

## Association among Selected Factors and ICT Usage among the Lecturers of Nigerian Tertiary Institutions

Umar Musa<sup>1</sup>, Habibah Ab. Jalil<sup>2\*</sup>, Abdullah Mat Rashid<sup>3</sup> & Aminuddin Hassan<sup>4</sup>

<sup>1,2,4</sup> Department of Foundations of Education, Faculty of Educational Studies, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor Darul Ehsan, Malaysia

<sup>3</sup> Department of Science and Technical Education, Faculty of Educational Studies, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor Darul Ehsan, Malaysia

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### ABSTRACT

The association between selected social, psychological and knowledge factors, namely performance expectancy, effort expectancy, social influence, knowledge of technological pedagogical content (TPACK), attitude towards ICT and ICT use has been a global topic of discussion. This paper examines the link between the selected social, psychological and knowledge factors and the use of ICT among the lecturers of Nigerian higher education. This research is quantitative in nature and used correlation analysis to determine the association between social influence, effort expectancy performance expectancy, technological pedagogical content knowledge (TPACK), and attitude towards ICT usage among the lecturers of Nigerian institutions. The population of the study consisted of Kano State colleges of education lecturers, Nigeria (N=1775). The study includes all the lecturers of Kano State colleges of education, which is a total of 325 lecturers. The sample size was 232, and it was determined by using the Cochran formula. The researchers used proportionate stratified random sampling technique in the study. The questionnaire used for the collection of data was adapted from Calouste Gulbenkian Foundation CGF (2016) on ICT usage, UTAUT theory by Venkatesh et al.(2003), Albirini(2006), and Technological Pedagogical Content Knowledge (TPACK) by Mishra and Koehler (2006). The statistical tool for the study is correlation analysis. The study indicated that there is a significant positive and low association between ICT usage and performance expectancy ( $r = .118, p < .05$ ). ICT usage and effort expectancy ( $r = .260, p < .05$ ), ICT usage and TPACT ( $r = .207, p < .05$ ), attitudes toward and ICT usage ( $r = .153, p < .05$ ). While there is a significant but low positive relationship between social influence and use of ICT ( $r = .388, p < .05$ ). Therefore, it is necessary to improve those selected factors, such as social influence, so as to ensure the optimal utilization of the ICT in the colleges of education in Nigeria.

**Keywords:** ICT, TPACK, Attitude, Performance, Effort, Social, Facilitating, Institutions, Nigeria

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### INTRODUCTION

Communication technologies have become much more important in every area of our lives and the societies have changed to keep pace with them. While less than 1% of the world's population has an internet connection in 1995, by 2014 the figure has risen to about 40% (ITU, 2014) which is used for different aspect of life. Thus, the ICT use in the provision of the core teaching and research facilities by tertiary institutions has significantly changed the way higher education is carried out (Ololube, 2015). The use of ICT facilities in the tertiary institutions by both non-academics and academics has completely changed the way they carry out the administration of the institutions.

The advent of ICT into the Nigerian educational system has been found to have improved the entire teaching and learning process. According to Emmanuel and Ngozi (2014), ICT has an effect on the development of academic courses, institutional administration, and management as well as the entire academic environments and the positions of the participants in the education process. Many Nigerian academic institutions also experience steady growth with the use of ICT. Currently, institutions especially the Universities, Polytechnics, and Colleges of Education have websites where detailed information can be obtained regarding the institutions. Many of these

\* Corresponding author: [habibahjalil@upm.edu.my](mailto:habibahjalil@upm.edu.my)  
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institutions provide admission forms, offer admissions, register students and conduct assessments and evaluations online. To ease lecturers and administrative activities, most of these institutions are provided with ICT facilities for both staff and students' usage (Ajah & Chigozie-Okwum, 2019). With the uniqueness of each institution depending on the milestone reached in the introduction of ICT services, most universities in Nigeria have ICT centers where both staff and students have contact to internet and computers relations. These improvements in the ICT provision in the Nigerian tertiary institutions sector give rise to obvious changes in the system that somehow allow lecturers, management and learners, and management to increase their knowledge of ICT. In this respect, many capacity building programs are ongoing in various institutions to enhance understanding of ICT users. Many institutions have opened separate units to handle ICT training for employees (Mahmud, Ndomi, & Omodara, 2017). As such, many Nigerian lecturers in college of education consider the use of ICT devices for teaching in e-learning, mobile learning and distance learning compared to the ICT usage as teaching tools in conventional classrooms to promote their teaching work and improve learner efficiency.

In this regard, the recognition of technological utility and its ease of use among lecturers at Colleges of Education has been recognized as one of the key determinants of the use of ICT in educational colleges (Abedalaziz, Jamaluddin & Leng, 2013). Numerous studies have shown a significant relationship between ICT usage and other factors such as Unified Technology Theory of Acceptance and Use (UTAUT) (Venkatesh, Morris, Davis & Davis, 2003), TPACK (Mishra & Koehler, 2006a) and Attitude towards ICT (Kpolovie & Awusaku, 2016). However, despite the fact that many kinds of literature have indicated the association among effort expectancy, performance expectancy, social influence, knowledge of technological pedagogical content (TPACK), attitude towards ICT and ICT usage in the Nigerian context yet, there are minimal studies regarding these social, psychological and knowledge factors in association with ICT usage in Northern Nigeria. Therefore, this study investigates the relationship between these social, psychological and knowledge factors in UTAUT, TPACK and TAM model with usage of ICT among lecturers of tertiary institutions in Kano state Nigeria.

## LITERATURE REVIEW AND THEORETICAL UNDERPINNING

Integration of ICT in education refers to the use of computer-communication technologies in the classroom that incorporates into the daily teaching process. With the aid of computers and web-related tools, ICT covers many programmed teaching/research methods. Teachers are seen as the main players in the instructions given in everyday classrooms training students for the present digital era (Arnseth & Hatlevik, 2010). Although the aim of ICT integration is to enhance and grow the continuity, usability and cost-effectiveness of teaching instruction for students, it also has to do with the advantages of networking learning groups in tackling the current globalization challenges (Albirini, 2006).

In many fields of study, the use of technology became important, especially for education in the 21<sup>st</sup> century (Ghavifekr & Rosdy, 2015). Nigeria's Federal Ministry of Education (2010a) describes ICT as integrating all resources (including obsolete radio, video and television technology into the software, hardware, firmware, etc.) as well as the procedures, processes, methods, concepts, strategies, and principles that come into play in directing information and communication activities. In addition, Jaffer, Ng'ambi, and Czerniewez (2007) mentioned that, science and technology have revolutionized the world and the progress depends solely on the educational norm. The use of ICT can be characterized as the use of a variety of technological tools and resources for information processing, storage, management and communication (Saraf et al., 2016).

According to Johnson, Onwuegbuzie and Turner (2007), the ideal new approach to learner-centered methods resulted from the widespread use and application of ICT tools in education, which is at the heart of education reform. In the recent technological age of the 21<sup>st</sup> century, the development has been made since the introduction of ICT in Nigeria's education system (Abioro, Adewoye, & Oladejo, 2018). Teachers in most African regions and most parts of Australia, Asia, and Europe have embraced and adapted the use of ICT in class (Leung, 2011; Rodríguez-Ariza, Lopez-Perez, Perez-Lopez, & Argente-Linares, 2013). Some countries in Africa highly value ICTs' contributions to national development (Awosejo, Ajala, & Agunbiade, 2014). However, teachers also struggled with obsolete instruments in most African countries, especially Nigeria (Dansarki, Ayub, & Kadir, 2015). Through appropriate lecturer's individualized and collaborative learning and learning assessment, preparation and instructional delivery, the workload of lecturers can be minimized by the use of ICT in teaching and school learning (Olayiwola & Alimi 2015).

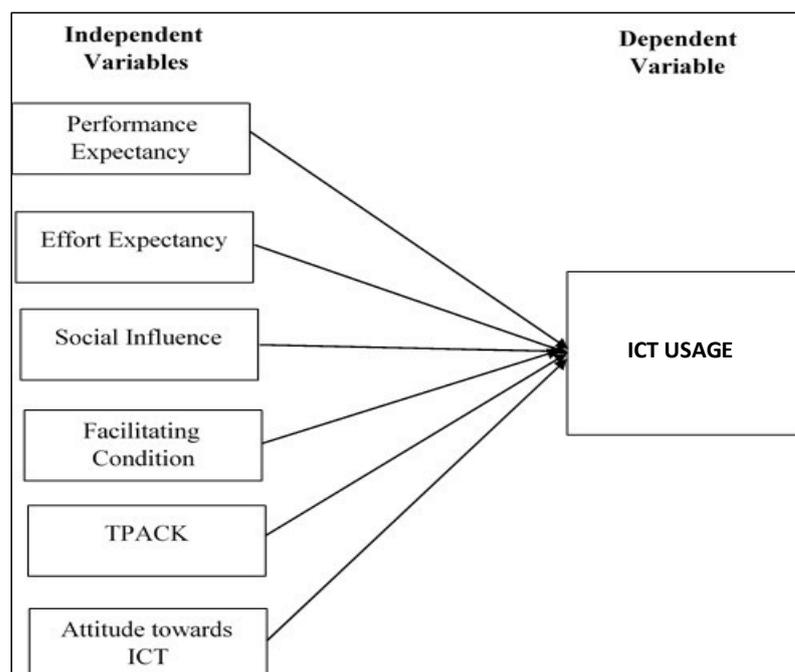
The academics and development partners have paid much attention to the incorporation of ICT use in teaching and learning. In a short time, ICT has proved to be one of the necessary tools of modern fellowship, and in addition to reading, writing, and arithmetic, ICT expertise has been recognized by many nations as well as mastery of essential sciences, technology and as one of the vital foundations of education (Noor-Ul-Amin, 2013). The lecturers were given space to boost teaching and learning in their colleges as a result of development of technology (Mishra & Koehler, 2006b). However, Nigerian colleges of education lecturers are facing

countless challenges and their use is highly worried, as they reached the rank of senior lecturers without basic knowledge of computer operation (Ehikhamenor, 2002).

In a study conducted among undergraduate students in Malaysia, it was revealed that performance expectancy acted as a chief factor that influenced the learners' utilization of newly developed software in learning Computer Graphics and Images processing via laptops, (Williams, Rana, & Dwivedi, 2015). Furthermore, performance expectancy remains strong in both intended and obligatory environments, as established by Venkatesh et al. (2003). Similarly, a recent research on the use of the learning management system showed that lecturers' overall performance goals have a clear positive outlook for using LMS (Mohd, Nuraini, Shahbodin, Hanapi, & Pee, 2014). Additionally, in a related study on the importance of effort expectancy in influencing the utilization of tablet computers by Nwagwu and Abanihe (2006), the results showed that, majority of users believed that it was easy and effortless to use computers. Meanwhile, in a study conducted by Lee, Yoon and Lee (2009), effort expectancy is one of the vital backgrounds of technology usage. Furthermore, in a research undertaken among lecturers at three universities in Taiwan on the impact of the social influence on ICT in the use of the learning management system; the researcher stated a powerful connection between the social influence and the use of LMS (Wang et al., 2009). In line with the above Mbachu (2015) performed a survey at Adamawa State University, Nigeria, among scholarly staff researching the most important variables for the adoption and use of ICT, he discovered that social influence and performance expectancy of commitment had a strong association with ICT use, while expectation of results had a significant and small relationship with ICT use.

In this regard, this study adopts theories and models to provide a framework to support the variables used in this paper. One theory and two models were adopted to underpin the philosophy of this study, namely the Unified Technology Acceptance and Use Theory (UTAUT) by Venkatesh et al. (2003), the technological pedagogical content knowledge (TPACK) Model (Mishra & Koehler, 2006), and the Technology Acceptance Model (TAM) by Davis (1989). The components of UTAUT, such as performance expectancy, effort expectancy, social influence and facilitating conditions were used as independent variables in this study. Moreover, TPACK model is also used as another independent variable in this study while, attitudes towards ICT from TAM model was used as the third independent variable.

In order to answer the objective of this study, six selected social, psychological and knowledge factors act as independent variables in this study were derived from the aforementioned theory and models namely; performance expectancy, effort expectancy, social influence, facilitating conditions, Technological Pedagogical Content Knowledge (TPACK) and attitude towards ICT and the ICT usage stands as dependent variable. Furthermore, in the conceptual framework, all the independent variables have a direct connection with ICT usage. The conceptual framework consists of two variables. Therefore, six factors are proposed to direct relationship with ICT usage. Below is the conceptual framework which shows the diagrammatic presentation of the relationship between independent and dependent variables.



**Conceptual Framework of the Study**

## METHODOLOGY

This study employs the quantitative study design, namely the correlational survey design and the population of the study is 1775. A sample of 232 was selected from the four colleges of education lecturers in Kano State. It is very rare for an investigator to receive the exact number of questionnaires been issued in the process of data collection. In this regard, Salkind (2012) recommends over sampling by 40% - 50% of the determined sample size to avoid sampling errors and non-responses. Therefore, 40% of the sample size was added to the existing sample size. In this case, 40% - 50% of 232 (93) was added to the determined sample size which increased the sample to 325 (93 + 232). A simple random sampling technique was used to select the respondents. The questionnaires are in form of rating assessment, and ICT usage scale was adapted from Calouste Gulbenkian Foundation CGF (2016); the performance expectancy, effort expectancy, social influence and facilitating condition scale was adapted from Venkatesh (2003) while TPACK scale was adapted from Mishra and Koehler (2006) and attitude towards ICT scale was adapted from Albirini (2006). The permission was granted to the researcher to use and adapt the instrument by the developers to suit the study. A five point Likert scale options was used in the questionnaire for the lecturers of the colleges by selecting one options. For ICT usage the options are: 1 = Not at all, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = All the time while for the other variables options the scales are: 1 = Strongly disagree, 2 = Disagree, 3 = Neither Agree or Disagree, 4 = agree and 5 = strongly agree.

Kano State was selected as the study area because it is one of the 36 States in Nigeria with highest population of over 10 million people from different parts of the country from different ethno – religious background. Kano has the highest number of education colleges in Northern Nigeria due it earliest contact with Western Education in Northern Nigeria. With these attributes, it is believed that the study findings from Kano State can be generalized on the other parts of Northern Nigeria. All the necessary information was given to the researcher from the educational colleges by giving him details of the total number of staff at each college, which helps in determining the population of the study. The questionnaire demonstrates a high degree of reliability and validity in assessing the buildings under this analysis (Cronbach's alpha=.86).

## RESULTS AND DISCUSSION

The goal of this study is to examine the relationship between ICT use and selected social, psychological and knowledge factors, namely performance expectancy, effort expectancy, social influence, TPACK and ICT attitudes among Kano State's educational lecturers' colleges. Using SPSS program version 22, data obtained for the filed was analyzed and the Person correlation was the statistics used for data analysis.

TABLE 1  
Relationship between Independent Variables and ICT Usage

Variables	Y	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>
Y (ICT usage)	1						
X <sub>1</sub> (Performance expectancy)	.118*	1					
X <sub>2</sub> (Effort expectancy)	.260**	.335**	1				
X <sub>3</sub> (Social influence)	.388**	.453**	.221**	1			
X <sub>4</sub> (TPACK)	.207**	.455**	.267**	.491**	.507**	1	
X <sub>5</sub> (Attitudes towards ICT)	.153**	.138**	.119*	.214**	.231**	.291**	1

\*\* . Correlation is significant at the 0.01 level (2-tailed)

\*. Correlation is significant at the 0.05 level (2-tailed)

The result from the Pearson correlation analysis was presented in Table 1 which indicated that there is a significant positive and low correlation between performance expectancy ( $r = .118, p < .05$ ), effort expectancy ( $r = .260, p < .01$ ), TPACK ( $r = .207, p < .01$ ), and attitudes toward ICT ( $r = .153, p = 0.01$ ) with and ICT usage. While the result shown a significant positive and medium relationship between social influence and ICT usage ( $r = .388, p < .01$ ).

## DISCUSSION

The study was set out to explore the connection between ICT usage with selected social, psychological and knowledge factors namely performance expectancy, effort expectation, social impact, TPACK, and attitude towards ICT among the lecturers of Kano State colleges of education. The findings have shown a significant positive correlation between ICT usage with the selected factors.

The finding of the recent study shown a significant positive and low correlation between performance expectancy and ICT usage. This clearly indicated that, the lecturers of colleges of education in Kano have

achieved a certain degree of performance in ICT usage. Even though, the finding revealed a small achievement but still the result justified an increase in their performance. This finding is in line with Yeh and Tseng (2017) who found that performance expectancy has significant positive relationship with the use of mobile payments in Taiwan ( $r=0.23$ ,  $p = 0.05$ ). Moreover, Zainol, Yahya, Yahya and Zain (2017) found a significant positive relationship between performance expectancy and acceptance of mobile learning ( $r=.527$ ;  $p< 0.05$ ). This means the more lecturers view the use of mobile learning smart phones as useful for their academic activities. Furthermore, a study by Samaila, Abdulfattah and Amir (2017) had shown that performance expectancy significantly related to students' behavioral intention to use learning management system software ( $r = .69$ ,  $p< .01$ ). This means that study further indicated that performance expectancy was the strongest factor in determining lecturers' intention to use the LMS. This result supported several studies (Abelson, 2008; Ibrahim, 2010; Juhary, 2014; Khechine et al., 2014; Lwoga&Komba, 2015) revealed that performance expectancy was the strongest critical factor affecting students' intention to use technology.

With regards to relationship between effort expectancy and ICT usage, the findings of the study shows that majority of the lecturers exhibited moderate effort expectancy and ICT usage. Which means that the use of ICT by the lecturers of higher institutions of learning is influenced by their acceptability of the usefulness of such technologies and whether they feel it eases their teaching process. Moreover, Onaolapo and Oyewole (2018) findings revealed that there is a strong significant positive relationship between effort expectancy and use of smart phones for mobile learning ( $r = .724^*$   $p< 0.05$ ). This means that the more smart phones are easier to use for mobile learning, the more lecturers will use them for such. The level of effort expectancy associated with the use of smart phones for mobile learning as noted by the respondents was moderate.

In the case of social influence, the association of social influence and ICT usage, the findings of current study shows that there was a significant weak and positive relationship between social influence and ICT usage. This clearly shown that, the lecturers of colleges of education in Kano have achieved a certain degree of social influence in ICT usage. Even though, the finding revealed a small achievement but still the result justified an increase in their socialization. This finding is in line with Birch and Irvine (2009) who found that, social influence had the lowest correlation with behavioral intention on pre-service teachers' acceptance of ICT integration in the classroom in Canada (.26).

Again, with regards to relationship of TPACK and ICT usage, the findings of current study indicates that a significant number of lecturers in the Colleges of education in Kano had shown great interest that technological pedagogical content knowledge (TPACK) significantly affected ICT usage. Which means that the use of TPACK by the lecturers of colleges of education in Kano State permit them to face tasks that need them to integrate ICT into classroom teaching. The findings is in line with Tondeur, Scherer, Siddiq and Baran (2016) study which the results suggest a significant inter-relationships between TK and TPACK on the investigation of TPACK within the pre-service teachers ICT( $r = .77$ ,  $p < .001$ ).

With regards to relationship between ICT usage and attitude towards ICT the finding of the present study revealed a significant positive and low correlation between attitude towards ICT and ICT usage. This finding is supported by Tezci (2011) which showed a significant correlation between attitudes towards ICT and ICT usage.

## CONCLUSION AND RECOMMENDATIONS

This study served as evidence that lecturers of the colleges of education are familiar with the connection between ICT usage and its associated selected factors, namely social, psychological and knowledge factors, as explained in the study. With this discovery, it can provide the basis for developing the learning and training strategies that can contribute to the acquisition of ICT usage skills, thereby enhancing lecturer achievements by probable solutions to the contemporary challenges faced by the use of ICT by lecturers (Ghavifekr & Rosdy, 2015).

This research is relatively unique in that it is the only known study to date that has conducted a literature review with a perspective on investigating the relationship between ICT use and performance expectancy, effort expectancy, social influence, facilitation conditions, TPACK, and attitude towards ICT. The Unified Theory of Acceptance and Use of Technology (UTAUT) served as a basic theory and provided a constructive framework for the researchers to understand the factors influencing ICT usage. This study used the Technology Acceptance Model (TAM) and TPACK to conceptualize the attitude of the lecturers towards ICT as a construct while TPACK was formulated by adding one variable each from TAM and TPACK.

Not many studies worldwide have specifically looked at the relationship between performance expectancy, effort expectancy, social influence, facilitating conditions, TPACK, and attitude toward ICT on ICT usage. The study contributed to the literature on the use of ICT in education especially within the context of developing

nations like Nigeria. The results show that expectation of success, expectation of commitment, encouraging condition (TPACK), and attitude of teachers towards ICT use is significantly positive and low in relation to ICT usage, while social impact is significantly positive and medium in relation to ICT usage

It can be concluded based on the positive low and medium correlation between the use of ICT and associated factors among the Kano State educational lecturers' colleges, more effort should be put to enhance the use of ICT among lectures of tertiary institutions in Nigeria. Since the outcome showed that there is a significant positive and low correlation between performance expectancy, effort expectancy, TPACK and attitudes toward ICT and ICT usage. It is therefore recommended that the government implement it so that these factors will contribute significantly to the use of ICT.

To motivate the lecturers of Colleges of Education in Kano State, Nigeria, and to improve their performance via the adoption of ICT usage in teaching and learning tasks, the management of the respective institutions should encourage lecturers by sponsoring and organizing ICT training for them regularly. They should also share and execute ideas that would help the lecturers develop different skills for using ICT in their daily tasks. The management should also provide self-development opportunities for the lecturers by sponsoring training programs and by providing other forms of capacity building opportunities for career development such as workshops.

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