

Mr. Tirus Muya Maina¹
Murang'a University College, Kenya
Dr. James Ogalo²
Kisii University
Dr. Naomi Mwai³
Technical University of Kenya

Original scientific paper
UDK: 37.022
DOI: 10.17810/2015.23

=====

THE PEDAGOGICAL READINESS OF INSTRUCTORS TOWARDS ACHIEVING INTEGRATION OF ICTS IN TVET INSTITUTIONS IN KENYA

Abstract: This paper points to the necessity to conduct research on the pedagogical readiness of instructors towards achieving integration of ICT's in Technical and Vocational Education and Training (TVET) institutions in Kenya. Research on the integration of ICTs in teaching and learning in TVET institution in Kenya have been done to improve the learning process, though very little progress has been recognized toward its effective integration. TVET subsector have revealed that in spite of the many efforts that researchers and educators put over the years in preparing teachers in the educational uses of ICTs, teachers still lack the Pedagogical skills and knowledge needed to be able to teach with ICT technology successfully. The aim of the study was to investigate the Effect of Pedagogical readiness on Effective Integration of ICTs in TVET institution in Kenya with specific reference to Michuki and Thika Technical Training Institute in Murang'a and Kiambu County respectively. The relationship between Effective Integration and Pedagogical readiness is significant, the correlation coefficient, R, is 0.863. Therefore, Effectively Integration is positively correlated with Pedagogical readiness and the relationship is very strong. Teacher's Technical education institutions need to develop strategies and plans to enhance the teaching learning process within teacher education programmes and to assure that all future teachers are well prepared to use the ICTs tools for learning.

Keywords: Pedagogical readiness, Integration of ICTs, TVET, ICTs.

Introduction

Pedagogical readiness as cited by (Bappa-Aliyu, 2012) focuses on the fit between ICTs and current teaching and learning practice. To be pedagogically ready, TVET institution must complete an assessment of the compatibility of ICTs with the current philosophy of learning, an examination of various opportunities for including ICTs in TVET, an assessment of the technological proficiency requirements for teachers and learners, ensuring that ICTs will meet learners' educational needs, and provision that instructors are competent to facilitate ICT-mediated learning. Therefore, according to Baltušite (2014) the pedagogical readiness is

¹tirus.maina@gmail.com

²jamesogalo@yahoo.com

³mwainaomi@yahoo.com

particularly significant within the process of the prospective teacher's professional development especially in the integration of ICTs in TVET.

(UNESCO, 2002) Argued that for TVET education to reap the full benefits of ICTs in learning, it is essential that pre-service and in-service teachers have basic ICT skills and competencies. Teacher Technical education institutions and programmes must provide the leadership for pre-service and in-service teachers and model the new pedagogies and tools for learning. They must also provide leadership in determining how the new ICT technologies can best be used in the context of the culture, needs, and economic conditions within their country. Teacher Technical education institutions also need to develop strategies and plans to enhance the teaching learning process within teacher education programmes and to assure that all future teachers are well prepared to use the new ICT tools for learning. Bausmith & Barry(2011)Argues that ICT competency generally, would benefit from the insights gleaned from the extensive literature on teacher expertise that focuses on how well teachers understand and use the ICTs in Teaching and learning in TVET.

(Angeli & Valanides, 2009) in their research noted that Agenda on the Pedagogical Integration of ICTs in the field of educational technology TVET, have also shown that in spite of the many efforts that researchers and educators put over the years in preparing teachers in the educational uses of technology, teachers still lack the skills and knowledge needed to be able to teach with technology successfully. Although computing skills are important, skills-based courses are not enough for preparing teachers to teach with ICT technology, because they are usually taught in isolation from a subject-specific context.

Engida (2011) observed that the absence of a subject-specific pedagogical focus in many Technical technology preparation programs, Even in those programs where subject applications are discussed, issues of how ICT in TVET interacts with the content and content-specific pedagogy are not sufficiently explored. As a consequence, the programs fail to adequately prepare teachers in the direction of establishing ICT pedagogical connections between the affordances of technology and the teaching of a particular content domain.

Further Engida (2011) insisted that the lack of national policy for TVET teacher training in the pedagogical integration of ICT and the lack of theory and conceptual frameworks to inform and guide research and actions in the area of teaching with ICT technology. The Lack of incentive plans for teachers and Absence of techno-pedagogical resource banks specific to Kenya education systems which include TVET. Instructors don't have time to search for and assess the vast quantity of resources available on the Internet. It may therefore be useful to select and compile the most relevant techno pedagogical resources so that teachers can use them easily to improve their teaching(Angeli & Valanides, 2009).

(Hooker, et al., 2011) argued that in Kenya and globally the use of ICT in TVET institutions is for research and accessing information as well as tutoring in computer science and computer literacy. ICT resources are mostly used for developing lecturers' own knowledge and for teaching students about computers. Facilitation of virtual learning environments or using ICT to develop students' 21st Century skills is not yet common practice. Lecturers are aware of the potential of ICT to enrich teaching practices but they have neither the skill-sets nor the access to ICT facilities to efficiently integrate the new tools and methodologies in curriculum instruction thus this forms the basis of the study.

Okojie, linzock & Okojie-Boulder (2006) in their conclusion expressed that TVET instructors are encouraged to view ICT integration from a wider perspective and be reflective in their teaching as they use ICT to support and facilitate instruction. ICT integration ought to be considered as part of the process of instructional preparation. Instructional technology should be identified at the planning stage just as the students' readiness is assessed, lesson objectives identified, methods of presenting are established, and evaluation strategies are determined.

AIM of the Study

The aim of the study was to investigate the Effect of Pedagogical readiness on Effective Integration of ICTs in TVET institution in Kenya.

The Research Questions

The study was guided by the following specific objectives:

1. Does the institution have qualified teachers in all the ICT subjects?
2. What is the teaching staff level of computer usage?
3. Does the Institutional internal ICT training program for ICT users and professionals?
4. Does the institution have adequate ICT technician?

RESEARCH METHODOLOGY

Research Approaches

Creswell (2003) noted that if the problem is identifying factors that influence an outcome, the utility of an intervention, or understanding the best predictors of outcomes, then a quantitative approach is best. Quantitative research method is essentially about collecting numerical data to explain a particular phenomenon, particular questions seem immediately suited to being answered using quantitative approach.

Survey Research Design

The survey research involves the collection of information from members of a predefined finite population, such as a group of students, teachers or other stakeholders in education, and the analysis of this information to illuminate some important educational issues. The purpose of survey research is to generalize from sample population so that the inferences can be made about some characteristic, attitude or behavior of the population (Creswell, 2003).

The Survey was a cross-sectional in design that are carried out at a just one point in time and popularly used in (Creswell, 2012). According to (Creswell, 2003) they provide with a snapshot of what is happening in that group at that particular time. The researcher opted to use this kind of research in this study considering the desire to acquire vital data from the respondents so as to formulate rational and sound conclusions and recommendations.

Study Area

The study was confined to Michuki Technical Training institute in Murang'a County and Thika Technical Training Institute in Kiambu County. Both Technical Training Institute operates under the Education Act as stipulated in the laws of Kenya. The Institute's operations are also carried out in accordance with the Government policies and procedures as spelt out in official

documents and circulars. The institute are conscious of the Government’s policy of industrialization by the year 2020, and the vision 2030. It is gearing towards playing a significant and leading role in the fulfillment of this policy.

Target Population

The study sample was drawn from a population of 195 consisting of Management staff, which include Board of Management and Principal. Administrative staff include Deputy Principal, Head of Departments, Head of Sections and Administration Assistant, teaching staff and technical staff as shown in Table 1 Below.

Table 1: Target Population Table

Category	Size of stratum(N)		Total
	Michuki TTI	Thika TTI	
Management staff	7	9	16
Administrative staff	9	16	25
Teaching Staff	41	93	134
Technical staff	6	8	14
Total	63	126	195

Source: Registrar office MTTI and TTTI, 2015.

Sample Size and Sampling Techniques

The study adopted the probability sampling which is commonly associated with survey in which individual in the population has an equal probability of being selected with randomization. A representative sample from a population provides ability to generalize to a population (Babbie 1990; Creswell, 2012). Stratified random sampling was used as the most appropriate sampling technique, since the population is not a homogeneous group (Kothari,2009;Creswell, 2012). The population is divided into 4 sub- population Management staff, Administrative staff, Teachingstaff and Technical staff as shown in Table 1 Above.

Sample Size Determination

To get sample size from the target population Taro Yamane simplified formula was adopted, it provided a simplified formula to calculate sample size (Yamane,1967).It’s a random sampling technique formula to estimate sampling size and is used to calculate the sample size (n) given the population size (N) and a margin of error (ε) at 95 percent confidence level (Israel, 2013;

Al-Subaihi, 2003). It is computed as
$$n = \frac{N}{1 + N\epsilon^2}$$

Michuki TTI sample size
$$n = \frac{63}{1 + (63 * 0.05^2)} = 54.43$$
 Approximate 54 respondents

Thika TTI sample size
$$n = \frac{126}{1 + (126 * 0.05^2)} = 95.82$$
 Approximate 96 respondents

The sample size of 150 respondents was represented as follows; 13 Management staff, 20 Administrative staff, 106 Teaching staff and 11 Technical staff as shown in the Distribution of Population sample Table 2 below.

Table 2 : Distribution of population sample

Category	Michuki TTI		Thika TTI		Total i_1, i_2
	size of stratum (N)	sample size $i_1 = n$ (N/P)	size of stratum (N)	sample size i_2 $= n$ (N/P)	
Management staff	7	6	9	7	13
Administrative staff	9	8	16	12	20
Teaching Staff	41	35	93	71	106
Technical staff	6	5	8	6	11
Total	63	54	126	96	150

Source: Registrar office MTTI and TTTI, 2015.

Research Instruments and Data collection Procedure

The main data collection tool was a structured questionnaire. The structured questionnaire was properly formatted with both open ended and closed questions adopting a five-point Likert scale with a view to uniformed information. A questionnaire is a form used in a survey design that participants in a study complete without intervention of the researchers collecting the data and return to the researcher (Wolf,2008;Creswell, 2012;Rubin &Babbie, 2008)Observation method was also used by the researcher in the field as an independent evaluation tool to respond to research objectives. The researcher recruited and trained research assistant who helped in questionnaire administration and collection. The Structured questionnaire was distributed at one time by the researcher and Research assistant to the respondents by taking the questionnaire to their respective departments. The Research assistant then collect completed questionnaires from respective departments or offices of the respondents.

Results and Discussion

This section presents the data of the respondents regarding the pedagogical readiness of instructors towards achieving Effective integration of ICTs in in selected TVET institution in Kiambu and Murang'a County, Kenya

The institution has qualified teachers in all the ICT subjects

The study sought to find out whether the institution has qualified teachers in all the ICT subjects in selected TVET institution in Kiambu and Murang'a County, Kenya

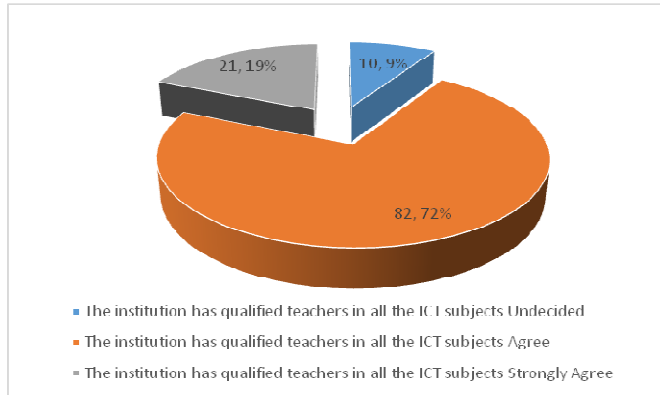


Figure 1: The institution has qualified teachers in all the ICT subjects
Source: Author Data (2015)

From the findings of figure 1 revealed that 91.2% of the respondent felt that the institution has qualified teachers in all the ICT subjects offered in the institutions. This may be attributed by the in-service training programs on ICT in the institution as stipulated in the Institution strategic plan and also recruitment of ICT specific graduates in the institution as teachers and Technician. (UNESCO, 2002)in support noted that for education to reap the full benefits of ICTs in learning, it is essential that pre-service and in-service teachers have basic ICT skills and competencies.

From the findings can also be inferred that Teacher Service Commission and Board of Management of the TVET institutions in Kenya recruit ICT competent Teachers and have carried out valuation of the technological proficiency requirements for teachers, ensuring that ICTs will meet learners’ educational needs, and provision that teachers are competent to facilitate ICT-mediated learning as supported by (Bappa-Aliyu, 2012).

The teaching staff level of computer usage

The study sought to find out the teaching staff level of computer usage in selected TVET institution in Kiambu and Murang’a County, Kenya

Table 3: The teaching staff level of computer usage

		The teaching staff have High level of computer usage					Total
		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	
Institution	Count	6	24	14	53	16	113
	% within Institution	5.3%	21.2%	12.4%	46.9%	14.2%	100.0%

Source: Author Data (2015)

The results from table 3 revealed that teaching staff having High level of computer usage was supported by over 60% of the respondent. This can be inferred that teachers have endeavored to be ICT competent this can be through in-service program catered for by the ICT strategic

plan, teachers own initiative or have acquired competency from their previous Teacher Training education institutions or universities.

The results were in agreement with (Angeli & Valanides, 2009) which have shown that in spite of the many efforts that researchers and educators put over the years in preparing teachers in the educational uses of technology, teachers still lack the skills and knowledge needed to be able to teach with technology successfully. These researchers and their reviews have attributed the failure to adequately prepare teachers to teach with ICT in TVET this can be observed in the findings that 27% of the teachers have low ICT competency.

It was also observed that Majority of teachers acquired basic computer operation and use of computers for word processing, spread sheet, presentation and institutional Management Information System. On use of Internet and online communications, many teachers knew how to use web browsing, email, social networks and instant messaging tools. When it comes to the use of ICT to enhance the quality of teaching and learning process, however, most teachers fell short on this as supported by (Paryono & Quito, 2010).

Institutional internal ICT training program for ICT users and professionals

The study sought to find out the organization has internal ICT training program for ICT users and professionals in selected TVET institution in Kiambu and Murang’a County, Kenya.

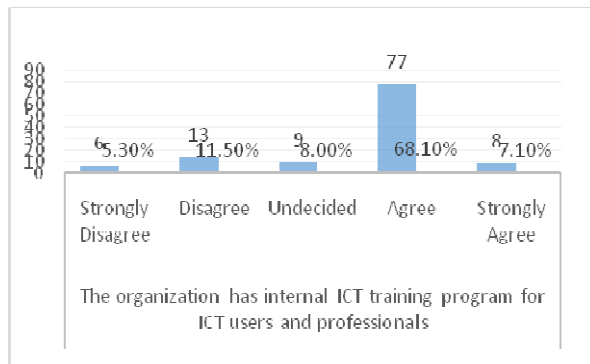


Figure 2: Internal ICT training program for ICT users and professionals
Source: Author Data (2015)

From the findings from figure 2 we can deduce that 75.1% of the respondents indicated that that the institutions has internal ICT training program for ICT users and staff members as it has been anchored in the ICT strategic plan. The findings were in agreement with [4] that The Lack of incentive plans for teachers and Absence of techno-pedagogical resource banks specific to the TVET systems hindrance the integration of ICTs in TVET.

The institution has adequate ICT technician

The study sought to find out the organization has internal ICT training program for ICT users and professionals in selected TVET institution in Kiambu and Murang’a County, Kenya.

Table 4: Adequate ICT technician

		The institution have adequate ICT technician					Total
		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	
Institution	Count	6	30	9	61	7	113
	% within Institution	5.3%	26.5%	8.0%	54.0%	6.2%	100.0%

Source: Author Data (2015)

The findings established the institutions have adequate ICT technicians as indicated by 60.2 % of the respondents. The ICT technician act as support person for all ICTs enquiry in the institutions especially in the laboratories and management systems. The ICT department and ICT Technician maintain the ICT infrastructure and support the users in the institution thus are critical support in integration of ICT in their respective (Hooker, et al., 2011).

The relationship between Pedagogical readiness and Integration of ICTs in TVET institution in Kenya

The study sought to establish the relationship between Pedagogical readiness and Integration of ICTs by using simple regression.

Table 5: Model Summary for Pedagogical Readiness

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.863 ^a	.744	.742	.427

a. Predictors: (Constant), Pedagogical readiness

Source: Author Data (2015)

This table 5 provides the R and R² value. The R value is 0.863, which represents the simple correlation. It indicates a high degree of correlation. The R² value indicates how much of the dependent variable Effective Integration can be explained by the independent variable, Pedagogical readiness. In this case, 74.4% can be explained, which is very large.

Table 6: ANOVA Table for Pedagogical Readiness

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	58.709	1	58.709	322.713	.000 ^b
	Residual	20.194	111	.182		
	Total	78.903	112			

a. Dependent Variable: Effectively Integration

b. Predictors: (Constant), Pedagogical readiness

Source: Author Data (2015)

The ANOVA table 6 above indicates that the regression model predicts the outcome variable significantly well. This indicates the statistical significance of the regression model that was

applied since $p < 0.00$, which is less than 0.05 , and indicates that, overall, the model applied can statistically significantly predict the outcome variable.

Table 7: Coefficients for Pedagogical Readiness

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.190	.204		.929	.355
¹ Pedagogical readiness	.892	.050	.863	17.964	.000

a. Dependent Variable: Effectively Integration
Source: Author Data (2015)

The table 7 above, Coefficients, provides us with information on each predictor variable. This gives us the information we need to predict Effectively Integration from Pedagogical readiness. The constant and Effective Integration contribute significantly to the model thus can present the regression equation as:

$$\text{Effectively Integration} = 0.892 + 0.190(\text{Pedagogical readiness})$$

From ANOVA Table 6 and Coefficients Table 7, since the p-value is 0, the relationship between Effective Integration and Pedagogical readiness is significant. From Table 5 the correlation coefficient, R, is 0.863. Therefore, we can conclude that Effective Integration is positively correlated with Pedagogical readiness and the relationship is very strong.

Summary of findings

In summary the study findings revealed that that the institution have qualified teachers in all the ICT subjects offered in the institutions, that teaching staff have High level of computer usage and that the institutions have adequate ICT technicians. The institutions have internal ICT training program for ICT users and staff members as it has been anchored in the ICT strategic plan. The relationship between Effective Integration and Pedagogical readiness is significant, the correlation coefficient, R, is 0.863. Therefore, the findings revealed that Effective Integration is positively correlated with ICT Policy and the relationship is very strong.

Conclusion

Effective Integration is positively correlated with Pedagogical readiness and the relationship is very strong. On Competency the TSC and Board of Management of TVET institutions in Kenya recruit ICT competent Teachers and though they have not carried out an assessment of the technological proficiency requirements for teachers, and provision that teachers are competent to facilitate ICT Integration in TVET.

Recommendations

Teacher's Technical education institutions need to develop strategies and plans to enhance the teaching learning process within teacher education programmes and to assure that all future teachers are well prepared to use the ICTs tools for learning. The TVET institution

should enhance ICT Competency to staff through Internal and external programs on formal ICT competency such as Seminar, workshops and conference and anchored it in ICT policy.

References

- Al-Subaihi, A. A. (2003). Sample size determination: Influencing factors and calculation strategies for survey research. *Saudi Medical Journal*, 24(4), 323-330. Retrieved May 20, 2015, from <http://www.smj.org.sa/index.php/smj/article/viewFile/4379/2153>
- Angeli, C., & Valanides, N. (2009). *Epistemological and methodological issues for the conceptualization, development, and assessment of ICT-TPCK: Advances in technological pedagogical content knowledge (TPCK)*. Retrieved 02 15, 2013, from Computers & Education: www.elsevier.com/locate/compedu
- Babbie, E. (1990). *Survey Research Methods* (2nd ed.). Belmont, CA: Wadsworth.
- Babbie, E. (1990). *Survey Research Methods*. Belmont, CA: Wadsworth.
- Baltušīte, R. (2014). The structural model of the pedagogy students' readiness for professional activities in the educational environment. *Rural environment. Education. Personality. (REEP) : proceedings of the 7th International scientific conference* (pp. 29-41). Jelgava: Latvia University of Agriculture. Institute of Education and Home Economics. Retrieved June 23, 2015, from <http://lufb.ltu.lv/conference/REEP/2014/Latvia-Univ-Agricult-REEP-2014proceedings-29-41.pdf>
- Bappa-Aliyu, M. (2012, June). Challenges and Barriers to Successful Integration of Information and Communication Technologies (ICTs) in Nigeria. *Journal of Technical, Vocational & Engineering Education*, 6, 124-130.
- Bausmith, J. M., & Barry, C. (2011, May). Revisiting Professional Learning Communities to Increase College Readiness: The Importance of Pedagogical Content Knowledge. *JSTOR*, 40(4), 175-178 . Retrieved June 20, 2015, from <http://www.jstor.org/stable/41238932>
- Creswell, J. W. (2003). *Research Design Qualitative, Quantitative and Mixed Methods Approaches* (2nd ed.). London: Sage.
- Creswell, J. W. (2012). *Educational research : planning, conducting, and evaluating quantitative and qualitative research* (4th ed.). Boston, MA: Pearson Education, Inc.
- Engida, T. (2011). *ICT-enhanced Teacher Development Model*. UNESCO, IICBA. Addis Ababa, Ethiopia: UNESCO-IICBA.
- Hooker, M., Mwiyeria, E., Waweru, S., Ocharo, M., Bassi, R., Palmer, L., & Clarke, D. (2011). *TIVET ICT BASELINE SURVEY*. TIVET Institutions in Kenya, Ministry of Higher Education Science and Technology in Partnership with GESCI, Nairobi.
- Israel, G. D. (2013). *Determining Sample Size*. Retrieved January 15, 2015, from University of Florida IFAS Extension Service: <http://edis.ifas.ufl.edu/pd006>
- Kothari, C. R. (2009). *Research Methodology: Methods and Techniques*. New Age International Pvt Ltd Publishers.
- Okojie, M. C., Olinzock, A. A., & Okojie-Boulder, T. C. (2006). The Pedagogy of Technology Integration. *The Journal of Technology Studies*, 32(2). Retrieved August 3, 2015, from <http://scholar.lib.vt.edu/ejournals/JOTS/v32/v32n2/okojie.html>
- Paryono, & Quito, B. G. (2010). Meta-analysis of ICT Integration in vocational and technical education in South East Asia. *Proceedings of the international conference on VTET research and networking 23- 24 June, 2010*.
- Rubin, A., & Babbie, E. R. (2008). *Research Methods for Social Work* (6th ed.). Belmont, CA: Thomson Brooks/Cole.
- UNESCO. (2002). *Information and Communication Technologies in Teacher Education*. A Planning Guide, UNESCO.
- Wolf, J. (2008). Self-administered questionnaire. In L. P, *Encyclopedia of survey research methods* (pp. 804-805). Thousand Oaks.
- Yamane, T. (1967). *Statistics: An Introductory Analysis*. New York: Harper and Row.006.

Biographical note

Tirus Muya Maina holds a BSc Information Technology from Jomo Kenyatta university of Agriculture and Technology and is currently pursuing MSC Information Systems at Kisii University. Has acquired Eleven (11) years' experience as an ICT specialist and Trainer including 1 year as a volunteer computer trainer in various reputable organizations in Kenya. Currently, working at Murang'a University College as Senior ICT Technologist II in the ICT Directorate in charge of End user support and maintenance. His research revolves around using Information Communication Technologies (ICT's) to improve the teaching and learning process for both students and lecturers, ICT to support administrative purpose and to support research and development in higher learning institution specifically TVET's. The Author interest include but not limited to TVET's, ICT policy, management information Systems and has published in several peer reviewed journals and conferences.

Dr. Naomi Mwai is a lecturer in the Department of Information and Knowledge Management at the Technical University of Kenya, where she has been since 1991. She also serves as an adjunct lecturer in various universities in Kenya. Dr. Mwai received a B.A (Sociology) from Bombay University India in 1988, and a B.Lib Sc 1989, from the SNTD University, India. She later received M.Lib Sc, from Kenyatta University in 2007 and a Post graduate Diploma in technical education from Kenya Technical Teachers College. In 2014 she attained a Doctor of Philosophy in Library and information Science, Moi University, Kenya. As a loving mother of three and a loving wife she has managed to balance her life and become an adept researcher and scholar. Her focus is in the field of Knowledge management, library science and information technology and how they impact in the academic field and in the profession. As an accomplished scholar she has published an array of academic works in the area of Information Science such as Application of RDT and TCT in outsourcing ICT services Mwai, Kiplangat & Gichoya, (2014), Attainment of User Centered Quality Services Mwai, (2016). Dr Mwai is an academic authority, by right in her field.