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ICT Skills, E-Learning Engagement and Interest as Correlates of Postgraduate Students' Academic Achievement

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Abstract
E-learning has become an increasingly popular learning approach in higher education due to the rapid growth of internet technologies. E-learning is a shift from traditional mode of learning or training to a more personalized, flexible, self-organized, collaborative ICT-based community of learners. Hence, its use otherwise referred to as e-learning engagement is described as the measure of behaviour students' display or effort applied while participating in a technology mediated learning. Today, the disruption of learning caused by Covid-19, incessant strikes, insecurity leading to closure of schools etc. has more than ever necessitated its adoption in research learning areas like grant writing, synopsis writing, instrumentation, research design and publication. Perhaps, effective utilization of e-learning is seen to be influenced by a number of factors hence the perceived poor performance of postgraduate students in research. Thus, the major purpose of this study was to determine the ICT skills, e-learning engagement and learners' interest as correlates of students' performance in Research Method in universities in Enugu State. Findings of the study confirm that for better academic performance to be achieved, students' active engagement of in e-learning is crucial. By using linear regression analysis, the study verified that significant relationship exists between the level of e-learning engagement and students' academic achievement in research method. It was therefore recommended, among others, that the ministry of education should adequately fund higher institutions in Nigeria towards incorporating e-learning resources and platforms such as cloud learning, blended learning models, mobile learning, MOOCS, among others required to create continuous learning that meets learners' interests and aspirations in this knowledge driven economy.

Keywords – E-learning, ICT skills, Learner Engagement, Learners' Interest, Research Method, Academic Achievement

Introduction
Research method is an essential course offered by all the university students. The essence is to help students understand the techniques of conducting research and be able to do so (Obaseki & Agu, 2019). Beyond passing the course, it equips the students with the skills and knowledge required to carry out project writing and seminar presentation which is a prerequisite for graduation. These research writing skills and knowledge such as theoretical procedures, experimental studies, numerical schemes, statistical approaches data analysis using computer related software are essential academic skills required for students' success in the field of learning. In view of the technicalities associated with these research skills, a number of postgraduate students perceive research method to be difficult and technical given the rigorous nature involved in conducting research as well as the high demand of ICT skills and competencies associated with research writing. Evidently, literature attests to the poor performance of postgraduate students in research method (Obaseki, et. al., 2019). This apparent poor performance in research method could be attributed to a

numbers of factors such as the level of ICT skills possessed by the students, individual differences, motivation, learners' interest, anxiety (Bolin, GlenMaye, HagLee & Yoon, 2012), teaching method and learning styles (Olelewe & Agomuo, 2016), e-learning engagement (Ahmad, Karim, Din, & Albakri, 2013), and self-efficacy level (Omeh & Olelewe, 2021).

Recent studies opined that computer/ICT skills enable one to use the computer, computer networks, wired and wireless networks, telecommunication networks and microelectronics for gathering, processing, storing, retrieving and disseminating information such as design web, presentations design, databases, graphical designs, spreadsheets, web browsers electronic mail, application for chat and so on (e.g. Obichukwu, et. al., 2021; Chen, Ramadan & Hudson, 2018). Specific ICT skills mostly needed by the students for better academic achievements can be grouped into four areas namely Computer Basics, Microsoft word, spreadsheet e.g. MS Excel, SPSS, etc. and the use of Internet (Ahmad, Karim, Din & Albakri, 2013; Khalkhali, Moradi & Amuei, 2008). In the context of this study, ICT skill is the capability (knowledge, skills, and aptitude) of students to identify, search effectively and present specific information in order to build knowledge and develop critical and creative thinking pertinent to a field of study. Today, ICT skills are having a revolutionary impact on educational methodology at both conventional and distance university level of education globally (Hamilton-Ekeke & Mbachu, 2015). Therefore, the possession of ICT skills by postgraduate students is a precursor to meaningful e-learning engagement that can transcends to career readiness upon graduation.

E-learning is defined as the delivery of education in a flexible and easy way through the use of internet to support individual learning or organizational performance goals (Clarkand, 2011, Maqableh, Masa'deh, & Mohammed, 2015). According to Arasteh, Pirahesh, Zakeri, & Arasteh, (2014), Draghici, Popescu, Fistis, & Borca, (2014), and Mustea, Muresan, & Herman (2013); e-learning is the method which allows people especially students to take courses from home or anywhere as he/she can access the internet, among other platforms such as peer-to-peer, client-server, and web services. It is the use of Information and Communication Technology (ICT) to deliver information for education where instructors and learners are separated by distance, time, or both in order to enhance the learners' learning experience and performance (Keller, Hrastinski, & Carlsson 2007; Tarhini, Elyas, Akour, & Al-Salti, 2016). E-learning is any technologically mediated learning which involves the use of computers to assist learning either from a distance or in a face-to-face classroom setting. It is a shift from traditional mode of teaching and learning to a more flexible, personalized, and collaborative ICT-based mode of teaching and learning (Jethro, Grace & Thomas, 2012). The application of e-learning resources in the classroom helps to reduce the teachers' burden of repetition while offering students the opportunity of having first-hand learning experience of the concept taught. It can therefore be argued, that e-learning strongly facilitates the acquisition and expansion of access to education, and in the process improve the quality of the classroom teaching-learning process via access to electronic active teaching and learning, research, training and overall learning outcomes. Therefore, in order to improve postgraduate students' academic achievement, universities teachers should consider adopting e-learning teaching strategies that encourages learner's engagement in the learning process.

In this context, e-learning engagement is strictly related to the active participation of students in different kinds of e-learning activities such as the use of Learning Management Systems, Web-based and Personal Learning Environments, Massive Open Online

Courses, among others. It is the extent to which all learners are motivated and committed to learning through the use of ICT tools and resources such as Word processing, Graphics packages, PowerPoint presentation, spreadsheet packages, web browsers, electronic mail and application for chat, use of internet among others in order to accomplish tasks successfully. According to Stott (2014), e-learning engagement is the measure of behaviours students display or effort applied while participating in technology mediated instruction. Giesbers, Rienties, Tempelaar, and Gijselaers (2013) described e-learning engagement as the interaction in which students actively use different types of ICTs tools and resources in their learning process. Creating, sustaining, and/or enhancing student engagement is a critical area of interest for universities administrators, scholars, and practitioners (Lee & Choi, 2011). Perhaps this accounts for the reason why universities continue to explore ways of adopting and utilizing online and computer mediated communication (CMC) learning technologies and innovative teaching modalities. In view of the huge benefits of e-learning engagement, determining how ICT skills, learner engagement and learners' interest influences academic achievement of postgraduate students in research method cannot be overemphasized.

Students' interest can be defined as an emotion or feeling that causes one to focus attention, concern or curiosity on an object or event (Onah, 2016). Interest in learning, could most probably be a very powerful affective psychological trait and a very strong knowledge emotion as well as an overwhelming magnetic positive feeling, a sense of being captivated, enthralled, invigorated and energized to cognitively process information much faster and more accurately. Interest is a precursor to effective application of psychomotor traits like self-regulatory skills, self-discipline, working harder and smarter with optimum persistence (Dev,

2016). It is a feeling of wanting to know more about something or to be involved in something. Interest is a very important learner-factor that affects learner's achievement which has attracted the efforts of researchers in an attempt to find out ways to improve it (Mendez Lopez, 2011).

Interest is seen to substantially influence educational and occupational achievement, interpersonal relations, the level of enjoyment one derives from leisure activities, and other major phases of daily living. Values are clearly related to life choices and are often discussed in conjunction with interests and preference. A consideration of interest might be of practical significance. The interest must be there for students to devote time for their studies. Also, research evidences show that the effect of interest on students' academic achievement can be determined by the mode teaching and learning is presented (Kutigi, Gambari & Gana, 2010). It is therefore pertinent to determine the degree of relationship to which students' interest predicts their academic achievement in research method. Given that factors that influence students' academic achievement at the research method course is multivariate in nature such as attitude to learning, interest in the learning context, study habit, attribution, self-efficacy, intelligence, and motivation (Kpolovi et al, 2014), research have shown that a learner can only be deeply involved in a particular learning environment in which he or she is interested in (Ghasvini, 2011).

Academic achievement of students is phenomenon that has educational, psychological and sociological connotation. Thus, students' academic achievement cannot be completely accounted for by only one or two variables but a number of them. Academic achievement is the outcome of education, the extent to which a student, lecturer or institution has achieved their educational goals. It is commonly measured by examinations or continuous assessment. However, Poja (2017) posits that there is

no general agreement on how it is best tested or which aspects are most important either procedural knowledge such as skills or declarative knowledge. Individual differences in academic achievement have been linked to differences in intelligence and personality (Noble, McCandliss & Farah, 2007). Student with higher mental ability as demonstrated by IQ tests and those who are higher in conscientiousness (linked to engagement and achievement motivation) tend to achieve highly in academic settings. A recent meta-analysis suggested that mental curiosity (as measured by typical intellectual engagement) has an important influence on academic achievement of the postgraduate students in addition to intelligence and consciousness (Noble et. al., 2007). According to Jerome (2013), applying Maslow's hierarchy of need theory when the need for love and belongingness are met, individual can then focus on higher level needs of intellectual achievement.

Student academic achievement can be interpreted inform of grades obtained from tests or examination on courses taken like Research Method. Adeyemi (2012) defined academic achievement as the scholastic standing of a student at a given moment, which states individual abilities. People with high academic achievement will act in ways that will help them to outperform others, meet or surpass some standard of excellence or do something unique (Acquah, 2017). The zeal for achievement varies among the postgraduate students depending on the group they belong. Some belong to the working class while others are non-working, and this has a long way in determining their success except an avenue is made to engage them or to increase their level of participation and keep them committed to learning and have a sense of belonging. This can only happen if the teacher has created a safe learning environment that encourages students to meet challenges and apply high rigor skills to real-world, unpredictable situations inside and outside of school. This study

aims to examine ICT skills, e-learning engagement and interest as correlates of postgraduate students' academic achievement in Research Method in public universities in Enugu State. With adequate adoption of ICT skills, e-learning engagement and learner's interest could lead to improved academic achievement among postgraduate students. Therefore, this present study seeks to determine the degree of relationship between ICT skills, e-learning engagement, interest and academic achievement of postgraduate students in Research Method in public universities in Enugu State.

Statement of the Problem

Research method is one of the major courses offered by postgraduate students hence a basic requirement for graduation. The essence is geared towards providing the students with a wide range of knowledge, skills and competencies required for research writing in such areas as grant writing, synopsis writing, literature review, instrumentation, data collection and analysis, designs and publication of research, among others. Unfortunately, most postgraduate students get finds it difficult to complete their thesis on record time. Years after completion of their course work, they are unable to complete their thesis owing the difficulties associated with research writing such as poor interest, lack of ICT skills, poor of numeracy skills, among others. Perhaps, students' poor performance could be attributed to a number of factors such as poor ICT skills, poor e-learning engagement and interest which influences the students in carrying out research given their poor research writing skills. This invariably leads to their inability to complete postgraduate studies on record time.

This study, therefore sought to investigate postgraduate students' ICT skills, e-learning engagement and interest as correlates of their academic achievement in research method in Enugu State with a view to determine the factors that affect the level of ICT skills, e-

learning engagement and interest of postgraduate students which perhaps account for the high level of difficulties associated with understanding research method as a course and be able to translate the knowledge into research writing.

Null Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

Ho1: There is no significant relationship between the ICT skills possessed by postgraduate students and their academic achievement in Research method

Ho2: There is no significant relationship between the level of e-learning engagement and postgraduate students' academic achievement in Research method

Ho3: There is no significant relationship between interest and postgraduate students' academic achievement in Research method

Ho4: There is no significant relationship between the ICT skills possessed by postgraduate students and their academic achievement in Research method with respect to gender

Ho5: There is no significant relationship between the level of e-learning engagement and postgraduate students' academic achievement in Research method with respect to gender

Ho6: There is no significant relationship between interest and postgraduate students' academic achievement in Research method with respect to gender.

Ho7: There is no significant relationship between ICT skills, e-learning engagement, and interest with academic achievement of postgraduate students in Research Method?

Method

This study adopted a correlational survey research design. Correlation research deals with establishing relationships between two or more ~~vi~~~~abl~~ ~~i~~ s~ ~~p~~opulation or

between the same variables in two populations (Leedy & Ormrod, 2010). This design was considered suitable for this study because it gives room for questionnaire administering to collect opinions, preferences, and perceptions of the postgraduate students' on ICT skills, e-learning engagement and interest as correlates of postgraduate students academic achievement in research method in all public universities in Enugu State, Nigeria namely University of Nigeria, Nsukka and Enugu State University of Science and Technology. The target population of the study is 133 participants made up of 50 postgraduate students of the faculty of Vocational and Technical Education, University of Nigeria and 83 postgraduate students of Faculty of Education, Enugu State University of Science and Technology. There was no sampling since the population is manageable.

The instruments for data collection were structured questionnaire titled "Postgraduate Students' ICT Skills Questionnaire (PSISQ)", "Postgraduate Students' E-learning Engagement Questionnaire (PSEEQ), Postgraduate students' Interest Questionnaire (PSIQ)" and "Postgraduate Students' Achievement Pro-forma (PSAP) in Research Method" developed by the researchers. ICT Skills Questionnaire (PSISQ) contained in Section A was used to gather the demographic information of the respondents containing, name of school, age, gender, type of programme, of the postgraduate students while Section B was used to collect information on the Postgraduate Students' ICT Skills Questionnaire (PSISQ) to show the relationship between level of ICT skills possessed and postgraduate students' academic achievement in Research Method based on gender and made up of 20-items. Section C was designed to collect information on the Postgraduate Students' E-learning Engagement Questionnaire (PSEEQ) to show the relationship between e-learning

engagement and postgraduate students' academic achievement based on gender and contains 20-items. Section D was designed to collect information on the Postgraduate Students' Interest Questionnaire (PSIQ) to show the relationship between students' learning interest and postgraduate students' academic achievement based on gender and contains 10-items while section E was designed to collect information on the Postgraduate Students' Achievement Pro-forma (PSAP) on postgraduate students' scores in Research Method. To guarantee confidentiality, details such as students' names, registration numbers were expunged from the raw score sheets. The items in section B – D were structured on a 4-points rating scale of Strongly Agreed, Agreed, Disagree, and Strongly Disagree with assigned weights of $, 3, 2 and 1 respectively. Therefore, any item with a mean value of 2.50 – 4.00 was regarded as High while any item with a mean value less than 2.50 was regarded as low.

The instrument was subjected to face validity by three experts, one expert in the Department of Computer & Robotics Education and two from the Department of Science Education (Measurement and Evaluation Unit) from the Faculty of Education, University of Nigeria Nsukka. Their comments, corrections and suggestions were used to improve the quality of the instrument. The reliability of the instrument was established using Cronbach Alpha reliability. Cluster A of the ICT skills gave a reliability index of .864, Cluster B of the e-learning engagement gave a reliability index of .907, and Cluster C which is on interest had a reliability of .856 while the overall reliability is .876 which indicated high reliability of the instrument. Data collection was done with the help of four research assistants through personal contacts. The data obtained were analyzed using simple linear and multiple regression statistical analysis to answer the null hypotheses. Analysis of variance (ANOVA) aspect of regression analysis was used to test null hypotheses 1, 2, 3, and 7 while Z-test was used for null hypotheses 4, 5, and 6 at 0.05 level of significance. Statistical package for social science (SPSS) was used for the analysis. All hypotheses were tested at 0.05% level of significance with the decision rule that the null hypothesis was rejected if p-value is less than the alpha level of 0.05; otherwise the null hypothesis was not rejected. However, the responses to the items were interpreted by describing the strength of the correlation using the guide suggested by Evans in Ohanu (2016), for the absolute value of r as follows: Very Weak Relationship (0.00 ± 0.19), Weak Relationship (0.20 ± 0.39), Moderate Relationship (0.40 ± 0.59), Strong Relationship (0.60 ± 0.79) and Very Strong Relationship (0.80 ± 1.00). Based on the above limits, any item that has a correlation of 0.00 – 0.19 was regarded as Very Weak Relationship, 0.20 – 0.39 regarded as Weak Relationship, 0.40 – 0.59 as Moderate Relationship, 0.60 – 0.79 regarded as Strong Relationship, and 0.80 – 1.00 regarded as Very Strong Relationship.

Results

The results of the regression for hypotheses are shown in the table below.

Table 1: Regression Analysis of Variance of the level of E-learning Engagement and Postgraduate Students' Academic Achievement in Research method

Model	Sum of Squares	df	Mean Square	F	Sig	Rem
Regression	1050.853	1	1050.853	5.965	0.016	S
Residual	23079.237	131	176.177			
Total	24130.090	132				

The result in Table 1 shows the F-ratio of 5.965 with associated or exact probability value of 0.016 was obtained. This exact probability value of 0.016 is less than 0.05 level of significance for testing the hypothesis and the result was found to be significant. Thus, the null hypothesis which stated that there is no significant relationship between the level of e-learning engagement and postgraduate students' academic achievement in Research Methods is therefore rejected. Therefore, students' academic achievement that can be predicted by e-learning engagement is significant.

There is no significant relationship between the level of e-learning engagement and postgraduate students' academic achievement in Research method with respect to gender

In order to test the linear relationship between the level of e-learning engagement and postgraduate student's academic achievement in research methods with respect to, a Z-Test statistics was used. Level of e-learning engagement correlates postgraduate students' achievement in research methods. The e-learning engagement was taking as independent variable while postgraduate student's achievement was taking as dependent variable.

Table 2: Z-Test Statistics of relationship between the level of E-learning Engagement and Postgraduate Students' Academic Achievement in Research Method with respect to gender?

Model	Gender	N	R	R^2	z-value	Sig	Rem
1	Male	74	.129	.074	-0.829	0.203	NS
2	Female	59	.271	.017			

The result on Table 2 revealed that the correlation coefficients (r) of .129 and .271 with associated coefficients of determinant (r^2) of .074 and .017 were obtained between male and female postgraduate students and their academic achievement in Research method. Result on Table 2 was also used to test significant relationship between the level of e-learning engagement and postgraduate students' academic achievement in Research method with respect to gender. The result revealed that z-value of -0.829 with associated probability value of 0.203 was obtained. Thus, the null hypothesis of no significant relationship between the level of e-learning engagement and postgraduate students' academic achievement in Research method with respect to gender was not rejected since the P-value of 0.203 is greater than 0.05

level of significant. The researcher therefore, concludes that, there is no significant relationship between the level of e-learning engagement and their academic achievement in Research method with respect to gender.

There is no significant relationship between interest and postgraduate students' academic achievement in Research methods

In order to test the linear relationship between the level of interest and postgraduate student's academic achievement in research methods, a simple linear regression was used. Level of interest correlates postgraduate students' achievement in research method. The interest was taking as independent variable while postgraduate student's achievement was taking as dependent variable.

Table 3: Regression Analysis of Variance of Interest and Postgraduate Students' Academic Achievement in Research Methods.

Model	Sum of Squares	df	Mean Square	F	Sig.	Rem
Regression	⁻⁻7.933	1	387.933	2.140	0.146	NS

Residual	23742.157	131	181.238
Total	24130.090	132	

The result in Table 3 shows that an F-ratio of 2.140 with associated or exact probability value of 0.146 was obtained. This exact probability value of 0.146 is greater than 0.05 level of significance for testing the hypothesis and the result was found to be not significant. The null hypothesis which stated that there is no significant relationship between interest and postgraduate students' academic achievement in Research methods is therefore upheld.

There is no significant relationship between interest and postgraduate students' academic achievement in research method with respect to gender?

In order to test the linear relationship between the level of interest and postgraduate Students' academic achievement in research methods, Z-test statistics was used. Level of interest correlates postgraduate students' achievement in research methods with respect to gender.

Table 4: Z-test statistics of relationship between interest and postgraduate students' academic achievement in Research method with respect to gender

Model	Gender	N	R	R²	z-value	Sig	Rem
1	Male	74	.089	.008	-0.888	0.187	NS
2	Female	59	.243	.059			

Result in Table 4 was also used to test significant relationship between interest and postgraduate students' academic achievement in Research methods with respect to gender. The result revealed that z-value of -0.888 with associated probability value of 0.187 was obtained. Thus, the null hypothesis of no significant relationship between interest and postgraduate students' academic achievement in Research methods with respect to gender was not rejected since the P-value of 0.187 is greater than 0.05 level of significant. The researcher therefore, concludes that, there is no significant relationship between interest and postgraduate students' academic achievement in Research method with respect to gender.

Discussion

With respect the relationship between ICT skills possessed and academic achievement of students, the data presented in Table 1 revealed a low positive relationship between ICT skills possessed by postgraduate students and their academic achievement. Also, the analysis further revealed that the there is a significant relationship between ICT skills possessed by postgraduate students and their academic achievement. This finding is consistent with Oguguo, et. al., (2020) who found that students' possession of relevant ICT skills enhanced their learning. Also, Nwosu, et, al., (2015) revealed significant relationship between the information literacy skills possessed by lecturers and their research output.

As presented in Table 3, the findings of the study revealed a positive low relationship between the level of e-learning engagement and the academic achievement of postgraduate students. Similarly, the analysis in Table 4 revealed that a significant relationship exists between e-learning engagement and academic achievement. The finding of the study is consistent with Onah and Obi (2016) who noted that e-learning increase students' achievement in computer networking. This finding is in line with Adebayo and Balogun (2019) who found that there is a positive and significant relationship between the use of e-learning tools and students' academic performance. The findings of this study revealed a low positive relationship between interest and the academic achievement. Further

analysis of hypothesis in Table 6 shows that there is no significant relationship between interest and students' academic achievement in research method. This finding is in contrary to the findings of Jayanthi and Ching (2014) who revealed that factors such as gender, nationality of student, co-curricular activities and an interest in pursuing higher degrees affected students' academic performance. Meanwhile, Fakolade (2019) found that there was no significant relationship between mean interest ratings and mean achievement scores of biology students with Kinesthetic learning style.

With respect to the relationship between ICT skills and the academic achievement of students and their gender, the data presented in Table 7 shows that the finding of the study revealed a low positive relationship between the ICT skills possessed by male and female postgraduate students and their academic achievement. Also, analysis of hypothesis revealed that there is no significant relationship between the ICT skills possessed by male and female postgraduate students and their academic achievement in research method. This finding supports Oguguo, et. al., (2020) who revealed that undergraduate students possessed the relevant ICT skills that enhances their learning and that the ICT skills of the male students were not different from that of the female.

The data presented in Table 8 revealed that the findings of the study revealed a low positive relationship between male and female postgraduate students' level of e-learning engagement and academic achievement in research method. Furthermore, the analysis of hypothesis revealed that there was no significant relationship between male and female postgraduate students' level of e-learning engagement and academic achievement in research method. The findings are in line with Rajabalee, and Santally (2020) who found a weak but positive significant correlation between satisfaction and engagement. The data

presented in Table 9 revealed a low positive relationship between male and female postgraduate students' interest and academic achievement in research method. The corresponding analysis of hypothesis revealed that there was no significant relationship between male and female postgraduate students' interest and academic achievement in research method. This finding is in contrary to the works of Sauer (2012) who found that students' interest is a contributing factor for successful academic performance. With respect to the relationship between ICT skills, e-learning engagement and interest and the academic achievement of students, the findings of the study revealed a positive inter-relationship between ICT skills, e-learning engagement, and interest with academic achievement of postgraduate students in research method. Also, the corresponding analysis of hypothesis showed that there is a significant relationship between ICT skills, e-learning engagement, and interest with academic achievement of postgraduate students. This is in line with the findings of Nkamnebe, Okeke, Udem, and Nkamnebe (2015) who found that Librarians are poorly skilled in ICTs hence the poor engagement in e-learning activities. In all, the findings of this study show that the postgraduate students' e-learning engagement has significant effect on students' academic achievement in research method. The findings of this study imply that ICT skills have important roles to play in postgraduate students' academic performance in research method. The implication of this finding is that lecturers and researchers should continuously explore emerging ICT skills required to adopt e-learning instructional platforms which are capable of aiding teaching and learning in the post covid-19 era. This implies that all stakeholders in the education sector including lecturers and students should keep abreast of virtual learning world required for the realization of individualized, and self-directed learning required in this 21st Century era.

Conclusion

E-learning has become an increasingly popular learning approach in higher institutions of learning among postgraduate students due to the rapid growth of Internet technologies. The multiple regression analysis yielded correlation matrix, analysis of variance among others which would be used to interpret the data. Findings of the study show that interest has a very low positive relationship with postgraduate students' academic achievement in research method. The combination of the two independents variable (E-learning Engagement, and Interest) has positive relationship with postgraduate students' achievement in research method. Thus, study concludes that the more the e-learning engagement postgraduate students have the more their interest in the learning of research thus leading an improved academic achievement in research method.

Recommendations

In view of the findings of this study, the following recommendations were made:

1. Lecturers should make efforts to gain a better understanding of students' interest which is a prerequisite for learning success as this will enhance effective teaching and learning required for improved learning outcomes.

2. More attention should be paid to the level of ICT skills possessed by students as this is essential for active engagement in research activities. It is believed that high level of ICT skills possessed and full engagement in e-learning would not only fast track their interest for better achievement in research method but also to improve their research productivity.

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