

The Impact Of Information And Communication Technology In Educational Assessment In Tanzania: Case Of National Examinations Council Of Tanzania

Maduhu Mshangi

Abstract: This study explored the impact of information and communication technology (ICT) in educational assessment: Case of National Examinations Council of Tanzania (NECTA). Four hypotheses were formulated for this study with questionnaire(s), interview(s) and observation(s) as the main instruments for data collection. The data obtained were analyzed using Regression analysis. The finding from this study revealed that the impact of ICT in educational assessment is explained by the impact of accessibility of ICT infrastructure, affordability of ICT infrastructure, reliability of ICT infrastructure and efficiency of ICT infrastructure.

Index Terms: Impact, Impact of Information Communication Technology (ICT), Educational Assessment, impact of accessibility of ICT infrastructure, impact of reliability of ICT infrastructure, impact of affordability of ICT infrastructure, impact of efficiency of ICT infrastructure.

1. INTRODUCTION

Information and communications technology or information and communication technology, usually abbreviated as ICT, is often used as an extended synonym for information technology (IT), but is usually a more general term that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), computers, middleware as well as necessary software, storage and audio-visual systems, which enable users to create, access, store, transmit, and manipulate information. In other words, ICT consists of IT as well as telecommunication, broadcast media, all types of audio and video processing and transmission and network based control and monitoring functions (WEKIPEDIA, 2013) [21]. The National Examinations Council of Tanzania (NECTA) is the government institution which was established by the Parliamentary Act No. 21 of 1973. NECTA is responsible for the administration of all National Examinations in Tanzania. In August 2005, the Government of the United Republic of Tanzania in collaboration with the Swedish Government through the Swedish International Development Cooperation Agency (Sida) initiated a project for introducing ICT in all government teachers' colleges (MoEVT, 2007) [7].

MoEVT has changed the curriculum for basic education (primary schools, secondary schools, teachers colleges) in order to create environment for introducing ICT as teaching subject at teachers college, secondary school and primary school level (MoEVT, 2008, 2009 & 2011) [8],[9],[10]. NECTA in collaboration with the Ministry of Education and Vocational Training (MoEVT) has initiated various ICT Projects leading to the use of ICT in education sector. One of the interesting projects initiated by NECTA is the use of ICT in secondary school, teachers colleges, primary school for registrations of candidates for different examinations. NECTA is offering number of services electronically such as marking of Primary school examinations by using OMR (Optical Mark Recognition) technologies, online registration; collection of continuous assessments electronically, dissemination of examination results through NECTA website, SMS –service for results notifications.

2. EDUCATIONAL ASSESSMENT AND IMPACT OF ICT

Assessment is the systematic collection, review, and use of information about educational programs undertaken for the purpose of improving student learning and development. Assessment is an ongoing process aimed at understanding and improving student learning (Palomba & Banta, 1999) [17]. Past research (Kaffash, Kargiban1, & Kargiban, 2010) [6] has shown that integrating information communication technologies (ICT) into teaching-learning process lead to improving education assessment. The use of ICT in education sector can bring changes to the way education assessments have been done. The change have impact on assessment tasks, with new learning environments moving away from summative methods of assessment to formative approaches and open-ended products; such as reports and research papers created by groups of students (Hennessy, Harrison, Edexcel, & Wamakote, 2010) [4]. This implies that integrating ICT in education sector facilitates student centered approach learning. In order to enhance the impact of ICT in education assessment, the government of Tanzania changed the curriculum for basic education. This aimed at introducing ICT as teaching subject at

- *Maduhu Mshangi is currently a PhD student in Information Systems at the Faculty of Science, Technology and Environmental Studies in the Open University of Tanzania,*
- *E-mail: mshangimaduhu@yahoo.com*

teachers college, secondary and primary school level. The assessment for ICT subject for “Diploma in Secondary Education Examination (DSEE)” started in May 2009. While assessment for ICT subject, TEHAMA (“Teknolojia ya Habari na Mawasiliano”: Swahili translation of ICT) subject for “Grade A Teacher Certificate Examination (GATCE)” started in May 2011 as shown in table 1 (MoEVT, 2008, 2009 & 2011) [8],[9],[10].

TABLE 1
PERFORMANCE IN ICT/TEHAMA SUBJECTS FOR
GATCE/DSEE

	SAT		PASSED		CANDIDATES		PASSED	
	DSEE	GATCE	DSEE	GATCE	ICT			TEHAMA
					DSEE	GATCE		
2013	8,186	18,213	5,175	17,980	7,380	1,411	17,883	
2012	4,871	14,106	3,085	13,270	4,189	833	13,837	
2011	7,211	10,852	5,442	10,582	6,882	963	10,788	
2010	7,954	12,983	5,199	12,383	7,336	-	-	
2009	5,544	9,038	3,801	8,460	4,748	-	-	
2008	3,730	8,421	3,282	7,164	-	-	-	

(Source: NECTA, 2009, 2010, 2012, 2013)

The use of ICT in education has improved educational assessment; this help students to develop their skills. An emerging body of evidence suggests that e-Learning can deliver substantial positive effects: students are more engaged and able to develop skills; teachers have a more positive attitude toward their work and are able to provide more personalized learning (Intel Educational Transformation, 2012) [5]. Past research (Eng, 2005) [1] has shown positive effect on school achievement for higher usage levels of ICT (based on pupil estimates of ICT activity) were found both at the level of the individual pupil and at the level of the school, although these were not large.

3. OBJECTIVE OF THE STUDY

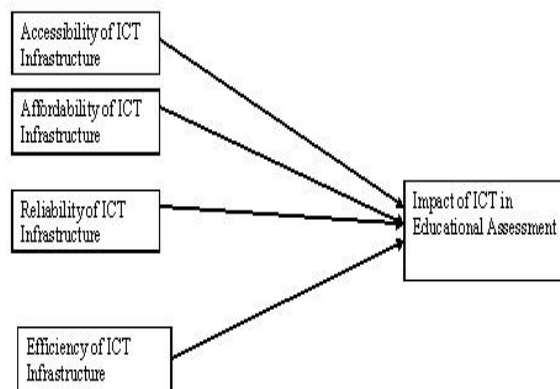
The general objective of this study was to explore the impact of information and communication technology in educational assessment in Tanzania: case of National Examinations Council of Tanzania. The specific objectives examined in this study are as follows:

- (i). To examine the impact of accessibility of ICT infrastructure in educational assessment in Tanzania
- (ii). To investigate the impact of affordability of ICT Infrastructure in educational assessment in Tanzania.
- (iii). To investigate the impact of reliability of ICT infrastructure in educational assessment in Tanzania
- (iv). To explore the impact of efficiency of ICT infrastructure on education assessments in Tanzania.

4. CONCEPTUAL FRAMEWORK

The developed model depicts that the impact of ICT in education assessment is the function of accessibility, affordability, reliability and efficiency of ICT infrastructure.

FIGURE 1
CONCEPTUAL FRAMEWORK



(Source: Developed from the Literature Review)

Hypothesis and explanations

Based on the literature review carried out and the proposed conceptual framework (figure 1); the following hypotheses have been formulated:

Hypothesis one: the impact of accessibility of ICT infrastructure in educational assessment.

H1: The higher the accessibility of ICT infrastructure the greater the impact of ICT in educational assessment.

Hypothesis two: the impact of affordability of ICT infrastructure in educational assessment.

H1: The higher the affordability of ICT infrastructure the greater the impact of ICT in educational assessment.

Hypothesis three: the impact of reliability of ICT infrastructure in educational assessment.

H1: The higher the reliability of ICT infrastructure the greater the impact of ICT in educational assessment.

Hypothesis four: the impact of efficiency of ICT infrastructure in educational assessment.

H1: The higher the efficiency of ICT infrastructure the greater the impact of ICT in educational assessment.

5. METHODOLOGY

5.1. The sampling, design and procedures

The sample for study comprised of all candidates studied ICT/TEHAMA for the past six years (2008-2013) for DSEE/GATCE (table 1); 400 respondents (students, tutors, ICT experts, examinations officers) drawn from 14 teachers colleges; and ICT experts, examinations officers from NECTA.

TABLE 2
SAMPLE FOR THE STUDY OF IMPACTS OF ICT IN
EDUCATION ASSESSMENT

S/N o.	ICT users	Institution	Respondents
1	Students taking ICT/TEHAMA	Teachers	325
2	Tutors teaching ICT/TEHAMA	Colleges	14
3	College ICT Experts		12
4	ICT experts from ICT department	NECTA	25
5	Examinations officers		24
	Grand Total		400

TABLE 3
TEACHERS COLLEGES INVOLVED IN THE STUDY

S/N	College Name	Location	Students registered for DSEE/GATCE May, 2013			Sample
			ICT		TEHAMA	
			DSEE	GATCE	GATCE	
1	KIBAMBA T.C	Dar es Salaam	-	-	81	20
2	MBEZI T.C	Dar es Salaam	5	15	99	20
3	EBONITE T.C	Dar es Salaam	-	10	144	25
4	PARADIGMST.C	Dar es Salaam	12	33	-	20
5	KINDERCARE T.C	Dar es Salaam	-	-	78	15
6	SAFINA T.C	Dar es Salaam	-	-	40	15
7	UNUNIO T.C	Dar es Salaam	19	-	248	30
8	KINONDONI T.C	Dar es Salaam	-	-	24	15
9	ST. MARY'S T.C	Dar es Salaam	4	-	38	25
10	WEST DAR ES SALAAM T.C	Dar es Salaam	-	-	167	15
11	COAST T.C	Pwani	8	45	-	15
12	VIKINDU	Pwani	-	48	288	30
13	MOROGORO T.C	Morogoro	873	-	-	50
14	MHONDA T.C	Morogoro	-	65	371	30
	GRAND TOTAL					325

(Source: NECTA, 2013)

5.2. Designing the questionnaire

The questionnaire research questions were designed based on the Likert-style rating scale with a rating scale of 5 point rating; from 1 (strongly disagree) to strongly agree (5); or from 1 (above 5 times) to 5 (none at all).

6. RESEARCH FINDINGS

This section presents the findings of the research about the impact of accessibility of ICT infrastructure, affordability of ICT infrastructure, reliability of ICT infrastructure and efficiency of ICT infrastructure in educational assessment.

6.1. The impact of accessibility of ICT infrastructure in educational assessment

Using overhead projector for presentations in the classroom

The analyzed data reveals the views when the respondents were asked whether overhead projector should be used in classroom for presentations. Over 50.7%

(strongly agree, agree) of the respondents revealed that overhead projector should be used in classroom for presentation so as to enhance educational assessment. Groot (2002) [3] found that the use of projector(s) affected the teaching and learning experience, several areas of influence were identified, including visual aid, greater flexibility for alternative teaching methods, enhanced teacher demonstrations, heightened student awareness and customized curriculum applications. With the use of projector(s) in the classroom, students can take better notes with the ability to discern what information the teacher displays is most useful to them. The presentations made can be projected on to a big screen. The use of overhead projector help every student to view information on the screen without any problem; as result it is easy for student to learn.

Using social networks: Facebook, Twitter, YouTube; and internet

The analyzed data reveals the views when the respondents were asked whether internet access and social networks should be used for education assessments. Among of them 49.8 % of respondents were undecided (moderate) whether social networks should be used for education assessment; and 0.8% of them agreed that social networks should be used for education assessment. Past research (Ronéle, 2010) [18] shown that the use of social networks enables educational organizations to more easily share content and information with each another and jointly make it accessible to users, such as researchers, students, teachers and the general public. Institutions are able to share their knowledge and collections with one another via the internet, via search engines and hyperlinks. Social networks also present greater opportunities for contact with users. In principle, users could link their own knowledge and collections to those of professional organizations. This result portrays that social network and internet access should be used for educational assessment with precaution in order to counter-balance the challenges associated with.

Access to television and radio program for learning

The analyzed data reveals the views when the respondents were asked whether students/teachers should have access to television/radio program for learning. Over 99.8% (agree) of the respondents revealed that students/teachers should have access to television/radio program for enhancing educational assessment.

6.2. The impact of affordability of ICT infrastructure on education assessment

The cost of buying projector(s) for presentations in classroom(s)

The analyzed data reveals the views when the respondents were asked whether the cost of buying overhead projector and other devices for presentation(s) is less expensive. Over 89% (strongly disagree, disagree) of the respondents revealed that most of colleges/institutions cannot afford to buy overhead projector(s) and other devices required for presentation(s). This implies that if the price is not affordable; less colleges/schools will own the Projector(s) hence the impact of ICT on educational assessment is minimal.

The cost of buying mobile devices and application software's for educational assessment

The analyzed data represents the views when the respondents were asked whether cost of buying mobile devices such as cellphone(s), computer(s) and application software for educational assessment is less expensive. Over 97% (strongly disagree, disagree) of the respondents revealed that most of colleges/institutions cannot afford to buy mobile devices and application software's for educational assessment. The lower the cost of buying computing devices and application software(s) the greater the impact of ICT in educational assessment; more of them will have purchasing power.

The cost of LAN/WAN/internet connectivity and bandwidth

The analyzed data reveals the views when the respondents were asked whether cost of LAN/WAN/internet connectivity and bandwidth for education assessment is less expensive. Majority of the respondents revealed that it is expensive to have LAN/WAN/Internet connectivity and bandwidth for education assessment; and this is depicted by 92.2% (strongly disagree, disagree) of the respondents. Lower cost, lead to greater impact of ICT in educational assessment; more of them will afford to use the LAN/WAN/internet.

6.3.The impact of reliability of ICT Infrastructure in educational assessment

Internet/information systems connectivity problem

The analyzed data reveals the views when the respondents were asked how many times per week the internet/information systems are not working. Over nine tenth of the respondents revealed that internet/information systems are not working; 1-2 times to above 5 times per week due to connectivity problem. The availability of reliable internet/information systems connectivity leads to impact of ICT on educational assessment; the systems are available for use when required.

Power interruptions to internet/information systems

The analyzed data reveals the views when the respondents were asked how many times per week the internet/Information Systems are not working due to power interruption. 100% of the respondents revealed that internet/information systems are not working; 3 times to above 5 times per week due to power interruptions. Mshangi (2007) [11] found that power failure and information connectivity problems; very much hinder respondents' accessibility to information systems. This implies that the availability of reliable power supply lead to impact of ICT in educational assessment; information systems is used when required.

Information systems not working due to computer failure (hardware/software)

The analyzed data reveals the views when the respondents were asked how many times per week the internet/information systems are not working due to failure in hardware/software. 100% of the respondents revealed

that information systems are not working; 1-2 times to above 5 times per week due to failure in hardware/software. This implies that the availability of reliable hardware/software lead to impact of ICT in educational assessment; information systems is used as needed.

6.4.The impact of efficiency of ICT infrastructure in educational assessment

Speed of accessing training materials through LAN/WAN

The analyzed data reveals the views when the respondents were asked whether the speed of accessing training materials through LAN/WAN/internet is very fast. Majority of the respondents revealed that the speed of accessing training materials through LAN/WAN for education assessment is not very fast; and this is depicted by 50.2% (disagree) of the respondents. This implies that the high the speed of LAN/WAN lead to impact of ICT in educational assessment; training materials is accessed at high speed.

The use of ICT facilitates preparation and dissemination of results

The analyzed data reveals the views when the respondents were asked whether the use of ICT facilitates easy preparation and dissemination of examinations results for student. Majority of the respondents revealed that the use of ICT facilitates preparation and dissemination of results; and this is depicted by 100% (agree) of the respondents. This implies that use of ICT for preparation and dissemination of results have impact in educational assessment.

The use of ICT in educational assessment minimize examination malpractices (misconducts)

The analyzed data portrays the results when the respondents were asked whether the use of ICT in educational assessment minimizes malpractices in the examinations. Majority of the respondents revealed that the use of ICT in educational assessment minimizes malpractices for educational assessment; and this is depicted by 100% (agree, strongly agree) of the respondents. Students can be identified using biometric technology such as fingerprints, including photo of student in their certificates; the use of ICT minimizes examination malpractices.

6.5.The impact of Information Communication Technology (ICT) in educational assessment

The use of ICT facilitates collection of information for education assessment

The analyzed data portrays the results when the respondents were asked whether the use of ICT facilitate collection of information for education assessment. Majority of the respondents revealed that the use of ICT facilitates collection of information for education assessment; and this is depicted by 100% (agree, strongly agree) of the respondents. The use of ICT facilitates the collection of information for educational assessment.

The use of ICT facilitates self-assessment, peer assessment and instant feedback

The analyzed data portrays the results when the respondents were asked whether the use of ICT facilitates self-assessment, peer assessment and instant feedback for education assessment. Majority of the respondents revealed that the use of ICT facilitates self-assessment, peer assessment and instant feedback for education; and this is depicted by 92.3% (agree, strongly agree) of the respondents. The use of ICT facilitates self-assessment, peer assessment and instant feedback for educational assessment.

The use of ICT improves students learning

The analyzed data portrays the results when the respondents were asked whether the use of ICT improves student learning. Majority of the respondents revealed that the use of ICT improves student learning; and this is depicted by over eight tenth (agree, strongly agree) of the respondents. The students can have access to online web based technologies 24 hours, 7 days of week with speed, direct communication, links to related topics and up-to-date notes (Sife, Lwoga, & Sanga, 2007) [19]. This implies that the use of ICT improves students learning.

The use of ICT enhance creation and management of digital portfolio

The analyzed data portrays the results when the respondents were asked whether the use of ICT enables students/teachers to create and manage digital portfolio. Majority of the respondents revealed that the use of ICT enables students/teachers to create and manage digital portfolio; and this is depicted by over nine tenth (agree, strongly agree) of the respondents. The use of ICT enhances creation and management of digital portfolio for students/teachers.

7. ANALYSIS AND INTERPRETATION

Analysis of impact of ICT in educational assessment The results from table 4 (Model regression summary) reveal coefficient of correlation (R) = 0.835 which implies that there is a positive impact of accessibility of ICT infrastructure, affordability of ICT infrastructure, reliability of ICT infrastructure, efficiency of ICT infrastructure in educational assessment. And the coefficient of determinations(R square) = 0.697=69.7%. This means that 69.7% in the variations of the Impact of Information Communication Technology (ICT) in educational assessment are being explained by the impact of accessibility of ICT infrastructure, affordability of ICT infrastructure, reliability of ICT infrastructure and efficiency of ICT infrastructure; the remaining 30.3% being explained by other variables not considered in this case.

TABLE 4
MODEL REGRESSION SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change
1	.835 ^a	.697	.694	.290	.697

b. Dependent Variable: impact of ICT in educational assessment

The impact of ICT in educational assessment is expressed as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

Where X_1 , X_2 , X_3 and X_4 representing the impact of accessibility of ICT infrastructure, affordability of ICT infrastructure, reliability of ICT infrastructure and efficiency of ICT infrastructure respectively; Y represents the dependent variable: impact of information communication technology in educational assessment; and β_1 , β_2 , β_3 and β_4 are regression coefficients, β_0 is the Y-intercept and ϵ is error term. These have been calculated by using regression analysis in SPSS as revealed in the Table 5. From this table the value for, β_1 , β_2 , β_3 and β_4 are 0.186, 0.218, 0.351 and 0.743 respectively and β_0 is -1.215.

From the table 5, the regression line is given by

$$Y = 0.186X_1 + 0.218X_2 + 0.351X_3 + 0.743X_4 - 1.215 \text{ (eq1).}$$

TABLE 5
Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig. (p)	Hypothesis	Hypothesis Supported (p<0.05)	95% Confidence Interval for B	
		B	Std. Error	Beta					Lower Bound	Upper Bound
1	(Constant)	-1.215	.317		-3.837	.000			-1.837	-.592
	accessibility of ICT infrastructure	.186	.033	.160	5.558	.000	1	Yes	.120	.251
	affordability of ICT infrastructure	.218	.046	.152	4.727	.000	2	Yes	.127	.309
	reliability of ICT infrastructure	.351	.070	.145	5.000	.000	3	Yes	.213	.489
	efficiency of ICT infrastructure	.743	.032	.710	23.198	.000	4	Yes	.680	.806

a. Dependent Variable: impact of ICT in educational assessment

TABLE 6
CORRELATION

	impact of ICT in educational assessment
Pearson Correlation	1.000
	impact of ICT in education assessment
	accessibility of ICT infrastructure
	affordability of ICT infrastructure
	reliability of ICT infrastructure
	efficiency of ICT infrastructure

8. TESTS OF HYPOTHESIS

In this study, the hypotheses were tested using 5% level of significance (95 % confidence interval), 95% confidence has been widely used in business and by majority of researchers; therefore making us in good position to compare the results to previous researches.

Hypothesis one: the impact of accessibility of ICT infrastructure in educational assessment

H1: The higher the accessibility of ICT infrastructure the greater the impact of ICT in educational assessment. The results from table 6, reveal that partial Pearson correlation(r) =0.141; which implies that there is a positive impact of accessibility of ICT infrastructure in the educational assessment. Since the significance level, p=0.000 which follow in rejection region; hence reject the null hypothesis at 5% level of significance level. Therefore, the test provides evidence to conclude that the higher the accessibility of ICT infrastructure the greater the impact of ICT in educational assessment

Hypothesis two: the impact of affordability of ICT infrastructure in educational assessment

H1: The higher the affordability of ICT infrastructure the greater the impact of ICT in educational assessment. The results from table 6, reveal that partial Pearson correlation(r) =0.506; which implies that there is a strong positive impact of affordability of ICT infrastructure in the educational assessment. Since the significance level, p=0.000 which follow in rejection region; hence reject the null hypothesis at 5% level of significance level. Therefore, the test provides evidence to conclude that the higher the affordability of ICT infrastructure the greater the impact of ICT in educational assessment.

Hypothesis three: the impact of reliability of ICT infrastructure in educational assessment

H1: The higher the reliability of ICT infrastructure the greater the impact of ICT in educational assessment. The results from table 6, reveal that partial Pearson correlation(r) =0.272; which implies that there is a positive impact of reliability of ICT infrastructure in the educational assessment. Since the significance level, p=0.000 which follow in rejection region; hence reject the null hypothesis at 5% level of significance level. Therefore, the test provides evidence to conclude that the higher the reliability of ICT

infrastructure the greater the impact of ICT in educational assessment

Hypothesis four: the impact of efficiency of ICT infrastructure in educational assessment

H1: The higher the efficiency of ICT infrastructure the greater the impact of ICT in educational assessment. The results from table 6, reveal that partial Pearson correlation(r) =0.786; which implies that there is a strong positive impact of efficiency of ICT infrastructure in the educational assessment. Since the significance level, $p=0.000$ which follow in rejection region; hence reject the null hypothesis at 5% level of significance level. Therefore, the test provides evidence to conclude that the higher the efficiency of ICT infrastructure the greater the impact of ICT in educational assessment.

9. CONCLUSIONS

In this study there were four hypotheses postulated; the findings revealed as follows: Hypothesis one: the higher the accessibility of ICT infrastructure the greater the impact of ICT in educational assessment; hypothesis two: the higher the affordability of ICT infrastructure the greater the impact of ICT in educational assessment; hypothesis three: the higher the reliability of ICT infrastructure the greater the impact of ICT in educational assessment and hypothesis four: the higher the efficiency of ICT infrastructure the greater the impact of ICT in educational assessment. Based on the findings in this study, it is concluded that the impact of ICT in educational assessment is the function of impact of accessibility of ICT infrastructure, affordability of ICT infrastructure, reliability ICT infrastructure and efficiency of ICT infrastructure.

10. RECOMMENDATIONS

Based on the findings in this study the following are recommendations made

- i. The ICT/TEHAMA subject(s) should be compulsory subject(s) and examinable, as currently is optional for GATCE as revealed in table 3 (MoEVT, 2011) [10].
- ii. Schools/college should have computer labs with computers connected to internet.
- iii. School/college should have overhead projector(s) and other computing devices for presentation(s).
- iv. Television/radio programs should be used for educational assessment.
- v. The cost of buying ICT equipment's such as computers, computer accessories, Projectors should be reduced by the government by waiving out taxes/duties for schools/colleges.
- vi. The cost of LAN/WAN/Internet connectivity and bandwidth should be reduced; the government should waive out taxes/duties for schools/colleges.
- vii. The cost of software for education assessment should be reduced; the government should waive out taxes/duties for schools/colleges.

REFERENCES

- [1]. Eng, S. T. (2005). The impact of ICT on learning: A review of research. *International Education Journal*, 6(5), pp.635-650.
- [2]. Gutterman, B., Rahman, S., Supelano, J., Thies, L. & Yang, M. (2009). *Information and Communication Technologies (ICT) in Education for Development*. Retrieved from <http://unpan1.un.org/intradoc/groups/public/documents/gaid/unpan034975.pdf>
- [3]. Groot, D. M. (June 2002). Multimedia projectors: A key component in the classroom of the future. *T.H.E. Journal Online: Technological Horizons in Education*.
- [4]. Hennessy, S., Harrison, E., Edexcel, L., Wamakote, L. (2010). Teacher factors influencing classroom use of ICT in Sub-Saharan Africa. *ISSN 2043-6165. Itupale Online Journal of African Studies*. 2 (2010) 39- 54.
- [5]. Intel Educational Transformation. (2012). *The Positive Impact of E-learning 2012 Update*. Retrieved from <http://www.intel.com/content/dam/www/public/us/en/documents/white-papers/world-ahead-positive-impact-of-elearning-paper.pdf>
- [6]. Kaffash, R. H., Kargiban1, A. Z., Kargiban, A. S. (2010). Undersecretary information and communication technology, Research and Educational Planning Organization, Ministry of Education, Iran. *International Journal of Instruction*, Vol.3, No.2. pp.65.
- [7]. MoEVT.(2007). *Information & Communication Technology (ICT) Policy for Basic [8] Education*. Retrived from http://www.moe.go.tz/index.php?option=com_docman&task=cat_view&gid=340&Itemid=622
- [8]. MoEVT.(2008, February 21). *New Curriculum for DSEE.Qualifications and Procedures for Assessment* from.May 2009.Ref.No.TTDB:198/437/01A/6.
- [9]. MoEVT.(2009, December 02). *Ammendment of Syllabus for GATCE & DSEE and Procedures for Assessment*.Ref.No.TTDB/85/483/01/25.
- [10]. MoEVT.(2011, July 22). *Ammendment of Assessment for Subjects for GATCE*.Ref.No.TTDB/01/09/50.
- [11]. Mshangi, M. (2007). *Usability of Money Transfer Information Systems: The Case of SWIFT and TISS in Tanzania*. Unpublished Dissertation for MBA. University of Dar es Salaam.
- [12]. NECTA.(2009). *Examinations Results Statistics, Exam Cycle: May 2009*.

- [13]. NECTA.(2010). Examinations Results Statistics, Exam Cycle: May 2010.
- [14]. NECTA.(2012). Examinations Results Statistics, Exam Cycle: May 2012.
- [15]. NECTA.(2013). Examinations Results Statistics, Exam Cycle: May 2013.
- [16]. NECTA.(2013). Examinations Registration data, Exam Cycle: May 2013.
- [17]. Palomba & Banta(1999). Assessment Glossary of Terms. Retrieved from http://www.unr.edu/assess/PlanResources/ResourcesPages/Glossary_09.html
- [18]. Ronéle, V. (2010). ICTs and Examinations Management in the Multicultural Society. Journal of the Association for Educational Assessment in Africa. Vol4.
- [19]. Sife, A. S., Lwoga, E. T., & Sanga, C. (2007). New technologies for teaching and learning: Challenges for higher learning institutions in developing countries. International Journal of Education and Development using Information and Communication Technology(IJEDICT), 2007, Vol. 3, Issue 2, pp. 57-67.
- [20]. Swarts, P., & Mwiyeria, E. (2010). Situational Analysis. Retrieved from <http://www.gesci.org/assets/files/Knowledge%20Centre/Situational%20AnalysisTanzania.pdf>.
- [21]. WIKIPEDIA. (2013). Information and communications technology. Retrieved from http://en.wikipedia.org/wiki/Information_and_communications_technology