THE CORRELATION BETWEEN ICT TECHNICAL SUPPORT AND ACADEMIC PERFORMANCE OF PUBLIC PRIMARY SCHOOLS: A CASE OF MATETE SUB-COUNTY, KENYA

Jacob Wambasi Kitari*, Lydiah Wamocha and Pamela Buhere

Masinde Muliro University of Science and Technology P.O Box 190-50100, Kakamega, Kenya.

*Corresponding Author
Jacob Wambasi Kitari
Masinde Muliro University
of Science and Technology
P.O Box 190-50100,
Kakamega, Kenya.

ABSTRACT

This research study sort to determine the correlation between ICT technical support and academic performance of public primary schools in Matete Sub-County, Kenya. Descriptive Survey design was used to collect data.The study adapted quantitative research methods. The study targeted World Vision ICT project schools and those that did not get the support for comparison purposes. Purposive and random sampling techniques were used to identify key respondents. Structured questionnaires were used to collect data from head teachers and teachers. Reliability of research instruments was established through test-retest technique whereby reliability coefficient score of 0.72 for the head teachers and 0.78 for the teachers' questionnaires were appropriate since these indices were above the minimum recommended value of 0.7. The research experts helped to clarify the contents of the test items in the questionnaires. Data collected were analyzed inferentially using Stata. The findings on the determination of the correlation between ICT technical support and academic performance of public primary schools, revealed statistically significant correlation, P= 0.022. Therefore, the researcher recommended that the government should deploy artisans with ICT management skills in all primary schools to repair and maintain both soft and hard wares.

KEYWORDS: ICT technical support, Public Primary schools, academic performance.

INTRODUCTION

According to UNESCO (2008), teachers need to be prepared to empower the learners through the utilization of technology. They are responsible for establishing classroom environment

and preparing learning opportunities that facilitate the use of technology to learn and communicate. Most teacher training education put more emphasis on basic computer operations as opposed to involvement of advanced technical skills and specific content pedagogical applications (Tin, 2002). This has resulted to a wide gap in the manipulative skills geared towards improved utilization of ICTs in basic education. This has necessitated the design of this study to determin the correlation between ICT technical support and academic achievement in public primary schools with a view to unravel the extent to which ICT technical support is affecting the use of technology in the teaching and learning processes.

Limitations to the study

i)   The research study was limited to Matete Sub- County only because this was the County which had a successful World Vision ICT Project in public primary schools in Kenya. However, the study findings may be generalized to other Counties which have similar characteristics.

ii) Limited availability of Kenyan and African literature in connection with the effective use of ICTs especially in public primary schools yielded a sparse research context. However, a review of literature borrowed from Western Countries provided adequate backdrop for this research study.

iii) The participants in the study were purposely sampled. Biases that could have emanated from this sampling method were overcome by the objectivity of data collection methods used by the researcher.

Literature review

Technical difficulties are a major factor in some schools causing a major problem and a source of frustration for students (Jamieson-Proctor *et al,* 2013). The effect is that teachers are not able to use computers temporarily and this may cause interruptions in the teaching and learning process. Turel and Johnson (2012) observe that technical problems become a major barrier for teachers. These problems include low connectivity, virus attack and malfunctioning printers. Schools in countries like Netherlands, U.K and Malta have recognised the importance of technical support to assist teachers to use ICT in the classroom (Yang & Wang, 2012).

Teachers' readiness and skills in using ICT play an essential role in the use of ICT to implement the technology and have high confident level to use it in classrooms; Besides,

teachers need insight into pedagogical role of ICT, in order to use it meaningfully in their instructional process. Winzenried, Dalgarno and Tinker (2010) noted that teachers who have gone through ICT course are more effective in teaching by using technology tools as opposed to those that have no experience in such training. In Canada, some teachers admitted to be reluctant to use ICT because they worried they might get embarrassed that students know more about the technology than they did (Hennesly et al., 2005). This enhanced the researcher's impetus in finding out the training programmes available for teachers of ICT in Matete. Further training in IT will promote hands on skills in computer works, hence, promoting efficiency in the use of ICT skills by educational instructors.

A part from basic skills training, schools use a variety of strategies to provide further professional development for ICT teachers. Warwick and Kershner (2002) pointed out the significance and advantages of ICT to be clearly known by teachers in order to conduct a meaningful lesson with the use of ICT. Indeed, teachers should be exposed to further training courses to learn about integration of ICT in teaching and learning processes. Some schools use peer tutoring. This is where a more skilful teacher is used to assist and guide other teachers who are less experienced with ICT alongside the preparation work for teaching and learning.

Hermans, Tondeur, Van Braak and Valckle (2008) have identified three main stages for ICT to be valued and regarded by teachers; integration, enhancement and complementary. Integration approach is about implementing right use of ICT in particular subject area that involved complex concepts and skills to improve students' achievement and attainment.

The review of curriculum is needed so that only related ICT resources and appropriate software will be installed for the main aims and objectives of curriculum to be achieved. Previously researchers established that the use of ICT in teaching will enhance the learning process and maximise students' abilities in active learning (Jamieson–Procter *et al* 2013). This approach allow students to be more organised and efficient in which they can obtain notes from computer, submit their work by e-mail from home as long as they meet the deadline and looking for information from various sources provided online to fulfil the task given to them (Hermans *et al*, 2008).

Technology based teaching and learning can make many changes in school that requires for proper planning and policy making. Researchers and policy makers must both have the same

insight about the future plan. Dudeney, (2010) notes that National ICT policies can serve several functions which are critical in the current knowledge based economy. They provide a rationale, a set of goals and vision of how education systems run. If ICT is integrated into teaching and learning process and they are beneficial to students, teachers, parents and general population of a given country. It is along this argument that the design of this objective was viewed as pertinent in trying to establish the extent to which programmes offered to supplement the world vision ICT project are meeting the expectations of various stakeholders in the world of education in Kenya as well as globally.

The social imperative for promoting ICT in public primary schools therefore is justified if pupils are to be prepared to lead a productive and fulfilled livelihood in a knowledge based society, they should be ICT competent on departure from the school system. This is in line with the recommendation by the information society commission (ISC) in 2002 which recommended that basic ICT skills should as fast as possible become a core component of mainstream education.

According to BECTA (2003), the main approach used to evaluate the impact of technology on teaching and learning in primary schools has been where pupils attainment across a range of tested curriculum outcomes has been correlated with the quantity and quality of technology which was available or which they experienced in their institutions. The successful gain translates into higher transition rate to the next level of schooling.

The researcher was determined to ascertain the extent to which public primary schools in Matete Sub-County embraced and engaged the use of ICT experts if any and evaluated the extent to which this variable impacted on KCPE performance. This was unique in that the available literature only outlined the role of ICT experts but did not specify the employer and more so none derived its source from the developing countries, more so, Kenya.

Research methodology

This study was exploratory in nature. It enhanced the discovery of concepts and insights. Buhere (2013) observed that exploration yields useful information concerning the nature of the phenomenon. Through Survey the researcher was able to gather relevant data concerning WV-ICT Project. The study adopted quantitative approaches in which data collected was analyzed inferentialy using mean scores, percentages and a Pearson Product-moment correlation coefficient test statistic. A survey of schools covered by world vision ICT project

where by the school management had employed ICT technical support personel and those which did not was done in which the correlation of the research findings was done for the WV-ICT covered public primary schools. This is because according to Kothari, (2008) correlation research facilitates collection of data from an accessible population in order to determine the current status and relationships between the issues under investigation. In this case, correlations facilitated collection of data related to the employment of ICT technical supprt and trends in KCPE performance of public primary schools covered by World Vision ICT project between 2008 and 2016. Correlation design was considered appropriate for this study because according to Kasomo, (2007), and Orodho, (2008), it ensured fair assessment of relationships of all sections of the targeted population.

RESULTS AND DISCUSSION

In this study the researcher was to determine the correlation between performance of public primary schools with and without ICT technical support in Matete Sub-County. In order to effectively address this study objective, a Pearson's Product-moment Correlation Coefficient was run to ascertain the correlation between the outcome variable (z_s2tm) and the explanatory variable while controlling for the school characteristics. The researcher ran a multiple linear regression regressing standardized assessment scores (z_s2tm) on head teachers perceptions of the effect of ICT technical support. The results are shown in Tabl**.**1

Table 1: Multiple linear regression coefficients of the effect of ict technical support on school kcpe mean scores (z_s2tm).

Variable	Variable label	Model 1 (z_s2tm)			Model 12(z_s2tm)			Model 3 (z_s2tm)		
		U.Coef	*P*	B	U.Coef	*p*	β	U.Coef	*p*	B
_Is55a1_1	Agreeing: Regular breakdown of digital signals/network	1.355	0.027	0.380	1.199	0.005	0.336	1.163	0.008	0.326
_Is16_1	School is WV-ICT covered				0.835	0.013	0.423	0.994	0.033	0.504
_Is18_1	School has a feeding programme				0.507	0.121	0.256	0.626	0.079	0.315
_It11_1	Male teacher							0.443	0.281	0.207
_It12_2	Teacher education: Diploma							-0.013	0.977	0.006
_It12_3	Teacher education: B,Ed. Degree							-0.054	0.920	-0.019
Constant		-0.113	0.493	n/a	-0.743	0.010	n/a	-1.168	0.041	n/a
N		36			36			36		
R²		0.1442			0.2417			0.2810		
Root Mean Squared Error (RMSE)		0.9386			.91073			0.9315		

Note. U.Coef=Unstandardized Coefficient; RMSE=Standard deviation of the regression model (the closer to zero better the fit)

Source: Stata Output, 2019

Three sequential regression models were developed while Controlling for the school characteristics (school is WV-ICT and school has feeding programme).

In the first model, teachers who agree with the statement "Regular breakdown of digital signals/network (_Is55a1_1)" are associated with up to 1.199114 standard deviation units above the mean, p<.005. This implied that regular breakdown of digital signals had a statistically significant correlation with learners' achievement in Matete Sub-County. This result explains up to 14.42% in variation amongst the covariates. The result conforms to the findings of the study by Tin, (2002) who postulates that most teacher training education put more emphasis on basic computer operations as opposed to involvement of advanced technical skills and specific content pedagogical applications. This has resulted to a wide gap in the manipulative skills geared towards improved utilization of ICTs in basic education. Further, the study observed that Technical experts are hired to address the need for expertise skills in the maintenance aspects of ICTs. It is assumed that shortage or lack of technological experts may negatively impact on academic performance since the tear and ware and the general maintenance services of the software and hardware in order to ensure efficient service delivery within educational institutions.

In the second model, schools on the WV-ICT programme are associated with up to .8347185 standard deviation units above the mean, p=.013. The findings are statistically significant. However, the model explains up to 24.17% of the correlations between the covariates. Thus the WV-ICT schools recorded improved performance in KCPE mean scores as compared to those public primary schools that were not covered by the World Vision ICT Project. These findings may be associated to the fact that World Vision provided technical staff to ensure efficient service delivery to some schools but not others. The model's constant is significant -.7427846, p=.010

The overall model is significant *p*=0.0019 and explains up 0.2417 or 24.17% of the variation in students assessment z-score (z_s2tm).This indicates that there are other factors that contribute to improved performance of public primary schools other than ICT technical support. These findings correlate with the argument by Kompf (2005) who holds that each author assumes ICT as a permanent feature in the landscape of teaching and learning. It is no longer possible nowadays to conceive education without ICT thus ICT helps to demystify the definition of education globally. While funding for research has increased in recent years, the expert group on future ICT skills requirement continues to warn of shortfalls in the output of

graduates in ICT. This implies that ICT graduates transiting various levels in the socio-economic world have inadequate IT skills to enable them compete favourably in the knowledge based world. Though ICT is a vital sector of the economy, requiring highly skilled professionals, it represents only a relatively small fraction of the total employment. However, in the knowledge economy as it is now and more so as it will be in the near future, ICT competence is a prerequisite for employees in virtually every area. Furthermore, the need for a facility with ICT is not confined to the work environment, but increasingly permeates all aspects of everyday life including all chores to be undertaken by an individual in any form of social context. Therefore, it is imperative for stakeholders to hire and subsequently deploy ICT experts to help in breaching the gap between the skilled personnel as compared to the non skilled ones.

Headteachers who agree with statement "Regular breakdown of digital signals/network (_Is55a1_1)" are associated with up to 1.354846 standard deviation units above the mean, $p<.027$. These results are statistically significant and explain up to 28.10% variations amongst the covariates. This means that regular network breakdown impact negatively on schools' performance since the learners are denied the opportunity to continuously access the desired information through on line within the stipulated time frame.

The overall model is statistically significant, $p=.0267$ and explains 14.42% of the variation in school KCPE mean scores between the years 2008 and 2016. Therefore, based on these results, ICT Technical support is important hence, educational institutions should endeavor to provide the technical personnel in order to facilitate efficient service delivery in the public primary schools.

CONCLUSION
The researcher conducted a Pearson Product-moment correlation coefficient test statistic to determine the correlation of KCPE performance of public primary schools that engaged ICT technical support personnel as compared to those schools which did not. The test results showed $p=0.022$. These findings were statistically significant at 95% significance level, hence, the researcher concluded that there was a correlation between ICT technical support and improved KCPE mean scores in Kakamega County.

Recommendations

The study was designed to establish the correlation between ICT technical support and academic performance in public primary schools in Matete Sub-County. The findings on the determination of the correlation between ICT technical support and academic performance of public primary schools revealed statistically significant correlation, *P*= 0.022. Following these conclusions, the researcher recommended that the Ministry of Education should provide skilled manpower in all public learning institutions. Teacher education course should incorporate technical skills that may enable educationists to manipulate ICT infrastructure for convenience purposes.

REFERENCES

1. Becta Primary schools. ICT standards. An analysis of National Data from Ofsted and QCA by Becta, Becta Coventry, 2003. http://partners.becta.org.uk/index.php?section=rh&catcode=-rp-02-a&rid=13819.

2. Dudency, G. The Internet and the language classroom (Vol. X) Cambridge: Cambridge University Press, 2010.

3. Ejakait, E., Olel, M., Othuon, L., & Khasenye, O. A hierarchical Modelling of Teacher Effects on Academic Achievement in the Kenya Certificate of Primary Education Examination. American Journal of Education Research, Ekundayo H.T., Alonge H.O., Kolawalo K.S., Teaching, 2016; 4(14): 1030-1040.

4. Haelermans, L. and De Wittc K. The role of innovations in Secondary School efficiency- Evidence from a conditional efficiency model. European journal of operational research, 2012; 223: 541-549.

5. Harris, J. Irish in Primary Schools: Long Term National Trends in Achievement. Dublin ICT Infrastructure, Connectivity and Accessibility, gesci-UN ICT task force, 2006. Available at: http://www.gesci.org/ict-infrastructure-connectivity-and-accessibilt.html

6. Harrison, C., Lunzar, E.A., Tymms, P., Taylor Fitz-Gibbon, C., & Restorick, J. Use of ICT and its relationship with performance in examinations; a comparison of the impact to project's research findings using pupil – level, school, level and multi-level modeling data. Journal of computer assisted learning, 2004; 20: 319-337.

7. Hennessy, S. Ruthven & Brindly S. Emerging teacher strategic for supporting subject teaching: commitment, constraints, caution and change. Journal of curriculum studies, Technology to enhance Teaching and learning in East African Schools. Review of the literature Aga Khan University, Nairobi Kenya, 2005; 37(2): 155-197.

8. Jacob Cohen; Patricia Cohen; Stephen G. West; Leona S. Aiken Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences (3rd ed.), New Jersey: Lawrence Erlbaum Associates, ISBN 978-0-8058-2223-6, 2003; 10: 2010.

9. Jamieson – proctor, R. Development of TTFT pack survey instrument. Australian educational computing, 2013; 27(3): 26-35.

10. Kompf, M. Information and communication Technology (ICT) and the seduction of knowledge, teaching and learning. What lies ahead of education; curriculum inquiry, 2005; 35(2).

11. Kothari, C.R. Research Methodology, Methods and Techniques (Second Revised Edition). New Delhi: New age international (Ltd, Publishers), 2010.

12. Michael Kompf Information and communication technology (ICT) and the seduction of knowledge, teaching and learning: what lies ahead for education." curriculum inquiry, 2005; 35(2).

13. Mkuwa C. W. Integration of Educational Technology in Teacher Education; Eldoret, Kenya, Moi University Press, 2015.

14. Ndiku L. The problems encountered by school personnel in the implementation of computer use in secondary schools in Uasin Gishu District, unpublished Thesis. Moi University Press, 2003.

15. Neyland, E. Integrating online learning in new secondary schools: Three schools perspectives on ICT adoption. Australian Journal of Educational Technology, 2011; 27(1): 152-173.

16. Nish, M. Development and Implementation of Pathways (on line), 2000. Available: http://www.ihsc.on ca/research/innovation/pathways/.

17. Nut J. Professional educators and the evolving role of ICT in schools: perspective report. Retrieved, 2010; 12: 2012. http://www.ictliteracy.info/rf.pdf/ict in schools.pdf.

18. OECD – Organization for Economic Cooperation and Development PISA 2009 Results: Students on line Digital Technologies and performance. Paris: OECD Publishing, 2011.

19. Orodho, J.A. Techniques of writing research proposals and reports in education and social sciences, second edition, Maseno, Karezja HP Enterprises, 2008.

20. Oso, Y. W. & Onen, D. Writing Research Proposal and Report. Nairobi: Prints Arts Limited, 2011.

21. Papageorgakis P., Pliassa S. and Georgakouda, E. The introduction and teaching of N.T in the "New School" First approaches and conclusions proceedings 2nd panhellenic conference: Integration and use of ICT in Educational process, 2011; 28(30): 643-654.

22. Price Water House Coopers "Building performance: An empirical assessment of the Relationship between Schools Capital Investment and Pupil Performance", Department for Education and Skills, United Kingdom, 2000.

23. Republic of Kenya (2005b). Sessional paper on a policy Framework for Education, Training and Research. Nairobi: Government Printer, 2005; 1.

24. R.O.K National ICT master plan towards digital Kenya. Government printers, Nairobi, 2014.

25. Selwood I. & Pilkington, R. Teacher workload: Using ICT to release time to teach. Educational Review, 2005; 57(2): 163-174.

26. Serin O. The effects of the computer-based instruction on the achievement and problem solving skills of the science and technology students. Turkish online journal of educational technology, 2011; 10(1): 183-201.

27. Schiller, J. Working with ICT: Perception of Australian Principals. Journal of Educational Administration, 2003; 41(2).

28. Somekh B. Pedagogy and learning with ICT. Researching the Art of innovation, London: Routledge, 2007.

29. Telecommunication union – ITU International Telecommunications Union database: Geneva: ITU, 2013. http://www.itu.int/ITU-D/ict/statistics/gender/index.html.

30. Tokonakidou E. (2010). Kaloyiannidou, A and Tsitouridou, M. The Internet in Primary Education: Teachers' approaches. In a Tzimoyiannis (Ed). Proceedings, 7th Panhellenic Conferences with International Participation "ICT in Education," University of the Peloponese, Korinthos, 2010; 23-26.

31. Totter A. Stutz D. and Grote; G. ICT and schools; Identification of factors influencing the use of new media in vocational training schools. The Electronic Journal of e-learning, 2006; 4(1): 95-102.

32. UNESCO, Moving Towards Universal Primary Education and Literacy. New York: UNESCO, 2007.

33. UNESCO, ICT Competency Standards for Teachers. Published by United Nations Educational, Scientific and Cultural Organisation, 2008; 8: 7. http://unesdoc.unesco.org/images/0015/001562/156207e.pdf.

34. UNESCO Bangok Case studies on integrating ICT into teacher education curriculum in Asia. Bangok. UNESCO Bangok, 2013.

35. UNESCO A comprehensive analysis of ICT integration and readiness in schools across Asia, Canada, UNESCO institute for statistics UIS, 2014.

36. UNESCO Institute for statistics Information and communication Technology (ICT) in five Arab states. A comparative analysis of ICT integration and e-readiness in schools in Egypt, Jordan, Oman, Palestine and Qatar. Montreal: UIS, 2013.

37. UNESCO. Bangkok Case studies on integrating ICT into teacher education curriculum in Asia. Bangkok: UNESCO Bangkok, 2013.

38. United Nations Millennium Development Goals, 2012. http://www.un-org./milleniumgoals/global.shtml.

39. Un population division Un population division database. New York: Un population division, 2014. http://www.un.org/en/development/desa/population.

40. Uwezo-Kenya, Scaling Basic Literacy in Lower Primary. Nairobi: Longhorn publishers, 2010.

41. Uwezo Kenya Are our children learning Nairobi, 2013. www.uwezo.net/www.twaweza.org.

42. Vaggelatos, A. Foskdos, F. and Komninos, Th. ICT introduction to schools; the factor "teaching practitioners' proceedings, panhellenic conference; integration and use of ICT in educational process, 2011; 2: 28-30.

43. Van Braak, J. Factors influencing the use of computer mediated communication by teachers in secondary schools. Computers and education, 2001; 36(1): 41-57.

44. Van Braak, J. et al Student teachers' thinking processes and ICT predictors of prospective teaching behaviors with education technology; integration; computers and education, 2010; 54(1): 103-112.

45. World Bank Information and Communication Technology for Education in India and South Asia Extend summary. Washington D.C: InfoDev/Price Water house coopers, 2010; 1.

46. World Food Program. School meals. Available at, 2010. http://www.wfp.org/schools_meals.

47. Yang K.T & Wang T.H Interactive white Board: Effective Interactive Teaching Strategy Designs for biology Teaching. Tech, E-learning-engineering, on-Job Training and Interactive teaching, 2012; 139-154.

48. Zhang, C. A study of Internet use in EFL Teaching and Learning in Northwest China, Asian Social Science, 2013; 9(2): 48-52.

49. Zhao, Y. Social Studies teachers' perspectives of technology integration. Journal of technology and teacher education, 2007; 15(3): 311-33.