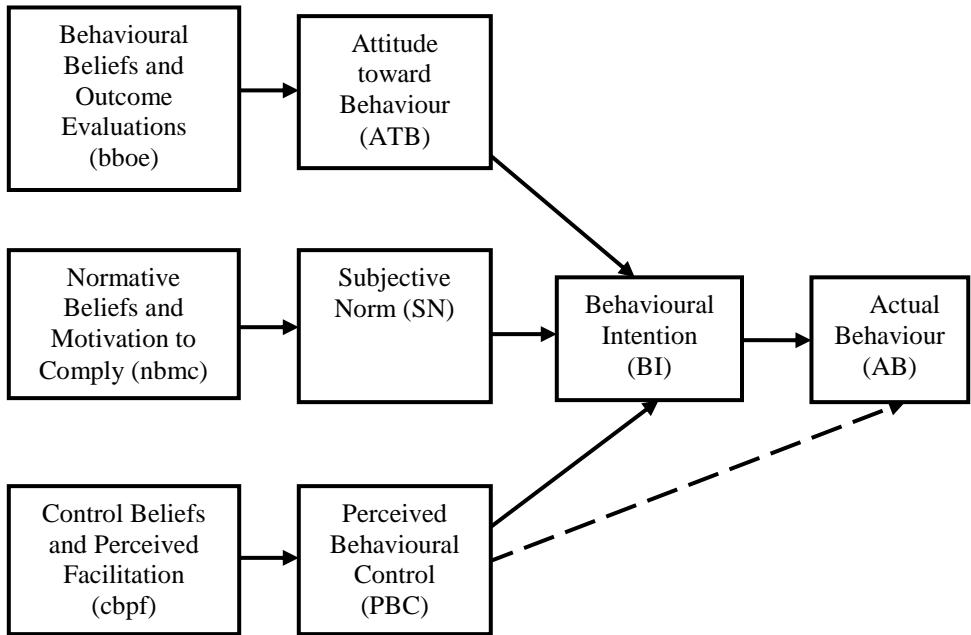


Figure 1: The Theory of Planned Behaviour (TPB)

Source: Ajzen (1991)

Conceptual Perspective

Basing on the Theory of Planned Behaviour (TPB) (reviewed in section 1.2), Figure 2 provides theoretical framework explaining the main construct, the integration of ICT in teaching and learning (IITL). The explanatory constructs are the intention to integrate ICT (II) in teaching and learning (II) and its determinants namely; the attitude toward the integration (ATI), subjective norm on the integration (SNI) and the perceived behavioural control over the integration (PBCI). Each of these determinants of II is influenced by its respective underlying beliefs, namely, behavioural beliefs and outcome evaluation on the integration (bboei), normative beliefs and motivation to comply on the integration (nbmci) and control beliefs and perceived facilitation on the integration (cbpfi).

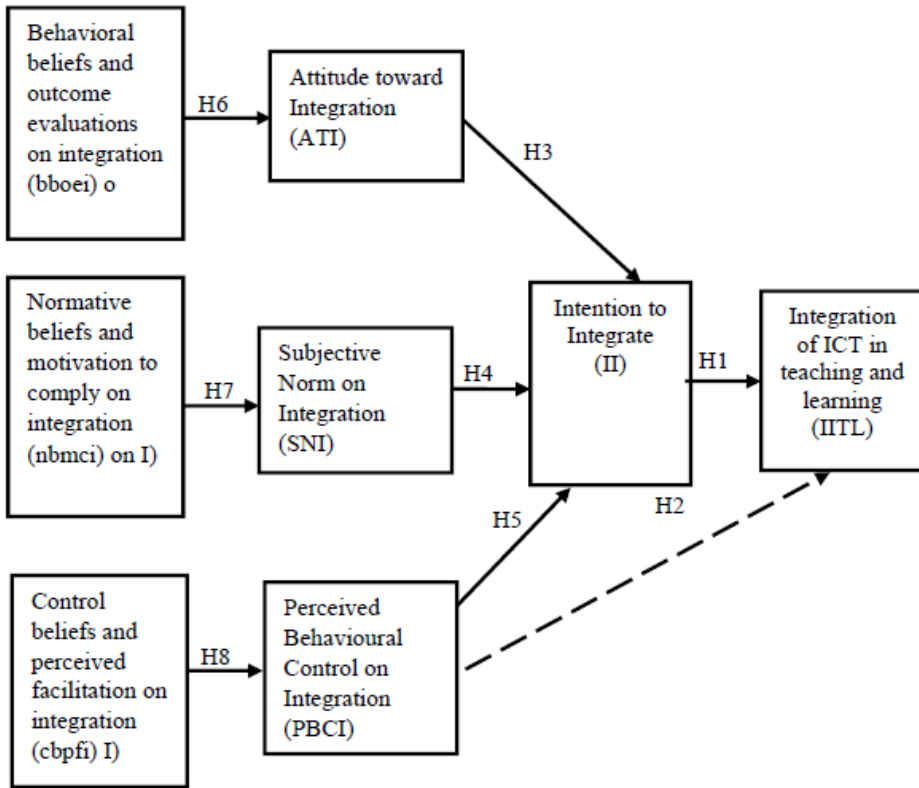


Figure 2: Theoretical framework relating IITL and the explanatory constructs of the TPB model

Source: Adapted from Figure 1

Statement of the Problem

Singh and Chan (2014) assert that integration of ICT in teaching and learning (IITL) brings about a powerful learning environment in which students deal with knowledge in active, self-directed and constructive ways. Despite its importance, IITL has been reported to be low among educators in public teacher training colleges (TTCs) in Tanzania (e.g. Andersson et al., 2014; Kafyulilo et al., 2015; Kihoza et al., 2016a, b; Mtebe & Raphael, 2013; Ndibalema, 2014). For example, Andersson et al. (2014) in their “evaluation of the ICT in Teachers’ College Project implemented from 2005 to 2008 in Tanzania” (p. 6), revealed that the objective of integrating ICT in teaching and learning (IITL) had only partially been achieved.

If such low IITL among teacher educators continues, it will impact on the learning environment by restraining students from dealing with knowledge in active, self-directed and constructive ways (Singh &

Chan, 2014). This will adversely affect the quality of education offered to students in these public TTCs. To address the problem of low IITL among educators in public TTCs, it is thus necessary to isolate the factors which underpin the problem. Basing on the Theory of Planned Behaviour, TPB (Figure 1), it is proposed in this study that a teacher educator's integration of ICT in teaching and learning (IITL) can be explained using the TPB model (Figure 2).

Objectives and Significance

The main objective of this study is to use the Theory of Planned Behaviour (TPB) to explain a teacher educator's integration of ICT in teaching and learning (IITL). The specific objectives of the study are (i) to establish whether the intention to integrate ICT (II) predicts IITL; (ii) to establish whether the perceived behaviour control on the integration (PBCI) predicts IITL. In turn, the study will seek (iii) to establish whether the attitude toward the integration of ICT (ATI) predicts II; (iv) to establish whether the subjective norm on integration of ICT (SNI) predicts II; (v) to establish whether PBCI predicts II. Finally, the study seeks (vi) to establish whether the behavioural beliefs and outcome evaluation on integration (bboei) predict ATI; (vii) to establish whether the normative beliefs and motivation to comply on integration (nbmci) predict SNI; and (viii) to establish whether the control beliefs and perceived facilitation on integration (cbpfi) predict PBCI.

The study will help the Ministry of Education Science and Technology (MoEST), the Tanzania Commission for Universities (TCU) and the National Council for Technical Education (NACTE) in formulating relevant ICT policies and ensuring their implementation for effective utilization of the available ICT resources in public TTCs. The study findings will also be used by college principals, academic deans and heads of department to improve on the determinants of teacher educators' IITL. Finally, this study will contribute to the existing body of knowledge by providing researchers and academicians with new insights of looking at IITL using social psychology theories such as TPB.

Related Literature

Studies on the Integration of ICT in Teaching and Learning in Tanzania

Studies have dealt with the issue of integration of ICT in teaching and learning (IITL) in Tanzania. For example, Andersson et al. (2014) carried

out “an evaluation of the ICT in Teachers’ College Project implemented from 2005 to 2008 by the Ministry of Education and Vocational Training (MoEVT) in Tanzania with funding... from the Government of Sweden” (p. 6). Their overall objective was to find out what actually had been achieved, what lessons had been learnt during the program implementation. They hence found that five out of the six project objectives had been achieved at the end of the project. The objective on basic ICT training had not been fully achieved since the project had not managed to train all tutors. Also, the objective of integrating ICT in teaching and learning (IITL) had only partially been achieved.

Kafyulilo et al. (2015) used the Technological Pedagogical Content Knowledge (TPACK) framework to describe the knowledge and skills that pre-service teachers of science and mathematics needed to develop in order to effectively integrate ICT in teaching and learning (IITL). TPACK (Koehler & Mishra, 2009) stipulates that in order for a teacher to effectively engage in IITL, the teacher needs knowledge (K), summarized as TPACK. TPACK comprises of seven components, three of which, namely content knowledge (CK), pedagogical knowledge (PK) and technological knowledge (TK) are core. The interaction between these three, results in pedagogical content knowledge (PCK), technological pedagogical knowledge (TPK), technological content knowledge (TCK), and technological pedagogical content knowledge (TPACK). Kafyulilo et al.'s study involved 22 pre-service teachers in the Bachelor of Education in Science from Dar es Salaam University College of Education (DUCE). They used three instruments for data collection, namely a “TPACK survey, an observation checklist and a reflection questionnaire” (p. 385). They analysed their data by computing “means and standard deviations... computed... from the TPACK survey and the reflection survey” (p. 387) whence they “used the Wilcoxon signed ranks test... to test the statistical difference between pre and post intervention technology use in teaching” (p. 387). Hence they found “significant changes in technology-related components of TPACK” (p. 381).

Kihoza et al. (2016a) “examined the impact of increased education level on the ICT use competence perception and the influence of ICT knowledge level and skills on the adoption of blended learning contexts.” (p. 60). Using a mixed methods paradigm, they collected data from teachers, school inspectors, curriculum development experts and teacher trainees using questionnaires and observations. Their results suggested that a teacher's education level did not determine their level of ICT knowledge. They revealed that the barriers to the use of ICT in education were both internal and external. The internal barriers, they

reported, were “more of personal attitudes and perceptions about a technology” (p. 60). The external barriers according to their findings, were “lack of availability and accessibility to the relevant resources (hardware and software), [and] lack of framework[s] that address integration of ICTs in teaching and learning and unreliable internet connection” (p. 60).

Kihoza et al. (2016b) “assessed classroom ICTs integration opportunities and the challenges in relation to... TPACK and SAMR... models” (p. 107). The TPACK framework has been introduced under Kafyulilo et al. (2015). The Substitution, Augmentation, Modification and Redefinition (SAMR) model of ICT was proposed by Puentedura (2010). According to him, at the level of substitution (S), ICT acts as a substitute for say a manual activity or another technology but with no functional change to the latter. According to Kihoza et al. (2016b), the classroom application of substitution ICTs (S) is when for example, “instead of coming with a poster into a classroom, [one] could display information using PowerPoint and a projector” (p. 111). At the level of augmentation (A), ICT acts as a substitute for another technology but with functional improvement. Kihoza et al. (2016b) assert that classroom application of argumentation ICTs “focuses on dictionaries, study guides, [and] history sites linked to online text” (p. 111). At the modification (M) level, ICT allows for activities to be redesigned. In Kihoza et al.'s (2016b) view, classroom application of modification “focuses on textual, visual, and audio tools for construction of shared knowledge” (p. 111). Lastly, at the redefinition (R) level, ICT allows the user to create new tasks of learning that were previously inconceivable without technology. Kihoza et al. (2016b) contend that classroom application of redefinition, “focuses on visualization of narrative and structural aspects of text (p. 111). Kihoza et al.'s (2016b) case study involved 206 respondents (tutors and teacher trainees) from two teacher training colleges in Tanzania, from whom they collected data using a questionnaire, observation and interviewing. Using descriptive statistics (percentages) for analysis, they found that the “majority of respondents ha[d] low pedagogical ICT competences” (p. 107). And, while the tutors exhibited good levels of knowledge on all the constructs of TPACK and SAMR that they had assessed, teacher trainees revealed poor skills and inefficient support on the use of basic ICTs. They challenged “the Government [of Tanzania] to work on a harmonized ICT in education integration framework” (p. 107).

Mtebe et al. (2011) wrote a position paper titled, “integrating ICT into teaching and learning at the University of Dar es Salaam [UDSM]” (p. 289). Focusing on how UDSM had used “technology to improve the

efficiency and effectiveness of educational processes and outcomes” (p. 289), they highlighted one key lesson learned. The lesson was that, “innovations in the sphere of teaching and learning need[ed] to take cognizance of, and address, factors in the broader national and institutional contexts, as well as those relating to the readiness of individual staff to accept change” (p. 289).

Mtebe and Raphael (2013) aimed to report on the experiences of, and the challenges faced by, the students of the University of Dar es Salaam (UDSM) while the University implemented blended learning programs. Using documentary reviews and responses from 22 students who reacted to a questionnaire, they generated the pertinent data. Hence they revealed that outdated learning resources, unavailability of instructors, under-utilization of learning centres, and technical difficulties were among the challenges related to blended learning in UDSM.

Mwalongo (2011) examined the perceptions of teachers about the use of ICT in teaching, administration, professional development and for personal applications. They collected their data from 74 teachers who had enrolled for a pedagogical course at a university in Tanzania, purposively selected. Mwalongo used “an online survey [*Survey Monkey*] and postings generated from the researcher’s blog” (p. 36). From the analysis of the qualitative data, Mwalongo found that, “while the frequency of use of ICT was influenced by access, the competence of ICT use was influenced by training; teachers used ICT in a wide range of teaching, administration, professional development and personal use” (p. 36).

Ndibalema (2014) studied the attitude of teachers in secondary schools in Tanzania “towards the use of ICT as a pedagogical tool” (p. 1). He collected data from 80 teachers who reacted to a questionnaire, in addition to interviewing a few of the teachers. He hence found that although the teachers had positive attitudes towards the use of ICT as a pedagogical tool, they had not effectively integrated it in their teaching.

Sife et al. (2007) discussed “the application of ICTs in teaching and learning by reviewing the e-learning context” (p. 57), and then focused “on the pedagogical, cost and technical implications of different ICTs that... [could] be used for e-learning purposes” (p. 57). They discussed “challenges for integrating these technologies in higher institutions in developing countries..., giving best practice approaches for addressing each of the challenges” (p. 57).

However, apart from only two of the studies reviewed (Kafyulilo et al., 2015; Kihiza et al., 2016b), other studies were short on theorization and hence frameworks on which their findings were based. Yet Ellis and Levy (2008) opine that the findings of any study without a firm

theoretical/ conceptual foundation/ framework, are more of random luck than scholarly work and hence make little or no contribution to the pertinent body of knowledge (BoK). They contend that for a given study to make a contribution to the BoK, there must be

a solid conceptual foundation for the research... Although many discoveries are... serendipitous, research is intentional, built upon a theoretical basis.... Research- worthiness entails that there is a real, identifiable conceptual connection between the research problem driving the study and the research being conducted to address the problem.... Without that conceptual connection, one would be left with the impression that any new insights resulting from the study were more the result of random luck than scholarly work (Ellis & Levy, 2008, p. 24).

Almost similar sentences can be found in Lester (2005) and Shulman (1986). In order to narrow the above theoretical/ conceptual gap, the study proposed in this paper will examine whether the theory of planned behaviour (TPB) can serve as a framework to explain the integration of ICT in teaching and teaching (IITL) among the educators in public teacher training colleges in Tanzania.

Studies on the TPB Model

Several researchers have recently used the Theory of Planned Behaviour (TPB) to explain the integration of ICT in teaching and learning (IITL). For example, Apeanti (2014) explored the perceptions of prospective Mathematics teachers on integrating ICT into instruction; and how this perception related to the teachers' willingness to integrate the ICT. He used TPB with another theory to investigate the perceptions of the usefulness of ICT in instruction. In particular, in his questionnaire, he measured the perceptions of the usefulness of ICT using the concept of social norm (SN) in TPB; and the readiness to use ICT using behavioural intention (BI) in TPB. He hence collected data from 126 third year undergraduates in the Department of Mathematics Education in the University of Education, Winneba (UEW) in Ghana. Using percentages as a means of analysis, Apeanti found that overall, the participants had "a positive perception about the effectiveness of ICT integration in Mathematics instruction" (p. 180). He similarly found that, "few... participants perceived that they... [were] highly prepared for ICT integration, while [the] majority... of them indicated that they were moderately prepared for ICT integration" (p. 181). Using Pearson's linear correlation (PLC) and linear regression, he found that, "prospective teachers with positive perception about the effectiveness of

ICT integration will [or would?] be more willing to use ICT in their future instruction than those with negative perception" (p. 182). In other words, Apeanti supported our fourth hypothesis (H4) as per Figure 2. However, Apeanti's study left a huge gap to the effect that of the eight hypotheses in our study (see Figure 2), he only tested the fourth (H4).

Chen (2013) explored the extent to which TPB and two other theories could explain the usage behaviour (UB) of web 2.0 ICTs. With respect to TPB Chen hypothesized that, behavioural intentions (BI) had a positive influence on usage behaviour (UB). Further Chen hypothesized that each of attitude toward behaviour (ATB), subjective norm (SN) and perceived behavioural control (PBC) could bring stronger behavioural intentions (BI). Hence using data collected from a sample of 638 respondents who reacted to a questionnaire "posted on the MY3Q website and various forms" (p. 2979) over a three-month period, Chen used structural equation modelling (SEM) to show that, "for the part of TPB..., attitudes, subjective norms and perceived behaviour control of users, actually affect[ed] behavioural intentions. In other words, Chen supported our third, fourth and fifth hypotheses (H3-H5). Also in their study, behavioural intentions affect[ed]... usage behaviours" (p. 2981), meaning that Chen supported our first hypothesis (H1). One gap that Chen's study left however, was that while he tested some of the hypotheses in our study (see Figure 2), namely H1, H3-H5, he ignored others (H2, H6-H8).

Zamani-Miandashti, Memarbashi and Khalighzadeh (2013) used the TPB "to predict the internet utilization behaviour [IUB] among... university students in Iran" (p. 114). Basing on TPB, they hypothesised, among others, that the intention to use the Internet (IUI) had a positive influence on IUB (our H1); that perceived behavioural control (PBC) had a positive influence on IUB (our H2); and that each of attitude toward the Internet (ATI), social norm (SN) and PBC had a positive influence on IUI (our H3, H4 & H5 respectively). They hence developed a survey questionnaire with among other variables, the following constructs of TPB, all measured using the five-point Likert scale: IUI (13 items, $\alpha = 0.88$); IUI (five items, $\alpha = 0.79$); ATI (eight items, $\alpha = 0.61$); SN (five items, $\alpha = 0.66$); and PBC (six items, $\alpha = 0.70$). They reported that, all "the items of the questionnaire were developed through... literature review, previous studies..., and interviews with two professors who were experts and had great interest in... internet use" (p. 118). They hence collected data from a sample of 214 undergraduate students in the Faculty of Agriculture at a university in Iran, and analysed them using regression for testing their hypotheses. Hence, while they supported our H1, H4 and H5, they did not do the same to our H2 and H3. However,

Zamani-Miandashti et al. left a gap to the effect that of the eight hypotheses of relevance in our proposed study (see Figure 2), they ignored the last three (H6-H8).

Meta-analytic Reviews on the TPB Model

Scholars have conducted meta-analytic reviews on the TPB model. For example, Riebl et al. (2015) determined how the TPB had been applied to explain dietary behaviours and to evaluate which constructs were associated with dietary behavioural intentions (BI) and actual behaviours (AB) in youth. Using electronic databases and contacts with experts in the field, they identified 34 articles for the meta-analysis. They only included studies that had participants aged 2-18 years with all TPB constructs discernible and measured, published in English peer reviewed journals and focused on nutrition related behaviours in youth. Using what they termed "a two-stage meta-analysis" (p. 160), Riebl et al. found out that attitude toward behaviour (ATB) had had strong relationship with dietary behavioural intention (BI) while the most common predictor of actual behaviour (AB) performance had been BI. Their study also pointed to a gap to the effect that of the 34 studies they reviewed 13 had been done on the UK, 11 on the US, three on Africa, two each on Australia, New Zealand, Iran and Canada and one on Hong Kong. Such a gap makes it necessary for the proposed study to use the TPB model in studying educational technology and measure the actual behaviour (for this case the IITL) in the context of public TTCs in Tanzania.

Hypotheses

The proposed study therefore comes in to narrow the contextual, conceptual and theoretical gaps by using the Theory of Planned Behaviour (TPB) to explain the integration of ICT in teaching and learning (IITL) among teacher educators in public TTCs in Tanzania. As Figure 2 suggests the other constructs in the theoretical framework are the intention to integrate ICT (II), the attitude toward the integration (ATI), the subjective norm on the integration (SNI) and the perceived behavioural control on the integration (PBCI). Others are the respective underlying beliefs, namely, the behavioural beliefs and outcome evaluation on the integration (bboei), the normative beliefs and motivation to comply on the integration (nbmci) and the control beliefs and perceived facilitation on the integration (cbpfi). Hence the following hypotheses have been generated to guide the study:

- H1: II positively predicts IITL
- H2: PBCI positively predicts IITL
- H3: ATI positively predicts II
- H4: SNI positively predicts II
- H5: PBCI positively predicts II
- H6: bboe positively predicts ATI
- H7: nmmci positively predicts SNI
- H8: cbpfi positively predicts PBCI

Methodology

Paradigm and Design

The proposed study will adapt the positivist paradigm in that ontologically it will take reality as objective and independent of the researcher and epistemologically the researcher will remain distant and independent of what is being researched in the process of acquiring knowledge (Bakkabulindi, 2015). In particular, the study will be a survey based on correlational and cross-sectional design. The study will be a survey in that it will involve a large number of respondents to enable generalisation of findings. Bakkabulindi (2015) observes that “positivist researchers deal with relatively large samples... [as] these... are more likely to be representative of their parent populations” (p. 27). The correlational design will help in establishing the relationships between the respective constructs in the theoretical framework (Figure 2). The cross-sectional design will facilitate the collection of data at once in a short period of time thus minimizing costs.

Data Collection Instrument

Data will be collected from a large sample of teacher educators in public TTCs in Tanzania. The instrument for data collection will be a self-administered questionnaire (SAQ) developed basing on the existing instruments already used by other researchers (Table 1). According to Bakkabulindi (2015) positivist research being ontologically objective, assumes the existence of only one reality and hence relies on one category of respondents and one method of data collection usually the survey method involving one instrument, which is often the self-administered questionnaire (SAQ). The adaptation of these earlier instruments is based on the fact that their reliabilities and validities can be taken for granted. As Bakkabulindi (2015) argued “while the

[positivist] researcher can design the instruments from scratch, it is usually advisable to look for and adapt ready-made instruments whose psychometric properties (validity and reliability) can be cited” (p. 31).

As Table 1 depicts, the main variable, the integration of ICT in teaching and learning (IITL) will be measured by the integration of substitution (S), augmentation (A), modification (M), and redefinition(R) ICTs as per the SAMR model of integrating ICT in teaching and learning (Lubega et al., 2014 citing Puentedura, 2010). Each of these constructs has a number of items adapted from an earlier instrument. The explanatory constructs as per Table 1 are the intention to integrate ICT (II), the attitude toward integration (ATI), the subjective norm toward the integration (SNI) and the perceived behaviour control toward the integration (PBCI). As per Table 1, there are also the behavioural beliefs and outcome evaluation on the integration (bboei), the normative beliefs and motivation to comply on the integration (nbmci) and the control beliefs and perceived facilitation on the integration (cbpfi). Each of them has a number of items adapted from earlier instruments.

Table 1: Variables in the Instrument

Variable	Constru ct	Number of items adapted	Source of instrument, number of items and their reliability (α value)
Integration of ICT in teaching and learning (main variable)	S	10	Lubega et al. (2014), 13 items*
	A	09	Lubega et al. (2014), 16 items*
	M	03	Lubega et al. (2014), 10 items*
	R	05	Lubega et al. (2014), 06 items*
Explanatory variables	II	02	Taylor & Todd (1995), 03 items ($\alpha = 0.91$)
		01	Not applicable
	ATI	04	Taylor & Todd (1995), 04 items ($\alpha = 0.85$)
	SNI	02	Teo & Lee (2010), 02 items ($\alpha = 0.91$)
	PBCI	03	Fusilier & Durlabhji (2005), 03 items ($\alpha = 0.80$)
	Bboei	05	Apeanti (2014), 15 items*
		01	Not applicable
	Nbmci	04	Taylor & Todd (1995), 08 items ($\alpha = 0.92$)
		02	Not applicable
	Cbpfi	04	Taylor & Todd (1995), 18 items ($\alpha = 0.78$)
		01	Thompson, Higgins & Howell (1991), 04 items ($\alpha = 0.86$)
01		Lumpe & Chambers (2001), 13 items*	

* No reliability (α value) reported

Data Management

Bakkabulindi (2015) asserts that positivist data management calls for statistical procedures for researchers to make meaning of the data gathered. Therefore, in the proposed study, data management will be statistical starting with data processing and ending with analysis. Data processing will involve coding the data and entering them into the computer using the Statistical Package for Social Sciences (SPSS), summarising them using frequency tables and editing them to remove errors. Whereas the reliabilities of the constructs are already given by previous studies (Table 1), and their validities implied (Tavakol & Dennick, 2011), after the collection of data, the reliabilities of the constructs will be retested using Cronbach Alpha method provided by SPSS. Similarly, the validities of the multi-items constructs will be tested using Confirmatory Factor Analysis (CFA). This retesting will be done since as Tavakol and Dennick observe, differences in samples call for retesting of instruments.

The data analysis will be done at different levels, namely univariate, bivariate and multivariate. The data analysis at univariate level will be based on descriptive statistics such as percentages. At the bivariate level, all the study hypotheses (H1-H8) will be tested using Pearson linear correlation. At the multivariate level, five regression models will be run. One multiple linear regression will be used to test the first two hypotheses (H1 & H2). Another multiple linear regression will be used to test the next three hypotheses (H3 through H5). Lastly a simple linear regression will be used to test each of the remaining three hypotheses (H6 through H8).

Conclusion

Since the integration of ICT in teaching and learning (IITL) brings about powerful learning environments, all avenues to foster IITL have to be explored. One such avenue is to isolate the factors underpinning IITL. In this concept paper, it has been proposed that a teacher educator's IITL can be explained using the Theory of Planned Behaviour (TPB). This paper has proposed a way of testing the above thesis. The study will help stakeholders (e.g. the Ministry of Education Science and Technology, MoEST, Tanzania) in formulating relevant ICT policies and ensuring their implementation for effective utilization of the available ICT resources in public TTCs. The study will also contribute to the existing body of knowledge by providing researchers and academicians

with new insights of looking at IITL using social psychology theories such as TPB.

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