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Technology Acceptance Model as a predictor of using information system' to acquire information literacy skills

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Abstract:

The Technology Acceptance Model (TAM) is gaining popularity for understanding the relationship between humans and technology through Perceived Usefulness (PU) and Perceived Ease of Use (PEU). The foremost rationale for adopting the TAM in this study was to present a foundation for ascertaining the impact of external variables on internal beliefs, personal abilities, attitude, mind-set and intention in attaining Information Literacy (IL) skills. The TAM is an information system theory that propagates stages to be followed by information seekers or learners in the acceptance, inculcating and utilisation of new technology to achieve information literacy skills. This study evaluates the TAM's main variables for Information Literacy acquisition such as: Perceived Usefulness (the intention to use, user training, computer experience, system quality) and Perceived Ease of Use (computer self-efficacy, perception of external control, ease of use, internet self-efficacy, efficacy of library use, computer anxiety, information anxiety, perceived enjoyment and objective usability, behaviour and intention). We intend to contextualise the TAM by analysing and explaining how the variables are applied in relationship to IL among school teachers. The outcome provides a deeper understanding and development of TAM as an appropriate model for Information Communication and Technology for Development (ICT4D)/social informatics/community informatics studies and for explaining the relationship between Information Literacy skills and technology acceptance. The study adopted qualitative content analysis method by selecting journals and conference papers relating to the subject matter of Technology Acceptance, which were evaluated, analyzed and reviewed in detail with regard to information literacy. The study identified resistance to information systems as a main reason for the failure of adoption of new technology in attaining information literacy. It was suggested that appropriate instruction and training on the use of technology and application to real life situation can lead to better information literacy.

Keywords: Technology Acceptance Model, technology resistance, community informatics, Information Literacy.

1. Overview of Information Literacy (IL)

The concept of information literacy skills have been widely discussed by professional bodies such as the Society of College, National and University Libraries (SCONUL, 2011), Association of College and Research Libraries (ACRL, 2011), American Association of School Librarians (1998), and the United Nations Educational Scientific and Cultural Organisation (UNESCO, 2008). The International Federation of Library Associations and Institutions (IFLA) (2006:17) described information literacy as the ability to identify when information is needed, ability to carry out a specific task or for problem solving purposes, cost-efficiently search for information, organise or reorganise sources of information, interpret, analyze and retrieve necessary information, appraise the accuracy and reliability of the information, and observe the ethical use of information sources. IFLA (2006:7) distinguishes the Information Literacy concept from other aspects of literacy like computer literacy, network literacy, digital literacy, information technology literacy and media literacy although these types of literacy are quite related. UNESCO (2004) considered Information Literacy as all activities concerned with teaching and learning regarding the whole variety of information sources and formats. UNESCO (2004) notes that to be information literate, an individual must be equipped with the why, when, and how to apply all IL tools and develop the ability to think decisively about the information they provide.

According to the Scottish Information Literacy Project (2013), Information Literacy is the panacea for promoting problem solving abilities, especially those problems that comes with the use of modern facilities channel towards accessing information. The document further shows that IL helps to equip scholars with critical thinking skills, ability to seek answers to critical questions, ability to find information from various sources, form intelligent opinions, and evaluate sources of information for informed judgement necessary for decision making.

Information Literacy is important for a number of reasons especially to educators. According to SILP (2013), it helps in promoting problem solving ability, helps critical thinking, boosts the ability to ask questions and seek logical answers, find information, shape opinion, and evaluate sources of information.

For an individual, being information literate is imperative in order to be a functional member of the society. Therefore, a government is expected to integrate the knowledge of Information Literacy into academic programmes so as to make people become more productive and equipped as functional global citizens of the 21st century (Rodney-Wellington, 2014:75).

Lincoln (2011: 4) observed that Information Literacy is essential because of the plethora of readily accessible information and that people are expected to acquire appropriate skills befitting the twenty first century to locate, evaluate, analyze and put to effective use information from various sources. The knowledge of Information Literacy is a must for everyone because it will determine the level of success at every professional level and is a key component of education. Davis, Lundstrom and Martin (2011:17) cautioned that there may be misconceptions among the modern generation who are information savvy that because they've grown up in an environment driven by technology that they are information literate, but ability to you modern information gadget does not mean being information literate.

The knowledge of Information Literacy is important because access to information is driven by technology which must be learnt for an individual to be a competent information user (Encyclopaedia Britannica 2010; Mordini 2007:544). Juutinen, Huovinen and Yalaho (2011) emphasise that embracing technology can help in improvement of people's lives. Information Literacy is an essential skill that is utilitarian in nature because of the beneficial effect it has on a large number of those who embrace the knowledge. According to Sasikala and Dhanraju (2011: 1), it can lead to independent, self-determining and student-centric learning, rather than an over reliance on educators to offer solutions to all problems. This, they argue, will give students greater ability to control their learning process, which will influence the growth of their imagination, logic and resourcefulness instead of teachers simply regurgitating facts.

Information Literacy is very important because it leads to an enlightened community. Shane (2011) admitted that the hallmark of Information Literacy is the capacity to decisively evaluate and ethically apply information in find solutions to problems and inspire individuals with the spirit of inquiry. He is of the view that even though in this information age there is a rapid increase in information in the library, internet, television, radio, etc., the availability of information does not necessarily mean that it is quality information. Unfortunately, knowing a particular IT knowledge today does not mean it will be useful for the future because of the constant changes in the application (Girard and Allison, 2008: 111). Therefore, the

knowledge of Information Literacy will equip scholars with the ability to adapt to a changing information environment.

2. Information Literacy theories

To come to a better understanding of the circumstances surrounding the evolution of the TAM, a concise narrative of theories and models preceding its manifestation is essential; most especially now that the use of technology has permeated every aspect of human life, which makes it imperative to understand why technology is rejected or accepted (Nikola and Granic, 2015: 85). For instance, Theory of Reasoned Action (TRA) was developed to predict and comprehend human behaviour and attitudes. This theory critically evaluated behavioural intentions rather than the attitudes as predictors of behaviours, the theory also implies that actual behaviour could be determined by previous intentions alongside beliefs that a person has for the given behaviour (Fishbein and Ajzen, 2010: xvii). The Theory of Planned Behaviour (TPB) was formulated to take care of the limitations of the Theory of Reasoned Action (TRA) and set out to predict the intention of people to engage in behaviour within a particular place and time and to describe all behaviours over which an individual has the capacity to apply self-control (Ajzen 2006). Fred Davis modified the above theories and originated the TAM which aims to predict the acceptance and rejection of modern technology.

There have been many time- tested Information Literacy theories and many researchers have spoken about the importance of research theories to have a significant impact on learners. Wikgren (2005), and Andrew and Lyn (2013) argued that there is a need to design a new model in the field of Library and Information Studies that should include not only information seekers but also the communicator or information provider.

Research on Information Literacy is increasing and many IL theories and models have been produced. Limberg, Sundin and Talja (2012: 93) categorised IL theories into three theoretical perspectives: phenomenography, socio-cultural theory and Foucauldian discourse analysis. Larsson and Holmstrom (2007:55) considered the phenomenography theoretical perspective as a qualitative research methodology, grounded in the interpretive research paradigm that sets out to investigate the qualitative and diverse ways in which people experience something or perceive certain events. Andretta (2008) observed the phenomenographic point of view to develop six theoretical outlines of Information Literacy consisting of: the content frame, the competency frame, the personal relevance frame, the learning to learn frame, the relational

frame and the social impact frame. In relation to Andretta (2008), Diehm, Rae-Anne and Lupton, and Mandy (2012: 5) identified six categories recounting how to learn Information Literacy which are: finding information, developing a process, building personal knowledge, advancing disciplinary knowledge, contributing to the community and creating a product.

Scot and Palincsar (2013) pinpoint that the socio-cultural viewpoint is a theory popular in the field of sociology and is used to describe the understanding of circumstances surrounding individual behavioural patterns relating to environmental, institutional, historical and cultural factors. Wang, et al. (2011:2) also described socio-cultural theory as a communal constructivist paradigm which considers human knowledge as a product of social interaction within the community through collaboration. This theory, according to Wang, et al. (2011:7), is based on three key principles: knowledge is a social construct and authoritative dialogic model that can help in acquiring Information Literacy; tools and equipment play a significant role in social relation; internalisation is an influential model, especially when data is created and evaluated using this research approach.

Foucauldian theory is based on discourse analysis, which is a form of interview analysis, focusing on relationships in society as expressed through language and behaviour, as well as the relationship between language and power (Lisa, 2008:249). Kendall and Wickham (1999) identified five stages relevant to Foucauldian discourse analysis: and they are; acknowledging dialogue as a statement organized in a logical way; understanding how the statement is constructed; unpacking what statement can be presented in a written and unwritten format; understanding how the new statement can be created; and building practices, material and discursive, simultaneously.

3. Resistance to technology

In spite of all the benefits of using new technology, a large number of researchers attest to the fact that people have developed a resistance towards the use of modern technology in accessing information. Kim and Kankanhalli (2009: 567) identified resistance to information systems as a major reason for the failure of adoption of new technology. In the opinion of Siegel (2008:2), resistance and little incentive to utilize new technology pose a major difficulty that persists among many professionals all over the world. The Technology Acceptance Model was invented to expand additional behaviour constructs to increase the understanding of new technology. Siegel (2008:9) also holds that resistance to technology illustrates a reluctance to embrace an initiative, perception, idea and action or opposing

untoward circumstances. Therefore, it is important for any organisation to understand the reason for resistance by individuals in order to comprehend resistant behaviour and find a way out. A possible solution is to offer appropriate instruction and training on the use of technology and application to real life situation geared towards overcoming the cause of resistance.

Berna-Martinez and Macia-Perez (2012: 148) observed that diverse cultural, technological, business and hierarchical levels can aid the adoption and rejection of new technology, however conclude that training can assist people in overcoming resistance to technology.

According to Rivard and Lapointe (2012: 897), technology resistance has also been viewed as an essential issue in IT implementation which, if not well managed, can lead to organisational problems. The two researchers suggested methods of response which are positive responses to the resistance: inaction, acknowledgment, rectification, and dissuasion.

In the opinion of Selvaganapathi and Raja (2012:22), fear of new technology is referred to as 'technophobic', which is a feeling of anxiety connected with the introduction to new technology. Those who are overwhelmed by a feeling of distress or cognitive anxiety find it difficult to embrace the use of modern technology, which is common in the twenty-first century because of the popularity of technology applied to every aspect of human life. Selvaganapathi and Raja (2012:22) suggest that this feeling of insufficiency is reflected in nervousness and the constant feeling of dissatisfaction and apprehension.

4. Effective Use of Technology

Effective use of technology requires proper integration to make it more productive and foster educational development which also entails proper utilization of information resources and the technology that promote its usage (Erişti, Kurt and Dindar, 2012: 30). According to Dennis, Wixom and Roth (2012:6) Systems Development Life Cycle (SDLC) is the procedure of deciding how an information system (IS) can sustain information needs, designing the system. Curry; McGregor and Tracy (2007: 905) also asserted that System Development Life Cycle (SDLC) as a procedure any organisation should go through to optimise the use of modern technology. This concept recommended phases to be followed in optimising the use of technology, which are feasibility study, systems analysis, systems design, system implementation, integration and testing, Maintenance and system auditing (Kay, 2002).

Feasibility study

To have a technology that will be readily accepted by the people, Hut (2008) suggested that feasibility study of what is expected is important, which is the act of setting objectives, clearly stating the requirement of the intended technology, determine the practical procedure and financial implication of the proposed transformation.

System Analysis and Design

The rationale behind systems creation is for problem solving purposes. Therefore Dennis, Wixom and Roth (2012) systems analysis is a method of gathering accurate data, understand the processes involved in recognizing problems and making practicable suggestions for functional system, it also involves examining information processes, understanding information flow, simplifying complex information processes and prevailing over system limitations for organisational objectives. System design is a systematic approach of characterising the fundamentals of a system which includes planning of different component, and various interfaces to satisfy specific information need. This is the phase that determines how system will function in terms of software, hardware, database and network infrastructure requirements (Dennis, Wixom and Roth, 2012:14).

System Implementation

System implementation is a stage of execution of an application, plan, initiative, design, model, standard, typically this phase gets the most attention, because it is the longest and generally costly development process Dennis, Wixom and Roth, 2012:15). Implementation of Information Systems helps to improve the efficiency and competence of any organisation. Inability to predict possible areas of challenges can affect the implementation process (Dennis, Wixom and Roth, 2012:446).

System Auditing

System audit is the process of re-examination, analysis and evaluation of existing information infrastructure (be it computerized or manual) in order to determine the integrity, remedy obstruction, repetition, and leakage of the information resources in line with the goals and objectives of a particular organisation (Hingarh and Ahmed, 2013: 3 and 4).

5. Objective

This content analysis examines the indication that the Technology Acceptance Model predict using information system' to acquire information literacy skills.

6. Purpose of the study

In the profession of Library and Information Studies, numerous researchers (e.g. Sever and Güven, 2014; Meier, Ben and Schuppan, 2013; Hicks, 2011; and Khalil, 2013) have revealed that contemporary information resources are grossly underutilized in many academic organisations, leading to colossal financial loss and professionals performing below the necessary productivity quotient. In view of this, many technology acceptance theories and models have been developed or used to study and evaluate the nature, use and adoption of Information Technology as it relates to information utilization and deployment. The main purpose of this study is to explore how the TAM can support Information Literacy research in a school environment.

The TAM has been used by researchers worldwide to understand the acceptance of different types of information systems. The gap in the research of the Technology Acceptance Model (TAM) is discussed. Regardless of the wide application of the model in many areas (Wann-Yih and Ching-Ching, 2015; Chung-Kuang, 2014; Teo, 2013; Sebetci and Aksu, 2014) focusing on on-line shopping behaviour, business intelligence system, teachers' intention to use technology respectively. In this study, the focus is on the use of the Technology Acceptance Model and how accessibility to modern technology can predicted by effective Information Literacy skill.

7. Methodology

In this study journals and conference papers relating to the subject matter of Technology Acceptance was evaluated, analyzed and reviewed in detail with regard to information literacy. This is done through qualitative content analysis by reviewing literature. McKinney (2008:1) attempts to define a literature review as an act that summarizes, recapitulates, reiterates, interprets, and decisively evaluates an existing body of knowledge (or published or unpublished material) in order to establish similarities within knowledge of a subject matter. The purpose of doing so is not only to state the opinion of experts on different views, but according to Anderson and Beveridge (2007:1-2), it is also germane to engage in content

analysis by drawing out strengths, weaknesses and gaps in the body of knowledge, and proffer appropriate solutions to bridge the gap.

8. Significance

The intension of this research is to intensify understanding on resistance to new technology in workplace and among professionals. The author intends to shed light on how established variables of TAM can form a foundation for ascertaining the impact of external variables on internal beliefs, personal abilities, attitude, mind-set and intention in attaining Information Literacy (IL) skills.

9. Technology Acceptance Model

In the opinion of Marangunic and Granic (2015: 81), the constant improvement and progress in technology, especially ICT related applications, makes the choice to decide on matters of acceptance and rejection a dilemma. Based on this, many models and theories have been developed to shed more light on the effective use of technology and, out of all the models, the Technology Acceptance Model (TAM) stands out in examining issues affecting users' acceptance of modern technology. Without considerable understanding of the foundation, growth, and adjustment, along with the limitations of the model, there can be no broad and systematic research in the field.

The Technology Acceptance Model (TAM) is an expansion of Ajzen and Fishbein's Theory of Reasoned Action (TRA) (Priyanka and Kumar, 2013: 144) which was a theory initiated by Fred Davis in 1986 and since then has gone through several modifications and validation. The aim of the theory is to describe factors that determine technology acceptance, information technology usage behaviour and to provide a parsimonious theoretical explanatory model (Bertrand and Bouchard, 2008:200). Ducey (2013:20) explains that the TAM includes Perceived Ease of Use and Perceived Usefulness which are the important determinants of technology acceptance and user behaviour.

Teo (2013: 81) identified various factors that promote the use and acceptance of technology. He enumerates individual differences, social influences, beliefs, attitudes and situational influences as factors that promote the intention to use technology and promote the ability to accept or reject it. In addition, Teo (2013: 81) posited that an individual's behaviour is influenced by an intention to perform the behaviour, in other words, the real performance of the behaviour is heralded by a person's behavioural intention to engage in the activity.

The Technology Acceptance Model (TAM) is a prominent theory that seeks to investigate the attributes that influence technology adoption. Ducey (2013:3) also described it as a parsimonious theory of technology adoption in an establishment which intends that individual responses toward a technology can trigger intentions or curiosity to use the technology, which in due course can influence actual usage (Aggorowati, Suhartono and Gautama, 2012: 499). Also important to TAM is intention which can also be used to envisage and predict the eagerness and motivation to perform behaviour and a number of skills. Such intention is determined by three factors: the first is personal in nature which reflects human attitude, the second is a subjective norm which shows social influence and the third is called perceived behavioural control (Huda, et al., 2012: 272). Therefore, peoples' intention to adopt a particular skill can be anchored on the three important factors stated above.

Many studies have been conducted to test the authenticity of TAM. For example, Aypay, et al. (2012: 264) tested the theory in predicting the intensity of technology acceptance among pre-service teachers and results indicated that there is a relationship between the model and information acquisition. Jiang, Chen and Lai (2010:243) also found that individual behaviours of technology acceptance are valuable but incomplete without looking at social factors and personal environment which are two of the factors alluded to in the previous paragraph. Thakur (2013:17) discussed the issues affecting consumer intention to adopt the use of mobile payment systems and found out that “performance expectancy, effort expectancy, social influence are facilitating conditions in the e-finance and mobile finance context”. Garg and Garg (2013:48) suggest that in formulating perceptions regarding new technologies, subjective and social norms influence consumers as well as perceptions of the quality of service.

Many theories have been developed that are applicable to Information Literacy research. They include: Diffusion of Innovation by Rogers (1983), Theory of Reasoned Action (TRA) by Ajzen cited by Priyanka and Kumar (2013: 144) and Theory of Planned Behaviour by Ajzen (1991). Despite that, the Technology Acceptance Model, in my view, is most appropriate because it helps to predict users' behaviour by considering the three components suggested by Huda et al. (2012:12) and supported by Shroff, Deneen and Eugenia's (2011: 604) study. The validity of the theory has also been tested and was found to be impressive.

The TAM, which is based on the two central variables of Perceived Ease of Use and Perceived Usefulness, has been adjudged as an essential determinant for classroom

instructional media acceptance and performance and is one of the most widely, applied theoretical models in the Information System (IS) field. The TAM is also one of the most influential and commonly adopted theories for describing an individual's acceptance of information systems (Bagozzi, 2007: 244). With careful observation, the variables that make up TAM are also similar to the personal ability expected of modern professionals in order to attain Information Literacy skill.

Suki and Suki (2011: 1) observed that the two definite beliefs of Perceived Usefulness and Perceived Ease of Use to a large extent have direct links to the attitudes that determine the use of technology. Perceived Usefulness is seen by Pantano and Di Pietro (2012: 2) and Teo (2013:81) as a subjective prospect that specific application systems will increase job performance within a particular organisation, which is also known as "performance expectancy". Wen and Kwon (2010: 255) observed that Perceived Ease of Use is anchored on the belief that it would be effortless and hassle free to acquire a particular skill also known as "effort expectancy". In the opinion of Bagozzi (2007:2), the TAM anticipated that attitudes would have a positive influence on the mind-set that would gear human efforts towards the use of technology.

The TAM has proven to be useful in revealing certain shortcomings in society. In Portera and Donthub's (2009: 999) study, it was discovered that despite the growth of information usage, evidence has shown that there is a significant decline among the elderly, illiterate, lower income earners than the younger, well educated and high income earners. The application of the TAM has helped to confirm that age, education, earnings and race are associated with beliefs of the importance of information and beliefs can influence attitudes towards and use of skills that will enhance access to information.

In the opinion of Davis (1989: 320), who is the creator of the Technology Acceptance Model (TAM), the two important variables, Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), influence the perceptions determining the adoption of technology and are suggestive of user intentions to develop new skills. The extent of the acquisition of new skills can be affected significantly by both extrinsic and intrinsic motivations (Davis 1989: 320). Extrinsic motivation refers to the performance of an activity because it is perceived to be helpful in achieving special outcomes that are different from the activity itself (Davis, 1989:320). In contrast, intrinsic motivation, Davis further explains, refers to the performance of a task for no apparent reinforcement other than the procedure of performing the activity per se. The

rationale why Perceived Usefulness is relevant to the acceptance of Information Literacy skill is that it is adopted first and foremost because it is instrumental in achieving specific objectives that are not inherent in the use of the skill itself. The underlying principle for each variable in the model is examined below.

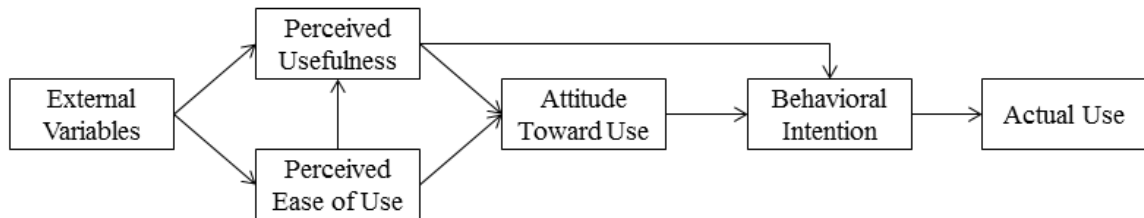


Figure 1. Technology Acceptance Model (Davis, 1986)

The two important constructs of the TAM, Perceived usefulness (PU) and Perceived Ease of Use (PEOU) are illustrated above. The Technology Acceptance Model makes available a succinct method to model the impact of external variables on peoples’ beliefs, attitudes, and intentions. External variables refer to the quality that is outside of an individual, for example, training, computer experience, quality of systems, etc. The external factors fundamentally lead to attitudes towards the use of a particular technology and the ultimate usage of the technology. Below, the TAM variables are explained.

Perceived Usefulness (PU)

Access to information offers the possibility for improved human competence. Lombardi (2007:2) observed that the acquisition of capacity to access authentic information is prevented by users’ reluctance to accept and use available strategies and techniques to access the information. Perceived usefulness, according to Davis (1989: 320), is the extent to which a person believes that utilising a particular method or technique would enhance his or her job performance or routine responsibility. This perception, he explains, is anchored on the consideration that the capacity acquired will strengthen performance.

Furthermore, Davis (1989:320) believes that people are naturally reinforced for better performance by raises, promotions, bonuses, and other rewards. The TAM undoubtedly presents value to many researchers because it has effectively demonstrated how such value

can improve users' job performance. Perceived Usefulness has proven to be a very important factor for technology adoption in most recent studies (e.g. Yeh and Teng 2012:525).

Perceived Ease of Use (PEOU)

Davis (1989: 320) argued that perceived ease of use is the extent to which an individual considers that making use of a specific system would be effortless and hassle free; in other words, ease of use means freedom from complexity and trouble. Thus, an application that is perceived to be easier to use is generally accepted and utilized by more people. Zhu, Linb and Hsu (2012: 968) add that Perceived Ease of Use signifies the degree to which an individual accepts that using certain technology would be effortless and hassle free. The system characteristics can help the ease of use of technology and system usage can equally lead to the acquisition of Information Literacy skill. .

Nanthida (2011: 13) enumerates certain factors that may influence the ease of use of modern resources such as characteristics of information resources, the job experience, technical equipment and support, etc. The following are the factors to consider when evaluating Perceived Ease of Use: computer self-efficacy, perception of external control, internet self-efficacy, computer anxiety, information anxiety, perceived enjoyment and objective, usability and behavioural intention to use.

External variables

Winarto (2011: 16) confirms that there are many external variables that can be used along with the TAM that can be a pointer to methods that must be followed in the use and adoption of new skills. Winarto (2011: 16) identifies more than 70 external variables that have been popularised to explain the procedure people go through in acquiring new skills. Yousafzai, et al. (2007: 252) classifies the variables into four categories, namely: organizational characteristics, system characteristics, user`s personal characteristics, and other variables.

Table 2

Variance of External Variables

Organisational Characteristics	System Characteristic	Users Characteristics	Other Variables
Competitive environment	System design	Age	Cultural affinity

Users Support	System operation	Cognitive ability	External computing support
Internal training	System maintenance	Information anxiety	Facilitating condition
Management support	System development	Computer anxiety	Subjective norms
Policy support	System auditing	Computer literacy	Social pressure
Organisational composition	Access cost	Educational level	Social influence
Peer influence	Interface	Experience	Argument for change
Training and Development	Convenience	Gender	
	User friendliness	Intrinsic motivation	
	Information quality	Personality	
	System quality	Perceived enjoyment	
	Cyber security	Perceived playfulness	
		Self-efficacy	
		Tenure at work	

Source: Winarto (2011: 17).

The four variables are quite applicable to IL skills as IL acquisition and application skills occur within a particular space/environment, largely within organisations, and depend on functional technology or machine interface and human capability and behaviour towards information access and use.

Information anxiety

Another factor that can affect the Perceived Ease of Use is information anxiety as access to an overwhelming amount of information is a major challenge of the modern world which is producing an information overload. Girard and Allison (2008:112), while recognising the global information overload, metaphorically pose the following question: should the information epoch be considered by the sense of drowning in an ocean of information or by new prospects arising from a better supply of information? As a result of the abundance of information, the problem of authenticity arises (Jungwirth, 2002: 94). Thus, information anxiety occurs as a result of information overload which is a condition where the amount of

information input exceeds the processing capacity of personnel and the negative effects of this can lead to poor decision making (Girard and Allison 2008:112). The panacea to this problem is Information Literacy skill.

Computer self-efficacy

Yussoff (2009:77) notes that many studies have been conducted to reveal the relationship between computer self-efficacy and technology acceptance as a psychological quality. Thus, computer self-efficacy is a determinant of acceptance of technology and Perceived Ease of Use. Advances in computer technology and the diffusion of personal computers, productivity software, multimedia, and network resources heralded the development and implementation of new and innovative teaching strategies (Hong, et al., 2006: 1819). Acquiring this knowledge, as explained by the authors, requires computer self-efficacy which is a significant factor relating to achieving information and computing literacy skills which can lead to the ease of use of educational technology. Therefore, computer self-efficacy can be defined as confidence demonstrated by individuals in making the right choice of action necessary to meet specific requirement in situation that will lead to maximum benefit from the use of computer resources (Yussoff 2009).

Kurbanoglu, Akkoyunlu and Umay (2006: 731) hold that accomplishment is not only based on the acquisition of expertise, it also requires the assurance to use these skills well.

Behavioural Intention to use

In the opinion of Walker and Pearson (2012:2), behavioural intention to use and apply new skills is the willingness or extent to which an individual is consciously prepared to execute or not execute a particular action. Intention is a dependent variable that predicts the actual usage of a particular skill that will ultimately lead to attitude formation. One of the opinions that are constant among various models is that learners' behavioural intention to use a technology or embrace a skill that leads to the actual usage of the skill and expertise (Ajzen and Fishbein, 2005) is important. Thus, learners' participation, interaction with others and attitudinal change create a fertile ground for behavioural intention to use a new technology.

Computer experience

Computer experience a motivating factor that could lead to perceived ease of use, therefore, computer literacy refers to the comfort level attained in using computer programs and other

applications that are associated with computers. Therefore, a helpful component of computer literacy involves the knowledge of how computers work and function (Liao and Pope, 2008) and it can also determine the Perceived Usefulness of a technology.

System quality

The quality of information system can be a possible moderator of perceived usefulness, for this reason the quality of systems and technology adopted must be capable of providing sufficient output quality that influences the users' perception of its quality (Nanthida 2011: 13). Certain factors determine quality technology support, namely: access to one-on-one personal supervision and aid; frequent participation in technology-oriented profession; support among peers; professional development content; focus on instruction and integration; and access to resources (Dexter, Anderson, and Ronkvist 2002: 265). Thus, the author argued that the quality of systems is capable of fostering the perception about the usefulness of the technology.

Perception of external control

In the view of Nanthida (2011:13), external control is a function of available knowledge, ease of use of relevant resources, dexterity in the use of new skills and modern technology, and an proficiency that is required in carrying out a particular task. Therefore, if learners have access to definite resources and have an increased knowledge base, the level of control in carrying out certain tasks will increase significantly.

Internet Self-efficacy

According to Torkzadeha and Thomas (2002), it is a fundamental concept that facilitates the understanding of technology acceptance, performance, and use. This quality may also be considered as a way to gauge the level of success in technology planning. It has been observed that self concept has positive implications for learning and development, especially in program appraisal, change in behavioural patterns, relationships between others, management of human resources, innovation and even fear (Torkzadeha, and Thomas :2002).

Computer anxiety

Fear, apprehension and anxiety toward the use of computers tend to increase negative attitudes in learners and deter interest in personal development. In the opinion of Dupin-Bryant (2002), the complication in computer-human interactions can trigger a multiplicity of

emotional reactions, including anxiety. Anxiety or nervousness regularly takes place when new knowledge is being acquired. Furthermore, Dupin-Bryant (2002) holds that the inability to adapt to change and resistance to transformation can lead to a negative effect on cognitive performance. This fear may be as a result of the unpredictability of computers, public display of ignorance, and threat of failure which may impair learners' attitude and be unfavourable to learning.

Perceived enjoyment and objective usability

Perceived enjoyment and objective usability refers to how functional and utilizable a system is and the effect it has on Perceived Ease of Use. Objective usability and perceived enjoyment influence a user's perception of a system's ease of use (Nanthida, 2011: 24).

10. Criticism of Technology Acceptance Model

TAM is a theory that has been extensively used in Information System (IS) research and regardless of the wide acceptability; the model has a number of limitations (Chuttur 2009: 17). Chuttur stated that scholars are doubtful about the application and theoretical precision of the model; therefore, it is persuasive to conclude that research on the Technology Acceptance Model (TAM) may have attained a saturation stage. This means future research may focus on developing new models that would take advantage of the strengths of Technology Acceptance Model (TAM) whilst discarding its weaknesses as noted recently by the increasing popularity of Unified Theory of Acceptance and Use of Information Technology (UTAUT) (see Venkatesh, et al. 2003).

Khan and Woosley (2011:713) identified certain noticeable limitations of the TAM and conclude that most of the studies validating it involved students in academic atmospheres not business environments, the types of applications studied were predominantly introduction of office software or development applications rather than business applications, and the problem of self-reporting. The TAM measures the variance in self-reported use, which is not necessarily precise. Factors measured in the adaption of Information Technology are also influenced by organization dynamics that are not included in the TAM and also studies only 40% of IT usage. Khan and Woosley (2011:713) recommended that there is need to expand the TAM to embrace social and human factors.

The TAM is also inadequate in explaining technology adoption by ignoring the societal influence that dictates technology adoption. It is not enough to examine the adoption of technology from an individual perspective because environment, exposure, society and economic status in the vicinity where technology is exposed to individual can collectively affect the adoption and use (Bagozzi, 2007: 212).

The TAM has been generally criticised and the limitations observed by many researchers has initiated the development of an extended model to make up its area of deficiencies. Priyanka and Kumar (2013: 147) observed the “theory include questionable heuristic value, limited explanatory and predictive power, triviality, and lack of any practical value”. Other researchers like Benbasat and Barki, 2007: 215) criticized the TAM for not being able to accommodate and adapt to the frequently changing IT settings and this has led to theoretical chaos and confusion.

11. Implication and application of TAM in LIS research

Despite the increased use of alternative sources and technologies to access and use information, libraries and indeed the LIS profession are poised to play a crucial role in academic institutions to support teaching, research and learning. Information Literacy is fundamental for enabling learning and research achievement to occur. Holden and Karsh (2010:157) and Zak (2014: 23) recognise the importance of IT for the LIS profession as it places the profession in a position of knowledge navigators and change agents that will meet the specialised needs of clients. Holden and Karsh (2010:157) notice that for this reason, it is important for the LIS profession to embrace cutting edge technology tools and techniques. Zak (2014: 23) holds that even cell phones have larger computing resources than a computer and virtual reality has become common in LIS literature. Therefore, in my view, the implication is that it is important to re-engineer and re-invigorate the teaching and learning outline in a manner that will accommodate the use and adoption of new technology. These will also foster the ability of the profession in adapting to the educational change.

Mutula (2013: 89) observed that the field of LIS has transformed extensively and this has led to the change in nomenclatures from library studies, library and information science to information science, information management and knowledge management to reflect the contemporary reality. This change in information management has also affected the job descriptions and job specifications of LIS professionals to reflect new realities (Chikonzo, et

al., 2014:107). There is no doubt that the LIS curriculum where IL belongs has to accommodate the rapidly changing information environment and embrace ICT in the LIS content, teaching and learning in order to bring all the actors on board and in preparation for current information access challenges.

Many studies have been conducted to evaluate the effects of modern technology. Singh and Pinki (2009) observed that the current LIS professionals are under threat due to the increasing use of ICT technology. Zak (2014:23) identifies the effects of Augmented Reality (AR) technology in the LIS professional ability to serve users and organise information and observed that the technology will enhance the user experience, which can lead to assessment of user behaviour, response, and observation of technologies. Bilandzic and Johnson (2013) observed the changing role of the library as a place that has to transform from a physical place to a digital environment as well as its implication on the profession. They also recognize that combining social, spatial and digital space can advance the connected knowledge experience among on-site visitors. Nastasie (2012:271) presents a general overview into the research potentials of LIS emphasising the significance of ICT in teaching and practice. However, the author decries “lack of opportunities to apply the acquired knowledge in practice and the need for 'sustainable, attractive and relevant' programs, competitive on the international market”.

The TAM is of particular interest to LIS professionals because it helps to enhance their desire in adoption and use of Information Technology (IT) which is the dominant technology of the contemporary society and has elevated the importance of theories that predict and explain IT acceptance and use.

From the earlier evaluation, it is apparent that the TAM has had extensive relevance in explaining LIS professionals' response to IT use and adoption. The constant use of the TAM is justifiable, especially with numerous relationships specified by the TAM continually validated in the information profession and to a large extent explained dependent variable (such as intention to use or actual use). And also present a relationship between PU and intention to use or actual use of IT facilities that is widely used in the profession, signifying that to encourage the use and acceptance, the IT infrastructure must be perceived as useful and the use must be effortless.

In view of the above observation, it is important that LIS professionals adopt the TAM to get the profession equipped with the use and adoption of new technology. The variables that

influence the attitude and mind-set necessary for the use and acceptance of technology are: behavioural intention to use, perceived enjoyment and objective usability, information anxiety, computer anxiety, internet self-efficacy, perception of external control, computer self-efficacy, system quality, computer experience, users training and intention to use.

12. Conclusion and Recommendation

The changing information environment calls for the appropriate use of modern technology because technology has become a tool that promotes access and use up-to-date information resources to advance productivity and development. This article incorporated variables from four elements – organisational characteristics, system characteristics, users' characteristics and other variables- to explain the procedure necessary for acquiring new skills. In the 21st century, efficient access and utilisation of information resources depends on the ability to effectively use the apparatus of Information Technology. The inability to demonstrate expertise in this area can lead to resistance to technology which has been acknowledged as the main reason leading to impediment in embracing new technology. This can lead to many organisations investing in the new way of doing things and yet it will be under utilised by their workers. Understanding technology acceptance will lead to better prediction of the use of new information resources.

The study shows that confidence in the use of technology can lead to increased personal control, flexibility and competent use of information. Therefore, increased knowledge can lead to better productivity. The study also revealed that the inability to control and accept the use of new technology can be overwhelming which may ultimately lead to anxiety to the extent that it will weaken the quality of decisions.

Supplementary appraisal of this study is suggested to empirically test the validity of the external and internal variables in Information Literacy skill, especially as it pertains to the reasons why professionals show evidence of resistance to the use of technology to access information resources. The researchers believe this will lead to better prediction of the use of information.

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