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Research article

The Role of School Administration in the Integration of Information Communication and Technology in Biology Instruction in Secondary Schools in Migori County, Kenya

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Abstract

The study investigated Information Communication and Technology (ICT) use in teaching and learning of Biology and how it enhances students' achievement in Migori County**,** Kenya. It employed descriptive survey design which utilized stratified, simple random and purposive sampling techniques. The theoretical underpinning for the study was that learners conceptualize their surroundings best through interactive learning. The study targeted teachers, students, principals, Sub County Education Officers and County Director of Education. A sample size of twenty four (24) secondary schools was used. The objective was to investigate challenges to ICT integration in Biology instruction. Research instruments included; questionnaire, interviews, Observation schedules and ICT resource checklists. Data was analyzed through Descriptive and Inferential statistical procedures. The major findings included: teachers and students did not use ICT, teachers ICT illiterate, poor ICT infrastructures, inadequate resources and lack of streamlined guide to ICT use. Major conclusions made included: inadequate funds for purchasing ICT resources, insufficient support from principals, intermittent power supply and congested classrooms due to large number of students.

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Introduction

The school administration has the sole responsibility of determining the kind of development undertaken by the school. One such responsibility should be whether the school should encourage ICT integration or not. School policies at large should cater for the individual student development in terms of holistic development of the learner. ICT offers such opportunities for all round individual learner development (Rumpagapon, 2007). All learners are able to perform given the right attitude, administration policies, constant internal and external motivation and the right teaching strategies. With favorable administrative environment that enables maximum learning conditions by availing the instructional resources including ICT resources, students can perform as expected in the various school subjects.

Principals must take a more responsible role in both administrative and academic activities in the schools they head. Due to lack of prioritization of the limited resources generated by schools, there are empty laboratories, libraries and inadequate ICT resources and facilities. The heads should understand that they cannot escape the blame for the falling standards of education because a school's performance is a reflection of the head's management style.

School administrators should appreciate any chance to support ICT integration since this is an essential element for teaching. This can motivate teachers to use ICT particularly if consistently encouraged in order to improve learning outcomes (Vaselinovskaa et al. (2010) suggest that some teachers value experimenting with existing ICT resources that can help them prepare class material more than learning about specific programs that can give direction to the learners on how to use specific ICT for learning purposes. It is worth noting that some teachers maybe technological experts and therefore more interested in ICT use than the less technologically skilled teachers.

According to Maundu et al (2005) a classroom teacher requires various kinds of teaching resources such as text books, apparatus, chemicals, charts, models, photographs, motion pictures and facilities such as laboratories, herbarium, green houses, botanical garden and others to enhance the effectiveness of his/her instruction. A resource is any source of information, expertise, supply or support. Resources play an important role in enhancing the teaching/learning process. They aid the teacher in teaching by modifying the teaching and learning situation. The use of resources involves the use of a broad range of the human senses at the same time in the learning process. This facilitates learning and helps in conveying the intended message.

Raghubir (1979) argues that availability of instructional resources does not necessarily translate into effective teaching and learning of a subject. Adequacy of resources is much more important in achieving the latter. This is because most of the resources play an important role in understanding concepts and imparting skills to the learner (Franyo, 2007). The learner can only adequately acquire these concepts and skills through the actual use of or contact with a resource.

This is particularly important in the sciences where a hands-on approach to learning has been demonstrated to play a crucial role in the understanding of concepts and retention of content taught, as well as developing the ability to think scientifically than by using the lecture approach. Determining the availability and use of ICT resources for teaching and learning Biology in selected secondary schools in Migori District formed a part of this study.According to SMASSE report findings of 2000, principals of secondary schools must take a more responsible role in both administrative and academic activities in the schools they head.

Hellinger and Heck (1995) noted that in many ways, the principal is the most important and influential individual in any school. It is his/her managerial skills that set the benchmark, the direction, the tone and the learning environment. His/her management are pivotal for the moral of the teachers and set the degree of concern for what students may or may not become. One basic role of schools is to provide a suitable environment conducive for learning.

Therefore, the principals should ensure that all available resources are directed towards this end. Starting projects for the sake of it without due consideration of high academic achievement including Biology is a failure on the heads part. Lack of prioritization by the school principals of meager resources generated by schools lead to empty laboratories, libraries and stores (SMASSE, 2000). Teachers work within hierarchical institutions that place highly visible constraints upon their professional discretion (Hawthorne, 1992). Teachers' effort to make a difference in the students' achievement is influenced by the school administration.

The principals cannot escape the blame for the falling standards of Biology achievement in Kenyan schools. This is because a school's performance is a reflection of the head's management style (SMASSE, 2000). Reid (2002) states that the basic reasons why some schools perform better than others in examinations is that while some school principals organize the learning process for their students, others leave it to chance. Principals who are committed to their work are responsible and have a sound moral conduct and usually provide favorable learning environment to the teachers and students alike.

Research Methods

The study was conducted in Migori County which is one out of the forty seven (47) Counties of Kenya. Migori County is on the Western part of Kenya, about 500 kilometers from Nairobi. It borders Homa-bay County and Tanzania as a neighboring country. The choice of this area was purposive due to poor achievement in Biology in particular and science in general at KCSE levels.
It should be clarified that Migori County is not the only county displaying low achievement in Biology but unlike the other poor performing counties such as Wajir, its choice was determined by the fact that Migori County is a cosmopolitan county comprising a number of ethnic communities with different socio-cultural backgrounds that provided the various expected differences in the respondents. It was also convenient to the researcher in terms of financial, time constraints and also the researcher's familiarity with the geography of the area ensured effective collection of data.
The study employed descriptive survey design which utilized stratified, simple random and purposive sampling techniques. The study targeted all secondary schools, teachers, students, principals,Sub County Education Officers and County Director of Education. The study used a sample size of twenty four (24) secondary schools. The main objective was to find out the extent to which ICT is used in Biology instructional processes in Migori County.Pilot study was conducted prior to data collection in three schools inorder to find out the weaknesses in the research instruments.
Research instruments included; structured interviews, Observation schedules and ICT resource checklists. Data was analyzed through Descriptive and Inferential statistical procedures. The findings were presented in tables, frequencies and percentages. Responses from close-ended questions were organized, coded and analyzed quantitatively using Statistical Package for Social Sciences (SPSS). Qualitative Analysis was used in responses from interviews and open ended questions where key statements from interviewees were quoted verbatim. Inferential statistics, specifically test of significance, was used in order to determine whether the respondents' scores regarding their views towards ICT integration in Biology teaching and learning differed depending on their positions and role in schools.

Results and Discussion

School administration support

The school administration is responsible for availing the necessary ICT resources to be used by the teachers and the students. From the interviews, one of the principals responded;

> "It does not make any sense at all when am put under pressure to avail ICT resources when other factors like source of power are yet to be availed. The process is on and it is taking too long for some schools especially the ones very far from major roads to connect to electricity sources. When power problem shall have been solved then I can seriously think about ICT use in this school".

Another principal commented;

> "Across the nation, school heads are forced to do more in terms of purchasing the necessary ICT resources with inadequate finances; however, modern technology makes administrators, teachers and students to be up to date with the global ICT context".

This clearly shows the kind of support some principals afford to ICT integration process, which remains a constraint in ICT use in most secondary schools in Migori County.

Teachers' Responses on Challenges

The following were the findings from the teachers' interview on the challenges of ICT integration in Biology instruction

Table1.1 Reasons why Biology teachers shy away from ICT use

Reason given	Percentage (%)
Computers available not functional	72
Computer illiteracy	60
Classrooms not ICT friendly	74
Electricity or power problems	69
ICT use requires time, resources and patience	33
Information overload and time wasted browsing	87

Table 1.1 above shows various reasons the teachers gave to justify the non- use of ICT in Biology instructional process. The following were the reasons they gave; computers available not functional, teachers were computer illiterate, classrooms were not ICT friendly, teachers claimed they experience constant electricity or power problems and that ICT use requires time, resources and patience which is very demanding on the teachers' side.

Majority of the teachers felt that they do not always get the right information from the internet due to information overload and therefore considered it wastage of time that can be used effectively in class. It's clear that technology can help transform teaching methods in the classroom despite the fact that teachers in Migori County have not yet fully adopted ICT use in the instructional processes.

Nonetheless, teachers must guide the students to use ICT for purposes of education and learning. The teacher must understand that not all websites are reliable or acceptable for effective learning. Students need to make better use of ICT that leads for effective learning. As Jhurree (2005) states, researchers believe that learners who have access to information pose better learning outcomes.

Inadequacy of ICT resources in schools

Majority of Biology teachers interviewed concurred that the available computers in their schools were inadequate. From the interviews, a teacher from one of the schools said,

> "I do not even bother about computers leave alone those that are connected to the internet because there are none in our school and even the neighboring school. It is not that teachers in this school are not computer literate though that also applies to some but there are no computers''.

Effective ICT uses encourage activities that can only be carried out effectively if computers are available and adequate in the schools. This may explain the fact that Biology teachers in Migori County who are able to use ICT do not actually integrate the same in their instructional procedures.

Inaccessibility of ICT resources to teachers

Sixty percent (60%) of the teachers indicated that there was inaccessibility to computer and internet in the schools in which they taught whereas fourty (40%) indicated they had access to computer and internet connection. The teachers claimed that when they cannot access the available ICT resources in the schools, they may be discouraged and therefore tend to shy away from using the same. This may explain partly why teachers are not keen in ICT integration process in Biology instruction in Migori County.

Constraints to ICT use

Twenty four (24) Biology teachers who were interviewed cited the following as constraints they face in ICT integration process in Biology teaching in Migori County. The following were stated as constraints to ICT integration; teachers reasoned that there was inadequate use of ICT during training by the instructors, that is they needed to see more of how and when to use technology in their instructional procedures from their mentors and other teachers.

Almost sixty percent (60%) of the teachers felt that there was intermittent power suppy in schools and that there was inadequate access to internet connectivity to both teachers and students. Nearly eighty (80%) of the teachers stated that there was insufficient ICT sustainability in institutions while most teachers felt that ICT resources and equipment were expensive and this was one of the major reasons why integration of ICT in Biology instruction is still lagging behind in Migori County.

When probed further on how poor ICT resources sustainability in schools can be curbed, Biology teachers cited the following as the barriers to ICT sustainability in secondary schools that need to be dealt with;

- Forty nine percent (49%) of the teachers said there is insufficient finance to purchase software by most schools
- Fifty one percent (51%) of the teachers said there is laxity on the part of majority of the principals to embrace ICT.
- Forty one percent (41%) of the teachers indicated that abolishing payment of school fees in public schools negatively impacts on sustainability. However, the teachers said that the principals still levy fees for running of other programs.
- Thirty nine percent (39%) of the teacher said teacher training institutions have not included ICT use in the system. The ongoing training sessions or workshop programs for teachers do not include ICT integration in instruction.

However, as Akbaba (2006) puts it, research confirms and have found that there are a lot of ICT uses in many places and programs, although teachers are not trained on practical ways to integrate technology into the classroom that target individual students and their needs. If these teachers are not proficient in ICT use then they would not possess self- efficacy needed for technology in their classroom. To quote him;

> "I'm not questioning the ability of teachers to develop good lessons; I'm questioning how they will be able to integrate technology into their class for maximum effect without a full understanding of the technology and what it is capable of" Akbaba, (2006) p. 76

Technology in the classroom should be used as second to pedagogy which comes first (Moersch, 1995). Teachers need to guide students to find a problem and use technology in a creative manner to solve the problem, rather than

bringing the same technology onto a classroom with a hope that it would automatically solve a problem. Becta (2005) claims that what is really needed are teachers who combine a love of technology with an understanding of the classroom; an approach where pedagogy comes first and technology follows.

When the learners have access to several sources of information they can realize their potential for learning and instill creativity. According UNESCO (2002), ICT also boosts self-esteem for students when they know how to use technologies available to them to explain concepts effectively. This increases knowledge in each school subject which translates to high achievement in the subject.

Moreover, majority of the teachers interviewed responded that they have high expectations for the improvement of academic performance due to ICT use in the instructional process and therefore had a positive attitude towards the same. However, some of the Biology teachers felt that ICT use makes no difference and therefore had a negative attitude. As one of the teachers responded in the interview,

> "Until recently many students did well without ICT in the Kenya Certificate for Secondary education (KCSE) examinations and many will still do well, so I don't see the urgent need for ICT advocacy".

Some teachers may be hiding the fact that their self- efficacy in ICT integration is actually very low. They therefore give reasons to justify their non- use of ICT by claiming the status-quo. Advancements in technology mean that teachers can turn to virtual field trips to make learning more interesting.

Conclusions

Based on the study findings the following conclusions can be made;

a) Fifty nine percent (59%) of the teachers said there is inadequate finance to purchase and sustain ICT resources
b) Fifty one percent (51%) of the teachers claimed that there was inadequate support of principals and teachers towards use of ICT.
c) Forty one percent (41%) of the teachers said abolishing institutional fees in public schools negatively impacts on sustainability though some levied fees against this policy.
d) Fifty six percent (56%) of the teachers felt that there was intermittent power supply in schools
e) Eighty seven percent (87%) of the teachers said that there was inaccessibility to internet services to both the teachers and the students.
f) Seventy eight percent (78%) of the teachers said congested classrooms due to large number of students are a major challenge facing ICT integration process.

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References

Akbaba, A, S. (2006).Complexity of Integrating Computer Technologies intoEducation in Turkey.*Journal of Educational Technology and Society* 5(3), pp.367-369.Retrieved from www.sciencedirect.com on 8th June, 2014.

Becta (2005).The Becta Review 2005: *Evidence on the progress of ICT in Education*. Retrieved from www.Bectaict@Research.com.

Franyo, I. (2007). The Process of Modernizsation in the Teaching of Biology.National institute for Public Education.1051 Budapest, Dorottya U.8. Retrieved on 13th February, 2009 from http.//www.oki.hu/oldal.pap

Hawthorne, R.K. (1992). Curriculum in the making: teacher choice and the classroom experience. New York: Teachers College Press, Columbia University.

Hellinger, P. & Heck, R. (1995).Exploring the Principals Contribution to school effectiveness 1980-1995.Green field Allyn& Bacon, Boston.

Jhurree, V. (2005) Technology Integration in Education in Developing Countries:*Guidelines to Policy Makers. International Education Journal* 6(4): 467- 483. Retrieved from:<http://ehlt.flinders.edu.au/education/iej/articles/v6n4/jhurree/paper.pdf> [Accessed 18 October 2013].

Maundu, J.N., Muthwii, S.M. &Sambili, H. J. (2005). Biology education: A methodological approach. Nairobi, Lectern.

Moersch, C. (1995). Levels of Technology implementation (LoTi): *A Framework for measuring Classroom Technology use. Learning and Leading with Technology.* Retrieved from http://loticonnection.com/pdf/LoTiFrameworkNov95.pdf on 15th June,2014

Reid, S. (2002). The integration of Information and Communication Technology into classroom teaching.*Alberta journal of Educational Research.* Vol.XLV111, No. 1

Rughubir, K. P. (1979). The laboratory-Investigative approach to science instruction, in the Journal of Research in Science Teaching, Vol. 16, No. 1.

Rumpagapon, W.M (2007). Students' critical thinking skills, attitudes to ICT & perceptions of ICT classroom learning environments under the ICT schools pilot in Thailand, PhD thesis, University of Adelaide.

SnezanaStavrevaVeselinovskaa , Jordan Zivanovika, Sonja Petrovska, Milena Gokika (2010). Interactive learning in programmed teaching of the subject.*Based of nature science at pedagogical faculties in the Republic of Macedonia (ICT tools in Biology education).* Retrieved from www.sciencedirect.com

Strengthening of Mathematics and Sciences in Secondary Education (SMASSE). 2000 report

UNESCO (2002).Information and communication technologies in teacher education: *A planning guide.*Retrieved October 19, 2013 from, http://unesdoc.unesco.org/images/0012/ 001295/129533e