Integrating Bluetooth Technology in Teaching and Learning for Effective Classroom Management

Nickson Moseti Ongaki

EMAIL: nickson.moseti@gmail.com

MOBILE: +254723944535/ +254202180624

Personal Biography

My name is Nickson Moseti Ongaki. I am a Kenyan young academician who has made significant contributions to the studies of human resource management and business administration. I was born in Kisii highlands in 1982. I remained there as I grew up and was educated in public schools. In high school I made several outstanding innovations and inventions that I managed to present during Science Congress to national levelI decided to seek academic careers, against my family's wishes. Both went on to attend Moi University, pursued a career in academics, ultimately becoming a banker, and teacher. I initially sought a bachelor's degree in education. Later, I decided to become an entrepreneur. After graduation in 2005, I attended summer school and took a masters course in Business Administration. I enrolled at the Jomo Kenyatta University of science, Agriculture and technology as a PHD student. I became a part time lecturer at Mount Kenya University after receiving my master degree. I described myself as being self-conscious, inarticulate, and innovative in my classes.I'm proud to say this new role suits me. I'm driven, not to do great things for myself, but to spur my society on to even greater ones.I am married to Faith Wavinya; we have 2 children, Linnah and Amma.

Abstract

Bluetooth is an open wireless protocol for exchanging information and data over short distances from fixed and mobile devices. This technology if well integrated in our classroom settings can improve the efficiency of classroom instructions by the teachers. Currently, most of our teachers are still using the traditional methods of instruction that is chalk and board against the use of digital devices like overhead projectors and laptops. This has made classroom instructions tedious to many teachers and learners are not quite involved in the learning process. These are the motivation for this paper and hence this paper seeks to explore the integration of bluetooth technology to enhance classroom instruction by:

i) analyzing the difficulties facing current classroom instructions.

ii) examining how the bluetooth technology can be integrated in typical classroom instruction set up

iii) investigating the application of bluetooth technologies in classroom set up.

iv) analyzing the challenges facing bluetooth adoption in typical class

Key words

Digital; piconet; master and slave units; authentication; synchronization; scatternet

Introduction

The Information technology (IT) revolution has led to data to be accessed on line or offline. Technology has made the world a global village where people communicate to each other

effectively and efficiently. It is clear that the communication landscape (Kress & Van Leeumen, 1996) has changed and with these changes we have witnessed dramatic shifts in the way young people make meaning from texts of all kinds ie multimodal texts. Multimodal in the global context is the communication in the widest sense, including the graphical, digital, electronic and artifact related. Dyson, 2003 argued that learners need a far wider range of affordances for meaning making in schooled settings and multimodal communication is a lens for understanding meaning by learners as it stretches out meaning. With the technological advancement, there has been need to digitalize learning systems. One of the tools being used in the same is "Bluetooth technology". This technology allows the scope for interactants to connect with the like minded others to feel the camaraderie of shared interests, to identify and solve problems in collaborative approach and to experiment with ideas and ways of communicating. I am particularly indebted to those who have demonstrated the potential of bluetooth technology in relation to its application in education environment.

Use of technology in classroom set up has various merits. Students learn at their own pace getting essential skills, knowledge and helps to bring the social gap amongst students. Students get enough time to practice with and without the teachers support from their peers as they get involved in the learning process. There is opportunity to apply skills and strategies in reading and writing meaningful text. Care needs to be taken with technology. If not well regulated, some students may get so much involved with the new devices and not the content and new concepts to be learnt.

Difficulties teachers face during classroom instructions

Traditional methods of instruction which relied on oral discourse and verbal comprehension have proven ineffective for many students and are cost effective. The method no longer coincides with or meets the modern technological needs or nuances of the society. The teacher has the responsibility to help the learners feel and be successful. Students often get bored and less interested in their school work. Some students get bored during instructions process and even doze in class since they are passive listeners. The learning process through school, academic tasks and concepts become increasingly more abstract and many of them fall further behind because their level of mastery is too rudimentary to allow for fluent learning. Facilities in most schools are quite inadequate vis a vis the number of the students currently enrolled for secondary education as a result of Free Primary Education in 2003. Many of these learners scramble to get the subsidized secondary education.

Some schools group students according to their ability without considering their individual differences. Ineffective instructional grouping with slow classes where instruction processes are at a slow rate. The task of delivering effective instruction and related services to students are more difficult in a classroom. Teachers face various discipline problems affecting delivery process. This mainly comes about where the teacher is the main contributor and students are mere passive observers. Similarly, some of the resources used may not be well adapted to the needs and abilities of the students , lacking innovation and interest

The traditional classroom layout make the amount of work space inadequate for students. The chalkboard in front of the classroom and sometimes others are at the sides or back make the main teaching resource. Instruction delivery is a vital important classroom activity and must be considered in the context of such factors as measures of desired student behaviour and considering individual difference.

Integration of the technology in classroom instruction

Since students are immersed in the electronic devices, teachers must learn how to integrate teaching and learning into this new electronic culture. Currently, there is integration of technology to enhance the performance of teachers and learners during learning process. The technology does not replace the teacher but help him / her do a better job. The idea is that by showing students content and processes everyday, teachers also see them and are receiving constant reinforcement of ideas they have taught (Webb & Palincsar, 1996).

Instructional technology is based on using modern electronic communication devices like VCR, audiotapes, computers and electronic bulletin boards. These present a new resource which make instruction comes alive. Students assume responsibility for their own learning especially if the material presented is stimulating. Mayer 2001 and his colleagues have shown that combining visual contents greatly increase learning and retention. Students also learn best when they control the rate of learning though participation and involvement. The latest pedagogical tools from technology permit teachers to customize instruction to the needs and pace of individual students. Students do not need be near the teacher for instruction to take place. One of the tools used to enhance effective teaching and learning is the bluetooth technology.

History Bluetooth Technology

The name bluetooth comes from King Herald Blaatard (Bluetooth). A Denmark who lived in the 10th century AD. He had dark hair thus the name Bluetooth meaning dark complexion. He is credited with bringing Christianity to Scandinavia along with the unifying Denmark and Norway. Bluetooth is an open wireless protocol for exchanging data over short distances from fixed and mobile devices, creating personal area networks (PAN). It can connect several devices overcoming the problem of synchronization. Its protocol stack allows devices to locate, connect and exchange data with each other and to execute interoperable, interactive applications against each other.

Bluetooth Basics

The key features of bluetooth technology are robustness, low power consumption and low cost. A fundamental bluetooth technology is the ability to simultaneously handle both data and voice transmissions. This enables users to enjoy variety of innovative solutions such as a hands free headset for voice call, printing and fax capabilities and synchronizing laptop and mobile phone applications.

This technology represents a wireless solution that is ubiquitous across a broad range of devices. It also unplugs the digital peripherals and makes a cable a thing of the past. These peripherals just need to be bluetooth equipped. The features of this technology include:

- 2.4 Ghz frequency band is separated into hops allowing the ability to hop from one channel to another and add a stronger layer of security.

- It can network up to eight devices in a piconet,

- Devices do not need to be pointed to each other because the signals are omni-directional eliminating the need for line of sight at a range.

- Both synchronous and asynchronous applications are supported making it easy to use a variety of devices for many uses eg voice and internet.

How does Bluetooth Work?

Bluetooth devices exist in small network configurations with the ability to operate as either master or slave. The specification allows the mechanism to switch their roles. The configuration can be single point, which has one master or one slave. Multi point configurations called piconet can have eight slaves clustered around a single master. A scatternet, a group of piconets hubbed via a single bluetooth device acting as a master in one piconet and a slave in another piconet. The scatternet permits either larger coverage areas or a greater number of devices than a single piconet. The role of the master is to control the available bandwidth between slaves. It calculates and allocates how often to communicate with each slave and locks out them into the appropriate frequency hopping sequence. The master transmits control by dividing the network into a series of time slots among the members

A bluetooth device does not have to be aware of the devices they are attaching to. There is a built in mechanism to inquire for devices, connect to them and once connected discover the services they possess in their database. The devices needing to connect proceed as follows:

- The master sends out an inquiry to discover device available to connect to.

- Slaves make themselves discoverable by entering inquiry scan mode and listen for inquiry from a master.

- The slave responds to the master with a frequency Hop Synchronization Packet (FHS). The FHS contains information that is needed to create a connection to the device including Bluetooth address and class of device.

- The master collects the FHS information and goes into page mode paging the device using the given address.

- The slave device will need to be in page scan mode to connect to a master. (Jones and Niel:6)
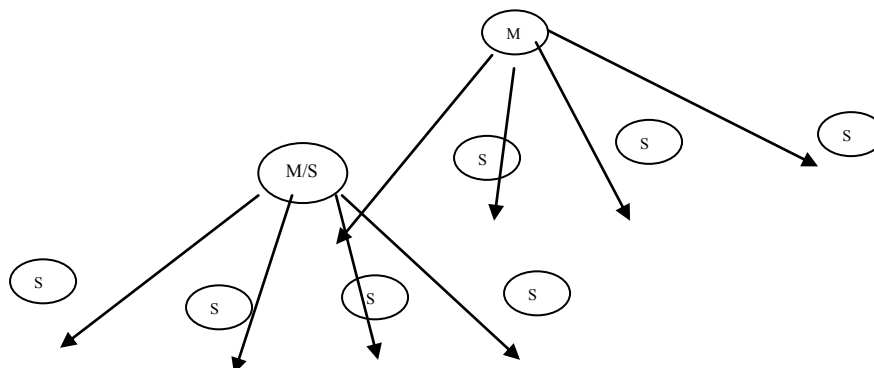
Master / Slave relationship

Application of the technology in a classroom setting.

Classrooms fitted with technological devices are very crucial in the delivery of instructions. Interest in the extent to which texts and graphics can and do cross sites is by now quite well established. In school, a raft of concerns have focused on the extent to which out of school cultures are tried across to classroom learning in pursuit of expansive educational purposes. This has brought together the pedagogical aim of helping student become effective and powerful participants with the latest classroom appropriateness from the digital environment like the use of the bluetooth technology. Maenpaa 2001 argues that teenagers use technology to share their lives to demonstrate that they are living in the same rhythm or wave with one's closest friends and peers. I have a sense of learners operating in constructed environments can benefit from these interactions

Ito and Daisuke 2004 describe the ways in which teenage keep in almost constant mobile phone contact with the close peer group and interact both within and beyond their immediate peer group. We see that teens share data and information amongst themselves and allow others to join them through participation. Wenger 1998:87 describes a process of enculturation where learners are formally instructed and learn through being part of a group. Where this is focus, we can apply the bluetooth technology in our classrooms. The bluetooth technology is an exciting new way to communicate not only between handhelds and computers but with almost every device imaginable as long as its bluetooth enabled. In a classroom, a teacher can use any bluetooth enabled device. Bluetooth will redefine the way we experience connectivity and communicate. It will from a cordless telephony in the classroom. Kess and Van Leemen 1996 argue that the communication landscape has changed and we need to positively change with the changes. Texts and graphics are constantly moving and changing amongst young students. One bluetooth device can browse a file system, create or delete files or folders or transfer files to and from shared resources, ideas and discovery to enhance learning. This inculcates in learners a sense of responsibility for their devices and sharing. It is learner centered method of learning as the teacher only does supervisory role. These devices simultaneously handle both data and wire transmissions enabling users to enjoy variety of innovative solutions eg printing capabilities.

The applications of bluetooth technology in classroom are quite varied depending on the availability of digital devices. Images can be transferred from a still or video camera to another device such as a computer for storage, editing and printing. No specific printer drivers are required for the printer to print from a bluetooth enabled device. Instead, the printer has the capability to decipher the information sent to it so that it can produce the desired format. In case of excursions or any form of tour, students can take varied pictures and easily share with their peers and any time. This enhances deeper understanding of the content learnt as they freely and easily relate what they are seeing to the subject matter. A buetooth device that has voice capability can act as a cordless phone when in the area of bluetooth access point or other device that has a connection to voice network. This can help to explain a point regardless of the number of students. As long as a student is within a scatternet where he / she can still understand the teachers instructions and respond accordingly. A sample of an ear device which bluetooth enabled is shown below.

A headset can receive or send audio to a mobile phone or to a handheld device. This promotes discussion amongst the students themselves or the teacher. Classroom arrangement or over crowding in the class does not inhibit interaction since the devices makes it simpler and easier. One bluetooth device can browse a file system, create or delete files or folders or transfer files or folders or transfer files to and from another blutooth device. Other devices like tablet PC can be used to improve the handwriting of students. It collects data about the words a student uses and he / she write them learning how the student's writing style and vocabulary. The Tablet PC recognizes the handwriting of every student and converts it typed text. This helps the teacher to receive every student's personal work.

Security

Security of the device is enhanced in various ways. To prevent others from seeing your device, you can set it to a non discoverable mode or you can only pair with a known device. The device has a pin for authentication and for this you can change the default pin to the pin you know. Generic access allows the discovery, link establishment and security levels between two devices regardless of the devices' manufacturer.

Recommendation

The wireless world continues to grow as engineers develop faster, more robust technologies to free us from wires for greater simplicity, convenience and efficiency. From short range to long range, the wireless landscape has taken shape in our educational system in different ways. E-learning has been enhanced across different countries and Kenya is not exceptional. We should embrace technology and integrate it to classroom instructions where applicable. Good classroom teaching is a vital part of the repertoire and we must

explore its potential.

Conclusion

Technology presents images or information to the learner whereby he or she constructs new knowledge. Learning is viewed as active, constructive process where new information is extracted from the environment and integrated with prior knowledge. Uses of technological devices can enhance deeper understanding of concepts like pumping of blood by the heart. Classroom environment should be multi dimensional – so many different events and so many different related tasks to learning should be co-related for effective dissemination of knowledge. The students are different from each other, the pace at which they can work, the depth to which they can understand, the background knowledge and experience that they bring, their attitude and willingness to learn all vary. Different learners need different approaches for effective learning process. This makes the classroom attractive in appearance and functional.

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