

USE OF BLENDED LEARNING IN NIGERIAN EDUCATIONAL SYSTEM: OPPORTUNITIES, BENEFITS AND CHALLENGES

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Abstract

Learning is an inherently social process, and different strategies for effective learning can be implemented. Blended learning - a new era of technology is bringing promising prospects, accompanied by numerous new challenges for educators. Traditional methods, such as face-to-face teaching, are experiencing substantial transformations by utilizing these innovative technologies, many of which are instructional tools. This paper examined the term blended learning, its difference from E-Learning, its benefits, opportunities and challenges including: developing blended pedagogy, teacher support and professional development, technological challenges, student preparation/support and transition, unrealistic expectations, assessment considerations and culture and innovation.

Keywords: E-Learning; Blended Learning, Traditional method of learning

Introduction

The global and contemporary society involves dynamic, frequently unpredictable changes, which call for graduates' ability to interact fluently and to adapt to a variable social professional environment (Homer-Dixon, 2000; Singer, 2006). In the current contemporary world, the development of university education process is marked by the overwhelming influence of information technology. As a consequence, the learning process is adopted in an exquisite and dandified manner. Modern society globalization has led the labour market to the emergence of new professions, resulting in reconfigurations of specializations within universities and transformation of traditional classroom functions into integrated learning that encompasses the research needs. Classrooms today have received a significant overhaul with the inclusion of ICT and new learning pedagogies. Advancements in computing and multimedia technologies in education have resulted in an emerging breed of technologically proficient learners (Mai, as cited by Ambikai and Muhd 2015). Today's students are digital natives condoned by the transformative environment created by the advanced technology which is an efficacious mode for civilization and globalization.

Traditional methods of learning have been inspected and found wanting, for example in terms of the need for flexible thinking and technological implementation. Traditional classroom-based learning in which students are passive recipients of information provided by the expert, have in certain circumstances been replaced by e-learning. The implicit assumption behind moves to full e-learning is that e-learning is the best way to achieve educational improvement, in all subjects, for all students. New educational paradigms have emerged, with the learner seen as an active agent. One way of facilitating such activity is to make the learner the information seeker. Thus, most educational institutions aim to adopt e-learning with an assumption that this will reap greatest educational improvement. (Ruba and Woodcock 2014). This can be referred to as online learning or E-learning. In the early 1980s, the computer industry and multimedia organizations started to constitute e-learning as a reality (Charp, 1997). Companies and educational institutions were steadily hiring instructors to train their students. In higher education, teachers had just begun to use PowerPoint, a program that allowed people to create visually enhanced presentations. They were also able to play explanatory videos that could assist student learning during the class. This period was referred to as Computer-Based Training.

Online Learning according to Rosenberg (2001), or e-learning experience offers various possibilities in terms of relating information and instruction as vehicles to develop and preserve intellectual capital. E-learning is defined as instruction delivered on a digital device such as a computer or mobile device that is intended to support learning, be it self-study (asynchronous) or instructor-led e-learning (synchronous) (Clark & Mayer, 2011). Ellis (2004) believes that teaching through digital referencing may help the students to enlighten their info seeking, besides promoting knowledge extraction from multiple resources. Web 2.0 in education is one of the primary catalysts that motivate the seeking engine in teaching and learning process (Hicks and Gruber, 2010). In contrast, Milson (2002) reported that many students simply took a path of least resistance when it came to gathering and working with information. Students sought to use sites that would yield the answer quickly, as opposed to examining a range of sites to pull together a more nuanced perspective. Similarly to Ambikai and Muhd (2015), students experiencing technology frustration might encounter initial disappointment in terms of technology's inherent ability to facilitate inquiry. In certain cases, the students did worse at the end-of-unit experimental result as traditional approaches. Ambikai and Muhd(2015) suggest that teachers must provide scaffolding to support and monitor students in using technology as a tool to facilitate inquiry.

Ambikai and Muhd (2015) viewing the e-learning process takes one on a never-ending journey of exploration. E-learning includes web-based courses, computer-mediated communications and multimedia enhanced delivery medium, which has the potential to make the learning process an active one. In the past, academic literatures have indulged in discussions for e-learning and blended learning (Graham, 2005; Garrison & Kanuta, 2004, and Graham et al., 2003). However, technology enhanced learning has been ignored to a certain extent. Technology and the ease with which it can be accessed have changed the way we live and work. Today's students will not only compete with students that sit next to them, but also with their peers from across the globe. The world has truly become "flat" and, for students to compete in this new reality, they must develop the skills to use technology appropriately and ethically to enhance their learning.

Technology became embedded in instruction practically from the time it was invented. But with the meteoric expansion of the Internet and its utility in instruction, the difference between blended learning and learning online must be clarified, as they are often used simultaneously to explain the same model. It is believed that instruction provided completely online is a different kind of model and should not be confused with blended learning. In addition, blended learning includes multiple technologies, not simply online technology. There are compelling reasons to differentiate the two models. For most students switching from an in the-classroom education to a complete online education program is not necessarily a good alternative. Students, especially elementary age students, benefit from classroom structure, age-appropriate activities and information, a sense of community that a public school offers, and an interaction with peers, teachers, education support professionals, and other members of the education team. These integrated processes constitute the focus of this paper review which is centred on blended learning.

To have a clearer view on the definition of blended learning, we would examine the classroom and the teachers. Historically, classroom teachers have used a range of learning activities and resources to assist learners to achieve learning objectives. Face-to-face presentations, visual material, paper-based assessments, online research and group activities have been the mainstay of classroom teaching for many decades. More recently mobile technologies and collaborative Web 2.0 tools have expanded opportunities for learning. Blended learning is really no more than a combination of all of these approaches. For some teachers, blended learning is describing what they've been doing successfully for years: that is, using a range of resources and activities to provide individualized, student-centred learning experiences for their students. The real difference today is the unparalleled access to the internet with its rich sources of information and services and more importantly, the connectivity it offers students and teachers, particularly the ability to create online communities and support networks. In addition, there is a growing use of mobile

technologies such as flip cameras, voice recorders, mobile phones and GPS devices extending learning beyond the classroom walls. For other teachers, blended learning represents a challenge. They are not comfortable with nor do they fully understand the technologies and media that their students use every day, or the potential that these can offer their learners. To assist teachers in implementing blended learning activities, this paper reinforces the concept that blended learning comes in many guises and isn't a "one-size-fits-all" educational solution.

Definitions of blended learning range from the very broad where practically any learning experience that integrates some use of ICTs qualifies, to others that focus on specific percentages of online curriculum and face-to-face instruction. Most people agree that blended learning combines teaching and learning methods from face-to-face, mobile and online learning and that it includes elements of both synchronous and asynchronous online learning options. The integration of new mobile technologies and online media is proving highly effective in helping schools meet the expectations of 21st century learners while addressing the challenges of limited resources and the special needs of many students. However, not everyone is happy with the term blended learning. Oliver and Tingwell (2003) in their article "Can blended learning be redeemed?" argue that blended learning is ill-defined and muddled as a description of particular forms of teaching with technology. They argue that the term blended learning may be redundant and gratuitous, as the practice of mixing traditional classroom methods with technology is widespread. This summary acknowledges that a broad continuum of definitions exists and that its definition will continue to evolve in the literature as new technology and associated skill sets emerge. Blended learning is realized in teaching and learning environments where there is an effective integration of different modes of delivery, models of teaching and styles of learning as a result of adopting a strategic and systematic approach to the use of technology combined with the best features of face to face interaction. Blended courses (also known as hybrid or mixed-mode courses) are classes where a portion of the traditional face-to-face instruction is replaced by web-based online learning. McGee and Reis (2012) point out that while there is no absolute agreement within higher education on the exact make-up of a blended course, institutions generally use "blended" (or related terms) to refer to some combination of oncampus class meeting and online activities. Graham, Herie, and Gibbons (2014) concur that "models adopting the (combining online and face-to-face instruction) definition are the most prominent in the research." Blended learning is a phenomenon subjected to much ongoing research. Additionally, Dziuban, Picciano, Graham and Moskal (2016) have edited a new collection of research on blended learning as a sequel to the two landmark books previously published. Nevertheless, practical questions often predominate in the minds of teachers and designers new to blended learning. For instance, how much of the face-to-face instruction must be replaced by online coursework? This question will vary greatly by class, discipline, and learning objectives. The Sloan Consortium (a professional organization dedicated to postsecondary online learning) defines blended learning as a course where 30%-70% of the instruction is delivered online. While this is a useful guideline, it may not be sufficient to cover every blended learning configuration.

A blended learning model incorporates the best aspects of both face-to-face and online instruction:

- Classroom time can be used to engage students in advanced interactive experiences.
- The flexibility and convenience of the technological/ online portion of the course can provide students with multimedia-rich content at any time of day, wherever the student has Internet access.
- Early evidence suggests that a blended instructional approach can result in learning outcome gains and increased enrolment retention.
- From the above views, blended learning can best be described as the integration of different teaching methodologies, the application of technology and the face to face delivery approach to the learners.

According to Griffith University (2010) Blended learning is about effectively integrating ICTs into course design to enhance the teaching and learning experiences for students and teachers by enabling them to engage in ways that would not normally be available or effective in their usual environment, whether it is primarily face-to-face or distance mode. In many cases the act of “blending” achieves better student experiences and outcomes, and more efficient teaching and course management practices. It can involve a mix of delivery modes, teaching approaches and learning styles. Advances in technology provide new opportunities for teachers to design and deliver their courses in ways that support and enhance the teachers’ role, the students’ individual cognitive experiences, as well as the social environment; three key elements in successful learning and teaching. Blended learning technologies can:

1. Broaden the spaces and opportunities available for learning;
2. Support course management activities (e.g., communication, assessment submission, marking and feedback);
3. Support the provision of information and resources to students;
4. Engage and motivate students through interactivity and collaboration.

So it is not just about using technology because it is available; blended learning is about finding better ways of supporting students in achieving the learning objectives and providing them with the best possible learning and teaching experiences, as well as supporting teachers in their role (including the management and administration of courses). Of course, the integration of blended learning in courses will naturally vary according to such factors as: discipline, year level, student characteristics and needs, course or program learning objectives, as well as the academic’s approach to teaching,

Examples of blended learning

1. Managing the marking, entering and releasing of grades for a course with over 700 students using an online grade centre in creating efficiency and accuracy for multiple markers and the course convener by reducing double handling, while giving students flexible and timely access to their results and feedback.
2. Delivering a lecture to on and off campus students simultaneously using an online virtual classroom tool helps to create a sense of community for the whole group and reduces workload for the lecturer by presenting only once.
3. Small group problem based learning activities are managed more effectively and efficiently within a large class by using an online collaborative workspace, allowing for greater transparency in group work assessment as well as providing an archive of resources for current and future students.
4. Weekly online practice quizzes to support lecture and textbook material using automatic marking functionality producing immediate and automatic feedback to individual students about their understanding

A current report suggests that, “the push toward blended learning is motivated by two factors: A huge industry out there ‘that’s dying to make money,’ and the idea that in the long run this will save money on teachers—a claim that so far does not have research to substantiate it.” Other research recommends that small scale blended learning pilots are necessary to determine the value and success of the proposed program. They caution that without pilot testing, “...this is a very costly, large-scale experiment on our children.” But whatever the rationale, most researches reveal that a clear and consistent teacher presence is essential to the “blending” of technological/online resources within class time.

The teacher:

1. Facilitates learning, even within an online environment
2. Develops student-centred courses—not traditional lecture-based classes

3. Organizes online learning to contain small-group activities and team projects where students must collaborate
4. Communicates clear expectations for students where activities and assessments should account for different learning styles and best practices are implemented
5. Prepares for the challenges of online instruction and the use of all kinds of technology, and is proficient in the content area

A teacher in an effective blended learning environment would:

1. Use modern information, communication, and learning tools
2. Promote online dialogue to deepen the learning experience
3. Use adaptive technologies to meet individual needs
4. Assist students with speech impairments, e.g., computers that speak through speech synthesis, and text messaging-equipped mobile phones
5. Use effective written communication
6. Collaborate with students online to further student participation
7. Understand how the content management system (such as the “Cloud”) works and how they can help facilitate the learning

Blended courses have proven to be among the most popular choices for students at institutions where they are offered (Olson, 2003 cited in Drysdale, Graham, Spring, and Halverson, 2013 and Kaleta, Garnham, and Aycock, 2005). At first glance, this popularity seems intuitive because blended courses allow students and faculty to take advantage of much of the flexibility and convenience of an online course while retaining the benefits of the face-to-face classroom experience. Ezekoka (2015) also agreed that the use of blended learning can also potentially elicit another good practice principle, which is to give prompt feedback, as blended learning usually involves online interaction. However prompt feedback depends on how frequently the instructor and students use the relevant online platform. Although fully online learning has become well established in higher education in Nigeria, many institutions appear to be struggling with conceptualizing and implementing blended learning. Yet, where blended courses have succeeded, they have most often done so when strategically aligned with an institution's mission and goals. The development and delivery of blended courses can be used to address a variety of institutional, faculty, and student needs.

For universities, blended courses can be part of a strategy to compensate for limited classroom space, as well as a way to think differently about encouraging faculty collaboration. For faculty, blended courses can be a method to infuse new engagement opportunities into established courses or, for some, provide a transitional opportunity between fully face-to-face and fully online instruction. For students, blended courses offer the conveniences of online learning combined with the social and instructional interactions that may not lend themselves to online delivery (e.g., lab sections or proctored assessments).

- inclusion of more differentiated/personalized instruction
- increased access to resources, experts and learning opportunities
- more authentic and student driven tasks being incorporated into the curriculum
- higher student engagement
- greater opportunities for collaboration (especially beyond the classroom and involving the wider school community)
- exposure to a wide range of Web 2.0 technologies and acquisition of contemporary literacy skills
- better access to infrastructure and, anytime, anywhere learning

If an institution's blended learning strategy can be designed to address the needs and dynamics of all three constituencies (institution, faculty, and student) simultaneously, then blended learning can become a powerful force for institutional transformation. As cited in the U.S. Department of Education's (2010) "Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies," "Students in online conditions performed modestly better, on average, than those learning the same material through traditional face-to-face instruction" and, notably, "Instruction combining online and face-to-face elements had a larger advantage relative to purely face-to-face instruction than did purely online instruction"

Not only do students perform better in blended courses, but the electronic resources inherent in the modality offer other advantages as well. For example, student performance analytics can be used to study and better understand student learning. Data analytics can also identify students who need early intervention, thus increasing retention. The online tools available in blended courses can also significantly enhance student engagement, ensuring that all students participate in course discussions and benefit from collaborative learning. When properly implemented, blended learning can result in improved student success, satisfaction, and retention. For instance, the University of Central Florida has consistently seen such results over the 17 years of their own blended learning initiative. Since beginning this initiative, as of the end of the 2015-2016 academic year, UCF has delivered 10,941 blended course sections containing 394,962 student registrations and generating 820,492 semester credit hours.

Blended learning aims to incorporate the best aspects of face-to-face classroom learning experiences with the best of mobile and online learning experiences. This allows:

1. An increase in learning outcome measures and lowering of attrition rates compared to fully online courses (Dziuban, Hartman & Moskal, 2004)
2. An opportunity for students to practice technology skills in navigating online course materials and creating their own digital content for assessment
3. An increase in student-teacher and student-student interaction through the use of communication tools like discussion forums, blogs and shared web content on the electronic whiteboard
4. The ability to reserve face-to-face time for interactive activities, such as higher-level discussions, small group work, debates, demonstrations, or lab activities. For students, the appeal of blended learning includes:
 5. Flexibility and the freedom to learn anytime, anywhere
 6. Some level of control over the pacing of their learning. Difficult concepts can be reviewed as often as necessary
 7. More engaging content that they can create and use their own initiative, and networks to shape
 8. The opportunity to engage and draw on expertise that would otherwise not be available to them without costly travel, such as virtual conferencing with zoo/museum/galley staff or virtual excursions to overseas historical or culturally significant landmarks.

The trial projects have identified a number of challenges for teachers and students to implementing blended learning strategies: developing blended pedagogy, teacher support and professional development, technological challenges, student preparation/support and transition, unrealistic expectations, assessment considerations and culture and innovation. Teaching using a blended approach can be challenging for some as it may require the acquisition of different teaching skills, re-designing the curriculum and the inclusion

of new teaching and learning opportunities, managing the learning content both online, in-class and beyond the classroom walls, and preparing students to work in blended modes. Most negative feelings towards blended forms of learning tend to be generated by poorly designed approaches. It takes a great deal of thought and careful planning to deliver a quality learning experience regardless of the mode of delivery (Idaho Digital Learning Professional Development, 2009). Adopting a blended learning approach must start with a re-examination of the intended learn outcomes? The teacher needs to design learning activities that support these intended learning outcomes, personalize or differentiate learning and then integrate these activities effectively with the required assessment tools. Teachers should prepare their students for the blended learning style and discuss the new roles and responsibilities. Some students won't be used to working independently or may be unfamiliar with some of the technologies, so support mechanisms will need to be put in place for these students.

Feedback from the trials indicated that the capacity for teachers to incorporate new technologies into teaching and learning programs may be limited without an expanded time commitment, and better support from IT staff and additional professional development. Professional development options to be considered include adding new competencies to the curricula, assessment schemes more suited to blended delivery, and graduate training to encourage blended teaching and learning approaches across all curriculum areas. Other options might include motivating and/or rewarding teachers for the innovative use of blended learning approaches to improve student outcomes plus support from peers and technical experts. Teacher training needs to include and refine competencies of teachers in taking on a more facilitative role: skills such as questioning, creativity, observation, differentiation/scaffolding, and facilitating collaboration and networking opportunities and especially in understanding of and imparting of knowledge of online protocols (such as cyber ethics and intellectual property). Support for teachers can often come from peers. The Overcoming ICT Barrier in the Seven Hills Cluster (2010) project allowed the teachers from each school to communicate more effectively, and to plan curriculum tasks together, where previously they would only meet on cluster days or on an ad-hoc basis. Some teachers in these trials were able to pair up with literacy and Ultranet coaches, as well as cultural partners (zoo, museum, Gallery, State library experts) to achieve better outcomes from blended learning projects.

Access to devices is generally a major issue in the Nigerian education system, as schools are not provided with a grant to enable them to purchase devices. However, even schools where government provides, the grants are not sufficient to support one-to-one access. Teachers are however handicapped to employed techniques to enable devices to be shared - by having class sets and using rotations and/or by sharing device functionality through headphone splitters or interactive whiteboards, or assigning collaborative tasks that require sharing. Teachers in Nigeria who have embraced blended learning as innovative teaching methodology have pointed out that technical support is not generally available and it is becoming an issue because devices are becoming more expensive, teachers are not offered professional development and most schools don't have allocation of funds for technical support. Both students and teachers acquired more knowledge of the devices through personal development. Collaborative teaching reduced the reliance on one teacher problem-solving technical issues. Access to technical assistance and ICT training opportunities remains the outstanding issue for some educators in the Nigeria system.

Another challenge related to technology is the pervasive access the technology affords. Although the flexibility to learn online and from a distance provided by blended learning is perceived as advantageous, the pervasive access may also be invasive to learner's personal lives. For some, the online component results in more time devoted to study, and less to personal concerns. This can lead to participants feeling overwhelmed and tired. Ezekoka(2015). It's not only the teachers who need support for the transition to a blended learning environment. Students also need preparation and support for the transition to becoming more independent learners and self-managers. Support for Students – the role of the wider workforce including paraprofessionals. Díaz and Entonado (2009) noted that the important role of teachers

in blended learning is in “facilitating of the teaching/learning process, combining the explanation of theoretical contents with activities, and encouraging interaction”. Students also required additional assistance in understanding internet protocols especially those of cyber safety and intellectual property. Intercultural understanding was also an area that required guidance. Students can also engage expert non-teachers (paraprofessionals) to assist with specific content teaching, for example scientists, especially through the use of Web 2.0 technologies. Ezekoka(2015) citing Poon(2013) suggests that students enrolled in blended courses can sometimes have unrealistic expectations. The students sometimes assumed that fewer classes meant less work, had inadequate time management skills and experienced problems with accepting responsibility for personal learning. Students in such courses as also reported feeling isolated due to the reduced opportunities for social interaction in a face to face classroom environment. Ezekoka(2015)

Assessment Considerations

- The way in which teachers assessed student outcomes in these blended learning projects changed, for example:
- Reflection was encouraged, so students could go back to revisit their products such as podcasts and refine them
- Teachers were able to assess many more skills than just traditional literacy (e.g. reading, writing) in activities such as digital story creation e.g. group work, media literacy and technical editing skills
- Technologies that enabled frequent feedback (online quizzes) allowed for differentiated intervention
- Engaging students in creating their own podcasts, films and games allowed teachers to assess deeper conceptual thinking and creativity
- Monitoring using ICT was often instantaneous and timely, offering immediate opportunities for remedial action
- Collaboration and peer review became part of the formal assessment using ICTs especially through blogging, discussion boards and film making, and this encouraged better performance
- Assessment criteria in these projects were also more transparent to students (possibly due to the use of rubrics), raising expectations in performance
- The public nature of students’ work and having an authentic audience (through blogging, web pages, online chat etc) made students more aware of social etiquette, the need to present better products and encouraged healthy competition between students raising academic achievement.

Culture and Innovation

The system and cultural influences on student performance, teacher practice and device access were profound. Student’s shows support by showing interest in the learning, providing encouragement/assistance, and by creating an expectation that there would be a flow-on effect across the school. This raised expectations, empowered teachers and students, contributing to better outcomes. An Innovative Culture, A culture that encouraged innovation is typical for the success of these blended learning projects. In general the culture must be accepting of change and risk and looked to overcome issues and to challenge students to do better.

Conclusions

In this study we considered the meaning of blended learning , opportunities, benefits and challenges associated with blended learning. Blended learning is more than just a hot new trend in education—it’s the way classrooms of the future will work. The concept behind blended learning is to take the best elements of in-person classroom instruction and online instruction and combine them. In a blended classroom, students attend classes in person and watch lecture videos or complete online activities. By

combining online and in-person elements, educators today are creating the best learning environment possible through blended learning. Blended learning has become extremely popular in higher education settings. Blended classrooms allow greater flexibility for students and can encourage non-traditional students to pursue higher education. This approach also saves teachers time, as they can record a lecture one time and use it indefinitely, rather than delivering the same lecture to multiple classes each semester. Although there are challenges in the use of blended learning, efforts should be made towards overcoming these since blended learning has numerous benefits.

Recommendations

From the above discussion, blended learning can be more effective if the suggested views are integrated

1. Training of teachers and students in the relevant ICT skills
2. Familiarity with Web 2.0 tools and other ICT gadgets
3. A commitment to collaboration and student-centred learning that should underpin the languages program
4. Sufficient class access to the internet and relevant hardware especially in our secondary schools
5. Sufficient time for professional learning, program planning and resourcing

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UNDERGRADUATE USE OF MOBILE TECHNOLOGY IN BLENDED LEARNING IN KOGI STATE UNIVERSITY, ANYIGBA.

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Abstract

In most tertiary institutions in Nigeria, mobile Phones are not officially allowed in the classroom session for teaching and learning. This paper therefore, investigated the use of mobile technology for learning by undergraduate students of Kogi State University, Anyigba. It was conceived as a result of the overcrowding situation in the Nigeria university system. Quasi-experimental research design was used to elicit responses from 235 undergraduate students of the university who were purposively selected from 300L to form both the control and experimental group. Two research questions and two hypotheses guided the study. A researchers made essay test was used with Instructional Mobile Technology Package (IMTP) to elicit responses from the students. Mean and standard deviation were used to answer research questions while ANCOVA was used to test the hypotheses at 0.05 level of significance. The findings of this study revealed that the use of mobile technology by undergraduate students enhances better performance and also help to solve some of the challenges of overcrowding in the classroom but this is not without its attendant challenges. Among the recommendations is that the use of mobile technology should be in cooperated into the undergraduate curriculum at all levels of the university system.

Keywords: Mobile-Technology, Blended Learning, Synchronous learning.

Introduction

Mobile technology is becoming more popular in our educational system with increase in the enrolment and population explosion in the university education. Mobile technology is used for cellular communication. It is a form of technology that mostly used in cellular communication. These include general packet services GSM, multimedia messaging MMS, Bluetooth, 3G wireless fidelity WIFI global positioning system GPS etc. it is the technology that is portable, it refers to any devices that you can carry with you to perform a wide variety of tasks.

Information and communication technology is a principal driver in our Information Society of which the immediate consequences for educational practice can be observed (Kozma, 2005). Following this evolution, several authors have mentioned the need to shift from the traditional classroom setting, where the student is seen as a passive consumer of educational knowledge, to a classroom in which learners are considered active participants and where collaboration and sharing information in a resource-rich environment is given precedence (Hill & Hannafin, 2001; Pelgrum, 2001; Figueiredo & Afonso, 2005). Fallon (2013), observed that to advance this shift and the necessary educational reform, hardware and software developers promote new technological tools, and more specifically tablet devices, as magic devices. These tablets are more narrowly defined by the New Media Consortium in 2012 as iPads, Windows or Android devices, i.e. small, wireless, mobile personal computers which have finger-driven touch screens and are backed-up by diverse applications in a well-provisioned application market place (Melhuish, 2010, Clark & Luckin, 2013).

Hattie, (2013) claimed that the following conditions should be fulfilled in order to integrate technology into the classroom; namely the role of the teacher, the need of professionalization, and the need of adapted teaching and learning approaches.

While it can be argued that the use of technology during classes can support constructivist approaches (Linn, 1998; Sanhoitz, Ringstaff & Dwyer 1998), implementing technology into classes does not imply a radical change of the didactics (Stoddart & Niederhauser, 1993; VanDusen, 1995). According to Yelland, (2006), learning with technology needs more than making learning activities digital, it is also about creating ‘contexts for authentic learning that use new technologies in integrated and meaningful ways to enhance the production of knowledge and the communication and dissemination of ideas’.

Obviously, with regard to integrating technology into the classroom setting, it is the teacher’s main responsibility to facilitate this educational innovation (Chen, Looi & Chen, 2010; Vanderlinde, & Braak, 2011). In this light, Fullan, (2001) formulated three important dimensions for educational innovation: (1) the possible use of adaptive material; (2) the possible use of new teaching approaches and, (3) the possible change of beliefs. While the need to investigate perceptions is emphasized by numerous authors (Vanderlinde, & Braak, 2011; Fullan, 2001) who stress that cognisance of end users’ perceptions of this technological innovation is crucial for predicting the success, speed and extent of its integration in classroom practice, teachers’ beliefs and attitudes towards innovation should be examined. Furthermore, research of Fullan (2001) and Niederhauser & Stoddart (2001) show that teachers’ beliefs are crucial; their beliefs are related to the actual uses of the implemented technology. The personal willingness of teachers to adopt and integrate innovations into their classroom practice is the key for successful innovation (Gess-Newsome, Southerland, Johnson, & Woodbury, 2003; Ghaith, & Yaghi, 1993; Groff, & Mouza, 2008).

The 21st century is characterized globally by a dynamic force for individual learners to collaborate and compete in a world which is driven by technology and information. The world is a global community where students in tertiary institutions should carve their niche as citizens of their country and a member of the global village where dignity of labour, skills and academic acquisition are paramount. University education should be committed to the appropriate, effective and sustainable use of information and communication technology to broaden access to and improve the quality and efficiency of education service delivery for the individual and the community. The introduction of mobile Learning (M-Learning) is a new paradigm shift in the education industry. The core idea of m-learning is to improve on past technology with a view to making life more self-realized, self-employed, skillful and technology centered. With the absolute use of m-learning, learning tasks would be easily surmounted by university students.

Mobile Technology is a form of technology that is usually used in cellular communication and other related aspects. It uses a form of platform where by many transmitters have the ability to send data at the same time on a single channel. This platform is called code-division multiple access (CDMA). This platform allows many users to make use of single frequencies because it restricts the likelihood of interference of frequencies from two or more sources. This channel has evolved over the years. The m-technology has improved from a simple device used for phone call and messaging into a multi-tasking device used for GPS navigation, internet browsing, gaming, instant messaging tool etc. M-technology through tablet and other portable computers are becoming more and more popular. This includes m-learning.

M-learning is an educational system. It is learning supports with the help of mobile devices, a continuous access to the learning process. It can be on appliances such as phone, laptop or tablet. Learning can take place whenever and wherever you want. M-learning is a form of e-learning whereby mobile devices, especially smart phones, are used to access learning resources on the internet or intranet and this is becoming acceptable. In advance country, more and more schools are using laptops or tablets, Children consider it to be a fun. There are increasingly more educational apps available for teachers. Examples of mobile learning in education include;

Offering mobile learning material: This is the easiest way of mobile learning. You can offer texts, videos or audios. It's possible to do this whenever you want. Participants are able to prepare homework by watching a video that the teacher has put online. This way of mobile learning is relatively less interactive. It's more about individual consuming. There is no interaction with teachers or other students, which makes it an asynchronous way of learning.

Interaction during lessons: If you do want to have some more interaction, you can use mobile devices during your lessons. An example of this is asking questions during your instruction. Teachers ask questions and the pupils will answer them on their mobile devices. Teachers are able to get immediate feedback. This is especially easy for teaching large groups.

Synchronous learning: Immediate feedback from your teacher or fellow students? This is possible with synchronous learning. You are able to get direct feedback while you're at home. Teachers can interact with their students during their lectures.

There are four generations of mobile system world-wide which include: 1G wireless communication system which became commercially available in the early 1980s. The 2G mobile networks referred to as "digits" introduced in the early 1990s. The 3G, UMTS (Universal Mobile Telecommunication System) launched in 2001, it offers up to fifteen times the network capability of the analogue, incorporating voice, video, multimedia and broadcast data services. The latest is the 4G network referred to as B3G which came into existence in 2010. 4G is intended to provide high speed, high capacity, low cost per bit. It also encompasses mobile TV, Mobile Virtual Networks Systems (MVNS) and mobile search and discovery. 4G extends the scenario to all internet protocol networks that integrate broadcast cellular and cordless, Wireless Local Area Network (WLAN) short range system and fixed wire.

According to Ring (2012), the main types of mobile devices used in education process include, Note book computer, tablet PC, Personal Digital Assistance (PDA), Cellular Phones, Smart Phones, Global System for Mobile Communication (GSM), Wireless Application Protocol (WAP), General Packet Radio Service (GPRS), Bluetooth, Infrared Data Association (IrDA). Among its characteristics are accessibility, interactivity, situating of instructional activities, adaptability, immediacy and permanency among others. Its prospects include but not limited to Short Message Services (SMS), cell broadcast, voice and call forwarding, e-commerce, mobile payment, e-banking, and e-learning. M-learning is not without its limitation, these include inadequate power supply, lack of raw material input, inappropriate infrastructural support, increased armed robbery and lack of technical and competent staff maintenance capacity which we believe are surmountable in the near future. M-learning as operated in some developed countries of the world should be introduced into Nigeria University system in no distant future.

Purpose of the Study:

Most Universities in Nigeria are faced with students' population explosion, inadequate teaching staff and shortage of infrastructures, (Tolorunleke, 2010). Millions of Nigerian students apply for admission through JAMB yearly into the universities and other tertiary institutions, but unfortunately not even two third of them are placed by JAMB/universities. The question is "What happens to the rest?" If quality learning opportunities are to be created for all in the education industry, then formal education needs to be complimented by the informal through the sky. The question then is 'what alternative teaching strategy can the education system adopt to bridge the gap'.

Research Questions

1. Will there be difference in the mean achievement score of undergraduate taught using mobile learning?

- Will there be difference in the mean achievement score of Male and Female undergraduate taught using mobile technology?

Research Hypotheses

The hypotheses were tested at 0.05 level of significance.

H₀₁: There is no significant difference in the mean achievement score of undergraduate taught using Mobile technology and those taught conventionally.

H₀₂: There is no significant difference in the mean achievement score of male and female undergraduate taught using mobile technology.

Methodology:

The study employed quasi-experimental design; the experimental research design is pre-test treatment/post-test groups. The two groups were pre-tested before the study to ensure equity in their cognitive background, after that the experimental group was taught using the IMTP; while the control group was taught using the conventional lecture method. The study was conducted for four weeks after which a post-test was administered to both groups. The population of the study consisted of all undergraduate students of Faculty of Education in Kogi State University, Anyigba. Purposive sampling was used to select 235 students who were willing to participate and has WhatsApp enabled phones. They were then divided into experimental and control group contain 121 males and 114 females. The experimental group was made up of 123 students (68 male and 65 females) while the control group had 112 students (53 males and 59 females).

WhatsApp application was used; a group was created for the students in the experimental group. The content of the lesson was sent on the students' phone two days before the class discussion while the control groups were only taught conventionally using lecture method. The two groups (i.e. experimental and control groups) were both exposed to the same examination and results computed.

Instructional Mobile Technology Package (IMTP) in video, audio and text mode designed by the researchers were used to teach the selected students for four weeks in educational technology. The instrument used to assess the students contains five essay researcher designed questions with option to answer any three questions. Both the experimental and control group were exposed to the same examination of paper and pen which was pre-test from other students that were not part of the study group. The assessment was based on standard rating of 0-39% Fail, 40-44% E Poor, 45-49% Fair, 50-59% Good, 60-69% Very Good, 70-above% Excellent. The data collected was analysed using mean, standard deviation to answer research question while the hypotheses were tested using ANCOVA.

Result

Research Question 1: Will there be difference in the mean score of academic performance of undergraduate students taught using mobile learning?

Table 1:
Mean achievement score of both groups

Group	N	Mean	STD	Mean diff.
Experimental	123	53.60	8.50	
Control	112	30.50	7.783	23.10

Table 1 shows that a difference in mean achievement score of 23.10 exist between the experimental and control groups. This difference is in favour of the experimental group.

Research Question 2: Will there be difference in the mean score of academic performance of Male and Female undergraduate students taught using mobile technology?

Table 2:

Mean achievement scores for male and female

Sex	N	Mean	STD	Mean diff.
Male	68	54.41	9.13	
Female	55	52.75	7.63	1.66

Table 2 shows that a mean difference in achievement scores of 1.66 exists between male and female students taught using IMTP, this difference is in favour of the male students.

H₀₁: There is no significant difference in the mean achievement scores of undergraduate students performance taught using Mobile technology and those taught conventionally.

H₀₂: There is no significant difference in the mean achievement scores of academic performance of male and female undergraduate students taught using mobile technology.

Table 3:

ANCOVA analysis on method and sex

Source	Type III sum of squares	df	Mean square	F	Significance	Decision
Corrected model	31469.902	4	7867.475	117.518	.000	
Intercept	25636.44	1	25636.414	382.937	.000	
Pretest	13.281	1	13.281	.198	.656	
Method	29846.491	1	29846.491	445.823	.000	S
Sex	110.547	1	110.547	1.651	.200	NS
Method *sex	5.350	1	5.350	.080	.778	NS
Error	15397.783	230	66.947			
Total	474274.000	235				
Corrected Total	46867.685	234				

Table 3 revealed that the computed F (1.230). 445.823 for method is greater than f-critical (3.84), p=0.000 is less than 0.05. Based on the result, the null hypothesis is rejected and the alternative accepted at 0.05 level of significance. This implies that, there is a significant difference between the mean achievement scores of students taught using IMTP and those taught conventionally. The table also reveals that computed

f (1.230), 1.651 for sex is less than f -critical (3.84) and $p=.200$ is greater than 0.05. Based on the result, the null hypothesis is upheld at 0.05 level of significance. This implies no significant difference between male and female achievement.

Discussion of Findings:

The data analysed in research question one indicated that there was significant difference in the post-test mean achievement scores of experimental and control groups after been exposed to the treatment. This simply means that students that are taught using IMTP performed better than those taught using conventional method. This study is in line with the study of Chaung and Chen (2009), Bala and Musa, (2006), Agwagah, (2000); and Alemina and Olubunmi, (2001). This may be as a result of the treatment with IMTP which allowed the student to interact with the learning materials before the class discussion giving the students opportunity to have better understanding of the concept of the lesson taught. The difference was found to be statistically significant. Furthermore, the study revealed close mean achievement scores between male and female students taught using IMTP. It shows that both male and female students benefited equally in the learning process, no statistical differences existed between the achievement scores of male and female students taught using IMTP. This result is in tandem with the works of Olagunju, (2001) and Aremu, (1999). The finding showed that there was no significant difference in the achievement of male and female students who were taught using the IMTP. It shows that the IMTP favoured both male and female students.

Conclusion:

It must be noted that in some tertiary institution, students are barred from using their phones in lecture classes while in some developed learning environment, mobile phones are required for learning. The study concludes that, use of mobile technology in blended learning by undergraduate students enhances better performance and increased their academic achievements.

Recommendation:

Based on the findings of this study, the following recommendations were made:

1. Mobile technology should be adopted into the Curriculum of the undergraduate students of Nigerian Universities.
2. Undergraduate students of Nigerian Universities should be allowed to make use of mobile technology devices as part of their learning resources within the classroom.

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EFFECTIVENESS OF BLENDED LEARNING STRATEGY ON UNDERGRADUATE BUSINESS EDUCATION STUDENTS' ACHIEVEMENT SCORES IN RIVERS STATE UNIVERSITY

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Abstract

The study aimed to investigate the effectiveness of Blended Learning strategy on the achievement scores of undergraduate Business Education students in Rivers State University. Three research questions and three hypotheses were formulated to guide the study. The design of the study was quasi-experimental with non-randomized pre-test post-test control design. 365 1st year students in the Department of Business Education of the Rivers State University formed the population and sample of the study. The instrument that was used for the study is a self-developed titled “Blended learning students’ Achievement Test (BLeSAT)”. The reliability coefficient of 0.73 was determined using Kuder Richardson (K-R₂₁). Data obtained were analyzed using mean for research questions, and Z-test and ANOVA used to test the hypotheses at 0.05 level of significance. Results showed that there is no significant difference in the mean achievement scores of male and female students taught Elements of Business Management with Blended Learning strategy. Although, there was no statistical difference in the post-test mean scores of students of Accounting, Management, Marketing and Office and Information Management options and there was a significant statistical difference in the post-test mean scores of students of the three groups based on level of online interaction. Based on the findings, it was recommended among others that Business education lecturers should adopt blended learning strategy to encourage students’ active participation in their learning and to create room for frequent interactive environment between the teacher and students.

Keyword: Blended Learning Strategy; Gender; Level of Interaction; Achievement Scores; Business Education.

Introduction

Blended learning has been in existence long before the advent of computers and social networks; teacher created blended learning experiences using simple technologies like paper and pencil. The idea of blending different learning experiences is as old as teaching, but the materials of the blend are new. It began as soon as humans started engaging in the art of teaching (Kpolovie, 2010; Williams as cited in Vaughan, 2015). What really brought the term into a glare of publicity in the recent time is the growing expansion of technological discoveries (web based educational technologies powered by web 2.0) in the field information and communication technology. The infusion of some of these Web-based technologies into the learning and teaching process enhance content creation, interaction and collaboration. These emerging technologies (social networking sites; Facebook, micro blogging; Twitter, multi-users virtual environments; Secondlife and Moodle, widget; wikis, flash website builder; Wix, synchronous video interactive conferencing; wiziQ, Discussion Board, Webcasting, E-portfolio, Online quizzes and surveys, In-class quizzes and polling, LAMS etc.) have created ample of opportunities for learners to interact with one another, teachers, and content (Kayii & Dambo, 2018; Vaughan, 2015). However, the term blended learning according to Krause (2007) is the principal means of referring the use of Information and Communication Technologies (ICTs) to improve learning and teaching activities.

Definitions abound in literature show that there is no generally acceptable definition, because the term means different to different people. However, the most appealing is that given by Krause (2007) “effective integration of different modes of delivery, models of teaching and styles of learning as a result of adopting a strategic and systematic approach to use technology combined with the best features of face to face interaction”. From the above definition, blended learning is strategic in the effective integration of ICTs in designing course content to enhance teaching and learning between teachers and the students; in such a collaborative and interactive manner that would not normally be available or effective in their usual environment, whether it is primarily face-to-face or online. The act of blending is primarily for achieving better student experiences and outcomes through effective teaching, by introducing more efficient ways of managing course content and feedback between lecturers and students of Business Education.

Business education as one of the major aspects of vocational and technical education which aimed at the development of specific skills required for economic and social changes, to achieve this required adequate utilization of human and material resources in order to promote saleable skills acquisition and employment generation. This could only be achieved through blended learning strategy; a well prescribed method of teaching and learning that uses more of guided discovery method to promote learning and development of practical skills (Ubulom, Kayii & Dambo, 2016; FRN, 2009).

Gender is the masculinity and femininity attributes that describes human beings. These preponderance attributes biologically distinguished the societal roles, responsibilities, attitudes and values between males and female (Gambari, Shittu, Ogunlade & Osunlade, 2017). Before now, this observed societal attributes was established for transmitting values of humility, low ambition and systematic underestimation of the females in cognitive achievement, societal attainment and capacity to work in some public establishments (Ebong, 2006 as cited in Ubulom, Kayii & Dambo, 2016). But with recent realization caused by technological innovation, gender equality campaigns and the need of the economy, the imbalances have grossly reduce especially when it comes to the study of Business Education.

According Kayii and Dambo (2018) achievement is a measuring scale that tells the degree of performance to which a student has accomplished specific task at the end of the instructional engagement. While, Ukwuji and Kpolovie (as cited in Akpan & Aminikpo, 2017) described achievement as “a psychological test which measures learners’ cognitive and intellectual traits”. From the above expressions, achievement scores are often used in an educational system to determine the level of instruction for which a student is prepared. High achievement scores usually indicate a mastery of grade-level material, and the readiness for advanced instruction. Low achievement scores can indicate the need for remediation or repeating a course grade (Vaugham, 2015).

Achievement score is an indicator or cut off point from an analyzed test scores used by teachers and institutions for making academic decision concerning the performance of students at the end or before of an instructional engagement. Practically, measuring level of achievement in all academic disciplines and award of classes of degree or certificate is based on earned cumulative grade point average (CGPA); the sum of all earned Grade Points divided by the total units attempted of courses.

Statement of the Problem

Blended learning as an emerging concept has been extensively research by scholars in examining its effect on students’ academic achievement. Though, blended learning has extensively researched, little has been published on its nexus with academic achievement locally when compared with developed countries. In developed countries, the use of technology has advanced more robust learning system in the area of social learning, mobile learning, interactive and collaborative learning, cloud computing etc., all geared toward enhancing creative learning. Unfortunately, it seems adopting this technologies in institution is rather taking steps back and quantum and strategic leap forward is urgently needed. However. Literature

on blended learning revealed a divisive views among researchers. Some studies revealed that conventional strategies enhanced students' performance; because too much technology make blended learning programs appears too flashy, and students may not take seriously (Umoh & Akpan, 2014). Also, Adidoye (2015) reported that learners preconceived traditional classroom to more effective and accessible, because they believed they are familiar with learning environment. While, others found that blended learning enhanced students' performance. (Al-Qahtani & Higgins, 2013; Vernadakis; Giannousi Derri, Michalopoulos & Kioumourtzoglou, 2011). For this reason, to bridge the perceived gap in literature. The present study examine the effectiveness of Blended Learning strategy on the achievement of first year Business Education students in Elements of Business Management.

Research Question

The following research questions guided the study.

1. What is the difference in the mean achievement scores of male and female students taught Elements of Business Management with Blended Learning strategy?
2. What is the difference in the achievement of students of Accounting, Management, Marketing and Office and Information Management taught Elements of Business Management with Blended learning strategy?
3. What is the difference in the achievement of students of low, medium and high level of interaction with online materials, taught Elements of Business Management with Blended Learning strategy?

Hypotheses

The null hypotheses formulated to guide the study were tested at 0.05 level of significance

H_{01} : There is no significant difference in the mean achievement scores of male and female students taught Elements of Business Management with Blended Learning strategy

H_{02} : There is no significant difference in the achievement of students of Accounting, Management, Marketing and Office and Information Management taught Elements of Business Management with Blended learning strategy.

H_{03} : There is no significant difference in the achievement of students of low, medium and high level of interaction with online materials, taught Elements of Business Management with Blended Learning strategy.

Literature Review

Social Learning Theory

Social learning theory (Bandura, 1977) integrated behavioural and cognitive theories of learning in order to provide a comprehensive model that could account for the wide range of learning experiences that occur in the learning environment. The social learning posits that learning is a cognitive process that takes place in a social context and can occur purely through observation or direct instruction, even in the absence of direct reinforcement. Imitative learning or social learning theory presupposes that it is dangerous for learners to rely sole on the effect of their own actions in order for them to have a change in behaviour (Awotua-Efebo, 2001; Achuonye & Ajoku, 2003). Thus, most human learning occurs not because of a person's own actions but by observing others. Based on this observation, ideas are formed on how to behave when faced with similar situation.

Constructivist Theory

The constructivist theory propounded by Jerome Bruner sees learning as an active process in which learners construct new ideas or concepts based on their current and past knowledge. The effectiveness of Constructivism is that it prepares students for problem solving in complex environment (Ahmad & Schreurs, 2012). In Constructivism theory; students are more of an active independent learner in building and creating knowledge based on their personal experiences and interpretations. The underlying assumptions of the theories that learner selects and translates information, constructs hypotheses and makes decisions depending on his\her cognitive disposition. This provides meaningful organization of learning experiences that allow the information to go beyond information given.

Blended Learning

Al-Zoubi and Bani- Doumi (2012) examined the impact of blended learning and motivation on the achievement of fourth graders learning Mathematics using a sample of (71) male and female students grouped into 4 classes. The 4 classes formed the experimental group comprised of 38 students and the control group comprised of 33 students. The reliability index of 0.63 for the achievement test and 0.59 for the motivation were obtained. Mean with standard deviation were used to answer the research questions while t-test and ANCOVA were used for data analysis. It was found that no significant difference exist between males and females in the achievement exam. Also, significant differences recorded between the two groups when blended learning was introduced.

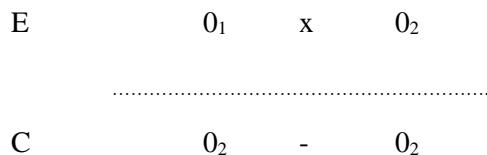
Gambari et al (2017) investigated the effectiveness of blended learning and e-learning modes of instruction on the performance of male and female undergraduate students in kwara state, Nigeria. Using purposive sampling technique to draw 85 undergraduate students from three universities in kwara state, Quasi- experimental technique that employs pretest, posttest, control group design was adopted for the study. Analysis of covariance was used for data analysis, and a coefficient of 0.71 was obtained using kuder-richardson (K-20). It was found that there is no significant difference in the performance of male and female undergraduates taught with blended learning.

In a related study, McLaughlin, Gharkholonarehe, khanova, Deyo and Rodgers (2015) studied the impact on the blended learning on students' performance in cardiovascular pharmacotherapy course using a sample of 250 students drawn from the population of students in Chapel Hill, North Carolina. Data were obtained from the participants using Blended Learning Assessment Performance Test. Using Pearson product statistic, a coefficient of 0.63 was obtained. Test of significance with a Z-test indicated that there was a significant difference between the performance of male and female students. While, McLaughlin et al. (2015) and Gambari et al used of tertiary institutions, the present study also used students with a larger sample size.

Yaghmour (2016) investigated the effectiveness of blended education strategy in the achievement of the third grade students in mathematics. Using a sample of 97, distributed into four classes; male, female, experimental and control groups. The researcher experimentally used a self-developed cognitive instrument to obtain data from the respondents. After, analysis of data using ANCOVA, the result showed that the is no significant difference between the mean performance of members of the study groups on achievement test for third grade students in mathematics due to bilateral interaction between blended learning and gender.

Methodology

The study adopted a quasi-experimental design. The study adopted a non-randomized pre-test post-test control group design. Two non-randomized groups pre-test post-test control group design are structured as follows:



All the duly registered 365 1st year students for the 2017/2018 which constitute the total population of the study were used to constitute the sample of the study. For the fact the total population represents the sample of the study, there is no sampling techniques applied for the selection of sample size. The instrument that was used for the study is the Blended Learning Students' Achievement Test (BLeSAT) which was used to assess the achievement of students. BLeSAT is a cognitive tool which is a researcher-developed multiple-choice objective test, it was constructed based on topics outlined in the course titled "Elements of Business Management". In writing BLeSAT, pool of items (questions) were generated based on the specification of content areas to ensure that the course outline is adequately covered. The topics were written out according to the number of weeks of teaching each topic, divided by the total number of questions. To establish the face and content validity of the instrument, BLeSAT was given to two content specialists and a Psychometrician with the table of specification to judge if the items on the instrument adequately covers and measures the specified course outline. The testees were requested to write a computer-based test made up of 36 questions. BLeSAT consists of a stem, a key and 2 distracters in a response options lettered A to C.

The validity of the instrument was ascertained by three experts including the researcher's supervisor from Rivers State University. The experts analyzed the items on the instrument and recommended 36 questions, which represents 51% of the penultimate questions generated. The experts were requested to improve on this specified area:

- a. Suitability of the instrument for the level
- b. Clarity of words and expression
- c. Ambiguity of items
- d. Relevance of items to course outline/content
- e. Proper keying.

To determine the difficulty level and discrimination power of the items. 27% of those took the trial test was used for item analysis.

The reliability of the instrument (Blended learning students' Performance Test) was determined using Kadar Richardson's K-R₂₁ estimates for its measure of internal consistency. Purposive sampling technique was used to draw a sample size of 25 for reliability test and to obtain its internal consistency coefficient. The reliability coefficient of the instrument was determined and found to be 0.73. The coefficient value is high enough to guarantee the use of the instrument for the study. For the fact that the researcher employed test-retest method for instrument, certain weaknesses were envisaged. In order to control memory effect or testing effect which is one of the weakness, a long interval of three weeks was allowed between the first and the second administration of the test. Furthermore, before the second administration, the items of the tests were shuffle to disguise its former pattern in order to overcome memory effect and certain response set.

Participants of the study made up of 252 males and 113 females were all 1st year's students who registered and learned Elements of Business Management in the department of Business Education. Both male and female learners participated in the study. Students with functional email account and internet enable smart phone/device were assigned to experimental (Blended Learning) group while students without functional email account and internet enable smart phone were assigned to the control (Classroom Learning) groups. A pre-test was administered to the blended Learning group (n=171) before treatment, students were assigned and grouped based on their achievement levels (low, medium or average and high academic achievements). The experimental group received both face-to-face as well as online interactions. While, the control group (Classroom Learning) (n=194) was taught based on the traditional teaching methods (lecture method) of outlined topics in the course outline, in which materials, instructions, and feedback were also through traditional classroom methods. The test and its criteria for placement were used to appropriately place students in relevant proficiency levels. In addition to the placement test, textbook and Power Point presentation were photocopied and given to students during classroom lectures.

Blended learning students' Achievement Test and the virtual platform (www.businesseducationust.ipage.com), which is a valid, reliable test and a highly effective instrument and platform in grouping participants, was used to assign the participants into three groups (low, medium or average and high) based on their level of online interaction. In addition, the blog (www.businesseducationust.ipage.com) was designed in a way that all activities (frequency of Visit, File view, File link downloaded, MsgRead, MsgPost) of subscribers or users were recorded. It is imperative to point out that the content of the blog was in correspondence with that of the materials to the control group. Participants in the experimental group had to check materials and receive feedback on their customized page.

After placing participants in the experimental and control groups, the course lecturer ensured strict compliance with the classes scheduled for the groups. Several measures were put in place to secure and ensure compliance with the schedule. For the control group, the course was taught based on traditional classroom teaching methods, and materials, instructions, and feedback were presented in classroom. In order to collect data, the control group received a test which was taken as the pre-test and their last piece as the post-test. All students in the experimental group received the treatment with the same number of sessions. Data obtained from the testees were subjected to statistical analysis using mean for the research questions, while z-test analysis and ANOVA used to test the hypotheses

Presentation of Results

Research Question 1: What is the difference in the mean achievement scores of male and female students taught Elements of Business Management with Blended Learning strategy?

Table 1:
Group Statistics showing Mean difference in mean performance of male and female students

Group	N	Pre-test		Post test	
		Mean	Std. Deviation	Mean	Std. Deviation
Male	252	48.33	15.08	54.05	13.09
Female	113	59.50	14.00	74.36	16.45

Table 1 shows the pre-test achievement mean score with standard deviation for male and female were 48.33(15.08) and 59.50(14.00) respectively. Similarly, for the post-test achievement score for male

and female were 54.05(13.09) and 74.36(16.45), their standard deviation were 16.41 for the male and 16.45 for the female.

Research Question 2: What is the difference in the achievement of students of Accounting, Marketing and Office and information Management taught elements of Business management with Blended learning approach?

Table 2:

Mean score (Post Test) of students of all options

	N	Mean	SD	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
ACCT	23	75.04	17.55	3.65913	67.4549	82.6321
MGT	95	74.15	15.96	1.63760	70.8959	77.3989
MKG	30	71.40	9.09	1.66132	68.0022	74.7978
OIM	23	76.23	16.40	3.41929	69.1262	83.3086
Total	171	74.06	15.22	1.16393	71.7667	76.3620

Table 2 shows post-test mean scores of students from the various options in the department of Business Education. As shown, their means and standard deviation scores were 75.04(17.55), 74.15(15.96), 71.40(9.09) and 76.22 (16.40) for Accounting, Management, Marketing and Office and Information management respectively. Although, these scores are all above 70, there exists some slight difference among them. Whether these difference is statistically significant would be determined by the analysis of variance (see Table 5).

Research Question 3: What is the difference in the achievement of students of low, medium and high level of interaction with online materials, taught elements of business management with blended learning?

Table 3:

Descriptive statistics showing score of students with low, medium and high online interaction

	N	Mean	SD	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Low	2	35.0000	.00000	.00000	35.0000	35.0000
Medium	66	59.3182	7.17937	.88372	57.5533	61.0831
High	103	84.2718	8.79861	.86695	82.5522	85.9914
Total	171	74.0643	15.22040	1.16393	71.7667	76.3620

Table 3 shows post-test mean scores of students who had low, medium and high levels of online interaction with the course. As shown, means scores were 35.00, 59.32 and 84.27 respectively for students with low, medium and high levels of online interaction with the course. Further, this results shows that students who had high level of interaction had the highest mean score followed by students who had medium level of interaction. The students who had low level of interaction had mean score below average. This shows that level of interaction with the online course influences achievement in the course.

Hypothesis 1: There is no significant difference in the mean achievement scores of male and female students taught Elements of Business Management with Blended Learning Blended Learning strategy

Table 4:
Z-test on Difference in Mean Performance of Male and Female Students

Groups	N	M	S.D.	Df	Z-cal	@	Z-crit	Decision
Male	252	48.33	15.09	363	-0.28	0.05	1.96	Retained H0
Female	113	59.50	14.00					P>.05

It can be discerned from table 4, that the 252 male have a mean of 48.33, standard deviation of 15.09 on their achievement scores. The 113 female on the other hand have a mean of 59.50, standard deviation of 14.00. The calculated z-ratio is -0.28 and the chosen alpha level is 0.05 for a two tailed test. The critical value of z is 1.96. Since the Zcal (-0.28) is less than the Zcrit (1.96) at df of 363 and 0.05 level of significance, the null hypothesis is retained for lack of sufficient empirical evidence. This implies that both male and female business education students do not differ in their mean achievement scores.

Hypothesis 2: There is no significant difference in the achievement of students of Accounting, Management, marketing and Office and information Management taught elements of Business management with Blended learning approach.

Table 5:
ANOVA for difference in achievement based on students' options

	SS	df	MS	F	Sig.
Between Groups	342.286	3	114.095	.488	.691
Within Groups	39040.006	168	233.772		
Total	39382.292	171			

Table 5. Shows the result of the ANOVA for test of difference in achievement scores of students based on based on students' options. As shown in the table for the between groups, the sum of square is 342.286, with 3 degree of freedom and a mean square of 114.095. For within groups, the sum of square is 39040.006 and 168 degree of freedom as well as the mean square of 233.772. The total has 39382.292 sum of square and 171 degree of freedom. The computed F is 0.488 which is not statistically significant, Therefore, the null hypothesis that there is no significant difference in the achievement based on students' options, taught elements of business management with blended learning is retained, $F(3,168) = 0.488$, $P < .05$. With these results, the hypothesis is accepted. This implies that there is no significant statistical difference in the post-test mean achievement scores of students based on their options.

Hypothesis 3: There is no significant difference in the achievement of students of low, medium and high level of online interaction with materials, taught elements of business management with blended learning.

Table 6:
ANOVA for difference in achievement based on level of online interaction.

	SS	df	MS	F	Sig.
Between Groups	28135.586	2	14067.793	210.141	.000
Within Groups	11246.707	169	66.945		
Total	39382.292	171			

Table 6. Shows the result of the ANOVA for test of difference in the post-test mean scores of students based on level of online interaction with course, Element of Business Management, As shown in the table for the between groups, the sum of square is 28135.586, with 2 degree of freedom and a mean square of 14067.793. For within groups, the sum of square is 11246.707 and 169 degree of freedom as well as the mean square of 66.945. The total has 39382.292 sum of square and 171 degree of freedom. The computed F is 210.141 which is statistically significant, even as low at as 0.001 alpha. Therefore, the null hypothesis that there is no significant difference in the achievement of students of low, medium and high level of online interaction with materials, taught elements of business management with blended learning is rejected, $F(2,169) = 210.141$, $P < .05$. With these results, the hypothesis is rejected. This implies that there was a significant statistical difference in the post-test mean scores of students of the three groups. Based on this, there was need to ascertain where the difference was coming from among the three groups. This was achieved by Scheffe's post hoc test as shown in Table 7 below.

Table 7:
post hoc test Multiple Comparisons between level of interaction and achievement Scheffe

95% Confidence Interval						
Mean Difference						
(I)	(J)	(I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Low	2.00	-24.31818*	5.87253	.000	-38.8218	-9.8146
	3.00	-49.27184*	5.84143	.000	-63.6986	-34.8451
Medium	1.00	24.31818*	5.87253	.000	9.8146	38.8218
	3.00	-24.95366*	1.29006	.000	-28.1398	-21.7676
High	1.00	49.27184*	5.84143	.000	34.8451	63.6986
	2.00	24.95366*	1.29006	.000	21.7676	28.1398

*. The mean difference is significant at the 0.05 level.

Table 7, shows that statistical significant difference in students' academic achievement in Element of Business Management existed among all the groups. This result buttresses the result of research question 4 shown in Table 4 with means scores of 35.00, 59.32 and 84.27 respectively for students with low, medium and high levels of online interaction.

Discussion of Findings

From the result of hypothesis1, the statistical analysis shows that there is no significant difference in the mean achievement scores of male and female students taught Elements of Business Management with Blended Learning Blended Learning strategy. This result means that the use of blended strategy greatly enhance the performance of students taught Elements of Business Management. The finding of the present study is in agreement with those of Gambari et al (2017) and McLaughlin et al (2015) who found out that there is no significant difference in the achievement of male and female students exposed to blended learning. From the result of hypothesis it shows that there is no significant difference in the achievement of students of Accounting, Management, marketing and Office and information Management taught elements of Business management with Blended learning strategy. This implies that there was no statistical difference in the post-test mean scores of students of the four group. This present is in support of Al-Zoubi and Bani-Doumi (2012) who found that no significant difference were recorded between the groups when exposed to blended learning approach. Result from hypothesis 3, shows that there is a statistical significant difference in the academic achievement of students of low, medium and high level of online interaction with materials, taught elements of business management with blended learning. This finding disagreed with that of Yaghmour (2016) who found that no statistical difference between third grade students due to bilateral interaction with blended learning and gender.

Conclusion

One of the goals of tertiary education is to provide accessible and quality learning opportunities formal and informal education in response to the needs and interests of all Nigerians through technologically-based professional courses either as a whole, components for the exposure to relevant future working environment (FRN, 2014). To achieve this, the infusion of emerging technologies into teaching to form supportive new learning environment and strategies in the instructional process should be adopted. The federal and state government remain supportive in the provision of necessary facilities and infrastructure for the promotion of teaching and learning. Therefore, this study concludes that new emerging technologies and modes of instructional delivery are not adequately embrace for effective teaching and learning of Business Education courses in Rivers State Universities.

Recommendations

On the basis of the findings and conclusion emanated from this study, the following recommendations are made:

1. Since the course content represents the total experiences to which the Business Education student must be exposed to be self-reliant, the universities should adopt best practices and provide working document to implement the new academic guidelines to make sure that technology is integrated into a variety of subject areas.
2. Lecturers who are not ICT compliant should be given the opportunity for upgrading through capacity building workshop on the use of interactive platform.
3. Business education lecturers should adopt blended learning strategy to encourage students' active participation and frequent interactive sessions between the teachers and students.

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**PERSONAL AND PSYCHOLOGICAL FACTORS ON UTILIZATION OF INFORMATION
AND COMMUNICATION TECHNOLOGY IN SPORTS MANAGEMENT AMONG SPORTS
ADMINISTRATORS IN LAGOS STATE, NIGERIA**

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ABSTRACT

The modern management of sports therefore, requires a revolutionized approach through effective use of ICT. This study therefore, examined personal and psychological factors on utilization of information and communication technology in sports management among sports administrators. Descriptive survey design of correlational type was used in the study. Multistage sampling techniques was used to select 50 respondents from Sports Councils and Ministry of Youth and Sports. A self-developed questionnaire with reliability value of 0.70 was used for data collection. Data were analysed using inferential statistics of multiple linear regression. The finding of the study revealed that personal and psychological factors of administrators' access, attitudes and computer self-efficacy had positive relationship with utilization of ICT in sports management in Lagos State. There was a significant joint influence of personal and psychological factors on utilization of ICT in sports management among the respondents ($F_{(3,46)}=34.766$; $p<0.05$). Administrators' attitudes ($\beta=0.548$, $p<0.05$) and computer self-efficacy ($\beta=0.294$, $p<0.05$) had relative influence on utilization of ICT in sports management among the respondents, while administrators' access ($\beta=0.039$, $p>0.05$) did not. There was a joint influence of personal and psychological factors on utilization of information and communication technology in sports management among sports administrators in Lagos State. Administrators' attitudes and computer self-efficacy had relative influence on utilization of ICT in sports management. It was recommended that an effective education on proper utilization of ICT in sports management should be organised for the sports administrators.

Keywords: Personal and Psychological factors, Utilization, ICT and Sports Management.

Introduction

The importance of Information and Communication Technology (ICT) to the development of different spheres of life has shown that, it is an indispensable component of modern society. In line with this, Meenakshi (2013) and Agere (2013) opined that within a very short space of time, ICTs have become one of the basic and indispensable components of modern society. It was also revealed that the influence of ICTs has so far permeated every domain of human life. Consequently, sport is considered as one of the distinctive spheres that needs the use of ICT for easier, faster and effective discharge of routine business activities. The modern management of sports therefore requires a revolutionized approach through effective use of ICT.

The advent of ICTs has made sharing of ideas easier, while storage of information is more secured. Hence, the use of ICTs offers enormous potential to enhance learning. The advent of ICT helps to avoid mistake in organisation and administration of various sports and games. ICT in sports has established scientific discipline, improves learning and coaching, Bio-mechanical analysis and field research have evolved (Winn, 2002; Ramesh, 2016). Similarly, ICT improves management of organizations, provided it is applied appropriately.

Management is regarded as the activities of setting the strategy of an organization and coordinating the efforts of its employees to accomplish its objectives through the application of available resources, such as financial, natural, technological and human resources. Also, sports management is regarded as a field that deals with the logistics of running a sports organisation or a major sports event. It is a broad and highly competitive field that incorporates aspects of many different areas, such as business, marketing and accounting (Hill and Gareth, 2012; **Johan Cruyff Institute, 2017**).

One the other hand, one of the major challenges in sports industry is keeping up with the pace of technological advancements, particularly among the administrators. Bello (2018) established that the sports industry in Africa is being faced with the challenges of trying to predict the next trend and the next big idea that will capture their audiences. Morakinyo and Aluko (2008) established that sports administration and management in Nigeria lack professionalism. In most cases, the appointees do not have necessary prerequisites to pilot the affairs of the Ministry of Sports. This might be associated with poor performances of Nigerian athletes at the regional and international competitions. In Nigeria, it has been ascertained that sports reflect the absence of functional systems and presence of powerful interest which often at variance with national interest. The sector has continued to struggle in planning and organizing sports with the use of modern ICT related equipment and facilities.

Based on personal exploration, the inability to utilize ICT for management of sports particularly in Lagos State might be attributed to personal and psychological factors like administrators' access to ICT, administrators' attitudes towards the use of ICT as well as computer self-efficacy in sports administrators. According to Tondeur, van Braak, Sang, Voogt, Fisser and Ottenbreit-Leftwich (2012), access to ICT is a key factor in determining the integration of ICTs in different institutions as well as the rules set by such institution on how and when to use the computers. Similarly, Schiller (2003) revealed that personal characteristics such as educational level, age, gender, educational experience and attitude towards computers can influence the adoption of ICT.

It was further asserted that, the mere presence of computers in an institution do not guarantee the use of the tools. It was also, revealed that self-judgment of one's ability to use computer skill for broader tasks does not focus on component (Schiller, 2003). This shows that an individual's belief in their innate ability to achieve goals through the use of ICT is important. Acquisition of skills such as using specific software features in a computer for effective management of sport is therefore a necessity. Conversely, Compeau and Higgins (1995) asserted that, a strong sense of computer self-efficacy affects both the frequency and the manner in which ICTs are used in everyday instructional practice. Integration and underutilization of ICT in sports management could be guided against provided the factors contributing to them are effectively tackled particularly in Lagos. Hence, this study examined influence of personal and psychological factors on utilization of information and communication technology in sports management among sports administrators in Lagos State, Nigeria.

Statement of the Problem

It has been ascertained that the integration and utilization in executing various tasks could go a long way in making and sharing of ideas easier. In addition, it was established that the advent of ICT helps to avoid mistake in organisation and administration. In spite of the benefits that are accrued to its integration and utilization, an explorative survey has revealed the persistent underutilization of ICT in sports management, particularly among staff of Sports Councils and Ministries of Sports. In order to tackle the prevalence of underutilization, previous studies focused more on the use of ICT for non-sports oriented organisations, with little emphasis on its effective utilization in sports management. This study therefore, examined influence of personal and psychological factors on utilization of information and communication technology in sports management among sports administrators in Lagos State, Nigeria.

Research Question 1: What is the joint and relative contribution of personal (administrators' access) and psychological (administrators' attitudes and computer self-efficacy) factors on utilization of ICT in sports management among sports administrators in Lagos State, Nigeria.

Hypotheses

The following hypotheses were tested at 0.05 level of significance:

H0₁: There will be no joint and relative contribution of personal (administrators' access) and psychological (administrators' attitudes and computer self-efficacy) factors on utilization of ICT in sports management among sports administrators in Lagos State, Nigeria.

Methodology

The descriptive survey research design of correlational type was used in the study. The population comprised the sports administrators in Lagos State. Purposive and simple random sampling techniques were used to select the fifty (50) sports administrators for the study. The respondents were selected from Sports Councils and Ministry of Youth and Sports respectively.

Purposive sampling technique was used to select sports administrators in Lagos State as the population for the study. Simple random sampling technique of fish bowl (without replacement) was used to select the fifty (50) respondents from both Sports Councils and Ministry of Youth and Sports respectively. This was done in order to give each of the respondents in both Sports Councils and Ministry of Youth an equal and independent chance of being included in the study.

A self-developed and validated questionnaire named as Personal, Psychological Factors as well as Utilization of Information and Communication Technology (PPFUICTQ) was used as instrument for data collection. The questionnaire was divided into three sections, namely, A, B and C. Section A entailed socio-demographic characteristics of the respondents, section B involved Personal and Psychological Factors Scale (PPFS), while section C entailed Utilization of Information and Communication Technology Scale (UICTS). The socio-demographic characteristics of the respondents covered in section A include; sex and age. Section B was used to elicit information on independent variables of personal and psychological factors, while section C was used to elicit information on utilization of information and communication technology. The responses in sections B and C were developed in a 4-point modified Likert format of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD).

Experts in the field of Sports Administration were used for the validation of the questionnaire. This really helped to improve the construct and content validity of the instrument. The data generated through pre-testing of the instrument were later subjected to factor analysis. A cronbach alpha method was used to test the internal consistency of Personal and Psychological Factors Scale and Utilization of Information and Communication Technology Scale which yielded reliability values of 0.70 and 0.71 respectively; while the entire questionnaire yielded a reliability of 0.70.

The filled copies of questionnaire were collated, coded and analysed using both descriptive and inferential statistics. Data were analyzed using the Statistical Package for Social Sciences program (SPSS), version 21. Frequency count and percentages were used to analyse demographic data, while inferential statistics of multiple linear regression was used to test hypotheses raised and *p*-value equal to or less than 0.05 was accepted as significant for each statistical test.

Results

Table 1:
Socio-Demographic Characteristic of the Respondents

Variable	Frequency	Percent (%)
Sex		
Male	31	62.0
Female	19	38.0
Total	50	100
Age:		
18-28 years	11	22.0
29-39 years	23	46.0
40 years and above	16	32.0
Total	50	100

As revealed in table 1, 31 (62.0%) respondents were male, while 19 (38.0%) were female. This means that most of the respondents were male. Also, 11 (22.0%) respondents were in the age range of 18-28 years, 23 (46.0%) were between 29-39 years, while 16 (32.0%) respondents were over 40 years. This means that most of the respondents were between 29-39 years.

Research Question 1: What is the joint and relative contribution of personal (administrators' access) and psychological (administrators' attitudes and computer self-efficacy) factors on utilization of ICT in sports management among sports administrators in Lagos State, Nigeria.

Table 2:
Correlation matrix showing the relationship between personal and psychological factors and utilization of ICT in sports management

Variables (sub-scales)	Utilization of ICT	Administrators' access	Administrators' attitudes	Computer self- efficacy
Utilization of ICT	1			
Administrators' access	.716**	1		
Administrators' attitudes	.813**	.858**	1	
Computer self- efficacy	.753**	.705**	.789**	1
Mean	6.86	7.52	6.86	8.04
Standard Dev	2.67	3.39	3.21	3.94

** Correlation is significant at 0.05 (2-tailed)

Table 2 showed the inter-correlational matrix of the relationship between the personal and psychological factors and utilization of ICT in sports management. The table revealed that administrators' access ($r=0.715, p<0.05$); administrators' attitudes ($r=0.828, p<0.05$) and computer self-efficacy ($r=0.689, p<0.05$) were positively correlated with utilization of ICT in sports management among sports

administrators in Lagos State. This implied that, administrators' access, administrators' attitudes and computer self-efficacy independently had positive relationship with utilization of ICT in sports management among sports administrators in Lagos State. The outcome means that an increased level of inability of administrators' access to ICT, administrators' poor attitudes to ICT and administrators' unfavorable computer self-efficacy among the respondents would lead to an increase in underutilization of ICT in sports management among sports administrators in Lagos State. The finding of the present study was in line with the finding of Schiller (2003) that, personal characteristics such as educational level, age, gender, educational experience and attitude towards computers can influence the adoption of ICT.

H0₁: There will be no joint and relative contribution of personal (administrators' access) and psychological (administrators' attitudes and computer self-efficacy) factors on utilization of ICT in sports management among sports administrators in Lagos State, Nigeria.

Table 3:

Regression analysis of joint influence of personal and psychological factors on utilization of ICT in sports management

R=.833

R²=.694

Adj. R²=.674

Model	Sum of Squares	df	Mean Square	F	Sig. (p value)	Remark
Regression	241.505	3	80.502	34.766	.000	Sig.
Residual	106.515	46	2.316			
Total	348.020	49				

Table 3 revealed that there was a significant joint influence of personal and psychological factors on utilization of ICT in sports management among sports administrators in Lagos State, Nigeria ($F_{(3,46)}=34.766$; $R=.833$, $R^2=.694$, $Adj.R^2=.674$, $p<.05$); with about 67.4% of the variation accounted for by the independent variables. The null hypothesis was therefore rejected. The implication was that personal and psychological factors had influence on utilization of ICT in sports management among sports administrators in Lagos State. The finding about joint influence of personal and psychological factors on utilization of ICT in sports management revealed that the linear combination of administrators' access, administrators' attitudes and computer self-efficacy.

It implied that administrators' access to ICT, administrators' poor attitudes to ICT and administrators' unfavourable computer self-efficacy jointly had strong impact on underutilization of ICT in sports management among sports administrators in Lagos State. The outcome of this study on personal and psychological factors was in line with the finding of Schiller (2003) that, personal characteristics such as educational level, age, gender, educational experience and attitude towards computers can influence the adoption of ICT.

Table 4:
Regression analysis of relative influence of administrators' access on utilization of ICT in sports management

Variable	Unstandardized coefficients		Standardized coefficients Beta (β)	t	Sig.	Remark
	B	Std. Error				
(Constant)	1.917	.549		3.493	.001	
Administrators' access	.031	.125	.039	.245	.808	Not Sig
Variable	Unstandardized coefficients		Standardized coefficients	t	Sig.	Remark
	B	Std. Error	Beta (β)			
(Constant)	1.917	.549		3.493	.001	
Administrators' attitudes	.454	.153	.548	2.977	.005	Sig
Variable	Unstandardized coefficients		Standardized coefficients	t	Sig.	Remark
	B	Std. Error	Beta (β)			
(Constant)	1.917	.549		3.493	.001	
Computer self-efficacy	.199	.090	.294	2.202	.033	Sig

Table 4 showed that administrators' access ($\beta=0.039$, $p>.05$) did not have significant relative influence on utilization of ICT in sports management among sports administrators in Lagos State. The null hypothesis was therefore accepted. This implied that administrators' access had no strong influence on utilization of ICT in sports management among the respondents. It means that administrators' accessibility to ICT did not have strong impact on underutilization of ICT in sports management among sports administrators in Lagos State. The outcome of this study about administrators' access on utilization of ICT in sports management was in contrast to the finding of Tondeur, van Braak, Sang, Voogt, Fisser and Ottenbreit-Leftwich (2012) access to ICT is a key factor in determining the integration of ICTs in different institutions are the rules set by such institution on how and when to use the computers.

Administrators' attitudes ($\beta=0.548$, $p<.05$) had significant relative influence on utilization of ICT in sports management among sports administrators in Lagos State. The null hypothesis was therefore rejected. It implied that administrators' attitudes had strong influence on utilization of ICT in sports management among the respondents. This implied that administrators' attitudes had strong influence on utilization of ICT in sports management among the respondents. It means that administrators' attitudes to ICT had strong impact on underutilization of ICT in sports management among sports administrators in Lagos State. The outcome of this study about administrators' attitudes on utilization of ICT in sports management was in line with the finding of Schiller (2003) that personal characteristics such as educational level, age, gender, educational experience and attitude towards computers can influence the adoption of ICT.

Computer self-efficacy ($\beta=0.294$, $p<.05$) had significant relative influence on utilization of ICT in sports management among sports administrators in Lagos State. The null hypothesis was therefore rejected. This implied that computer self-efficacy had strong influence on utilization of ICT in sports management among sports administrators. This implied that computer self-efficacy had strong influence on utilization of ICT in sports management among the respondents. It means that computer self-efficacy to ICT had strong impact on underutilization of ICT in sports management among sports administrators in Lagos State. The outcome of this study about computer self-efficacy on utilization of ICT in sports management was in line with the finding of Compeau and Higgins (1995) that a strong sense of computer self-efficacy affects both the frequency and the manner in which ICTs are used in everyday instructional practice.

Conclusion

It was concluded that personal and psychological factors of administrators' access, administrators' attitudes and computer self-efficacy had positive relationship with utilization of ICT in sports management among sports administrators in Lagos State. It was also concluded that personal and psychological factors jointly had significant influence on utilization of ICT in sports management among sports administrators in Lagos State. It was further concluded that administrators' attitudes and computer self-efficacy had relative influence on utilization of ICT in sports management, while administrators' access did not.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. A periodic and effective sensitization programme on utilization of ICT in sports management should be carried out by the authority of Sports Council and Ministry of Youth and Sports. It is necessary in order to ensure that the sports administrators are aware of the proper utilization of ICT as well as utmost benefits that are accrued to it.
2. An effective education on proper utilization of ICT should also be organized for the sports administrators. This will assist the sports administrators to have better understanding on the need to utilize ICT in sports management.

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Teachers' Perception and Utilization of Community Resources for Sustainability of Basic Technology Instructions in South-west Nigeria

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Abstract

The pre-vocational subject in the Nigerian Junior School Curriculum which blends skills from various professions for the benefit of the society is the Basic Technology. This subject needs community resources for effective teaching and learning. These resources are human and non-human discovered outside the immediate school environment which is relevant for improving teaching and learning. Usability of these community resources and teachers' perception of the use are major precursors for the sustainability of Basic Technology instructions in Nigeria. Hence, this research adopted a detailed research type of inquiry approach with the use of the questionnaire. The Cronbach's alpha value of the instrument for Availability, Usability and perception of the use of community resources was 0.65, 0.67 and 0.74 respectively. The target population was all the upper basic school teachers from two states (Oyo and Osun) in South-west Nigeria. 959 Basic Technology teachers were purposively sampled from the states. One research hypothesis was formulated and tested using a t-test and three research questions were answered using frequency count and means. The outcome reveals that the identified community resources are not used as expected by Basic Technology teachers for Basic Technology teaching; the teachers have a positive perception of the use to basic technology instruction; both male and female Basic Technology teachers were not different in their perception of the use of community resources for teaching. Based on the findings, it was therefore recommended that the use of community resources in Basic Technology instruction should be sustained.

Keywords: Community Resources; Perception; Sustainability; Utilization

Introduction

The place of instructional resources in the well-delivered curriculum cannot be over-emphasized. These resources provide ways by which learning contents messages can be disseminated to learners. Amosa (2013) states that instructional resources can be grouped into human and material supports or aids that a teacher can use to pass information to the learners in his or her class. Instructional resources, apart from enhancing the positive attitude of learners towards learning, also help students in making use of their various functioning sense organs to the maximum.

Resources are those materials used by instructors and learners to concretize instructional contents. Learning and instructional resources abound and they can be categorized into human and material resources such as resource persons, centres, places, television, radio, computer, printed and non-printed materials. The classification of teaching and learning materials is based on some degree on the five senses and to some extent on common senses. According to Abolade (2009), the categorization adopted includes Audio materials, Visual materials, Audio-visual materials and Community resources.

Amosa (2013) describes community resources as all instructional environments whereby teachers and learners get helping hands through real-life experiences with the locally available supports or aids that would make teaching/learning process to be real and meaningful. to teachers and learners. Community

resources refer to teaching supports or aids sourced from locally available places like production companies, higher institutions workshops, private sawmills, roadside mechanic work and web-based resources. Bakare (2011) describes community resources as resource persons and materials resources which are within the geographical area of both the teachers and learners that aids or supports information in the class.

Dada (2013) characterized some relevance of community resources in learning situation as: (1) motivating students and enhancing their interest in school work, for example, students of social studies who watch a naming ceremony conducted in the traditional way might learn better and probably be more willing for subsequent visits; (2) the use of community resources assists learners to witness the real process of what they have learnt in classroom; (3) stimulates new interest in the students and lesson become real; (4) Community resources makes possible close observation of a multitude of natural and man-made materials, thereby improving learner's observation skills; and (5) Community resources usage in Basic Technology instruction makes learning to be an integrated or interdisciplinary unit, that is, lesson can be done in the community by following a process of how a tree is being felled from the forest, cut into logs of wood and split into marketable sizes at the saw-mill.

Since Basic Technology is concerned with the scientific laws and principles applications to solve basic human problems, the formal instructional setting is a closed space for instructional delivery. Therefore, teaching and learning must further away to the locally available supports or aids. There are several human and non-human resources within the community that can be used in several ways to enhance teaching and learning Yusuf (2004). Abolade (2009) also explained that there are several resource persons within the community, these resource persons can be used in several ways. They can be used as a guest speaker within the school to provide new information and experience for the students.

Many stakeholders have an interest in efficient integration of practical experiences most especially the use of immediate environments in a pedagogical system where teachers play key roles. Suitable use of locally available community resources could be a standard to advances from the conventional method of instructional delivery to a practical learning experience. The administrators and managers would need to empowering instructors before this can be achievable (Ndirika, 2011). Perception is a word which has its origin from the Latin word "Percipio" which means "taking, accepting, possessing, and apprehending with senses" (Yusuf and Falade, 2016). It may be described as the means by which living organisms organize, interpret and consciously comprehend what is happening around them.

The study by Naisiyaki, Jackson and Kirui (2017) confirm that teachers have a negative perception of the adequacy of some selected instructional materials. Let us see the perception of the instructors on the utilization of locally available supports in classroom situations for Basic Technology instruction. The National Policy on Education (FRN, 2004) stipulates on Basic Technology to be included in Junior Secondary Schools' curriculum. This would incorporate every individual to become a reputable and effectual citizen. The newly introduced educational system (9-3-4) in which the subject became necessary to enhance technological development so as to fulfil the dictate of the National Policy that is aimed at bringing the Nation to the world globalization standard in Education. The contents under each are made to reflect knowledge, skill, creativity and attitude which are the basic nature of technology.

The word 'use' implies putting a thing into action in order to achieve a goal or end result. Utilization of community-based things or services is the actual act, or judiciously usage of the valuable content of the services to achieve some purposes or specific goal. To this end, using community-based supports vary with task. Nigerian Educational Research and Development Council (2013) mentions utilization of supports or aids which include educational resource Centre, web-based resources, libraries, workshop/laboratories,

community-based resources (resources from the local environment) such as things in our homes, market, skilled occupations around us like woodworkers, welders' workshops and school resource centers among others. The table 1 below illustrates the resources for teaching various Basic Technology topics in school.

Table 1:
Resources for Teaching Various Topics in Basic Technology.

Topic	Resources	Sources
Motor vehicle parts	A motor car Labelled diagram of internal parts of vehicle, posters and pictorials. Vehicle under repair. Pieces of various motor parts.	Homes, schools, Basic Technology workshops, school resource Centre, education resource Centre, mechanic village, market places, motor parts, dealers' shop.
Woodwork Project	Timber, woodwork machines and tools, non-wood materials such as adhesives, nails, screws, hinges, wood varnish. Wood projects.	Timber shed, woodwork shops, Basic Technology workshop and market.
Energy Conversion	Radio, Torchlight, Solar Panel, Kerosene stove.	www.Personal.utulsa.edu/Kenneth.we .
Metalwork Machines	Power Hack saw, Lathe machines, Drilling Machines, Shaping and Grinding Machines.	www.ebay.cp.uk/sch/metalworking.mil . www.warco.co.k/5-metal-working.machine .
Board Practice (use of drawing instruments).	Drawing Board, Ruler, Masking Tape or Thumb Pin, T-square, Set Square, Compass, Dividers, Protractor.	Technical drawing laboratories & Architect's drawing room/Studio.

Source: (NERDC, 2013).

Statement of the Problem

Basic Technology is an activity-oriented course. NERDC (2013) recommends that the subject must be taught with resources that will facilitate full attention and participation on the learners' side during the lesson period. The study by Olanigan and Ojo (2008) had submitted that non-availability of well-equipped Basic Technology workplaces with adequate functional types of machinery were some major problems militating against excellent performances of learners in Basic Technology in Nigeria. These problems have been ameliorated through the utilization of locally available supports or aids such as things in our homes, markets, skilled occupations like welding workshops, carpentry workshops, and so on. This would create rooms for interaction between teacher, learners and the learning resources for Basic Technology instructions.

Also, Olumorin (2008) explains that the excellent integration of ICT into tertiary institutions banks heavily on the readiness level of teachers for its' use, not only on awareness but also on availability. Availability of these locally supports and teachers' perception is major precursors to teachers use or non-use of the locally available resources. Hence, there is need to look into the availability of community resources and perception of teachers on the use of community resources for Basic Technology instructions. Positive perception of the use of community resources by the teachers can act as a model to change from teacher-centred pedagogy to a more learner-centred pedagogy.

Research Questions

The following research questions were generated to guide the conduct of this study:

1. What are the available community resources for teaching Basic Technology?
2. Do community resources use for teaching Basic Technology?
3. What is the Basic Technology teachers' perception of the use of community resources?

Research Hypotheses

This null hypothesis was tested in the study;

H_0 : There is no significant difference between male and female teachers' perception of the use of community resources for teaching Basic Technology.

Methodology

This research was a detailed research type of inquiry approach. An inquiry approach connotes describing the event(s) exactly as they appear without the manipulation of external researchers or investigators with the use of the questionnaire. All Junior Secondary School Basic Technology teachers from two states (Oyo and Osun) in Nigeria was the target population for the study. Purposive sampling technique was employed since the target population was basically Basic Technology teachers. 959 Basic Technology teachers were selected randomly from Oyo and Osun state for this study. Community resources items were selected based on their relevance to Teachers' Perception of, availability and use for Basic Technology. The questionnaire contained items for each of the variables. It is structured in a clear and simple language that will enable the respondents to provide relevant answers to the questionnaire willingly.

The instrument is of three sections, A is for demographic data and B sought to find out if the recommended community resources by NERDC for teaching various topics in Basic Technology are available or not. Also, C elicits information about teachers' perception of the use of community resources for teaching Basic Technology. The response mode for availability and utilization of the resources are Available (A) and Utilization (U), Not available (NA) and Not Utilize (NU). While the response mode for teacher's perception was the Likert's response modes of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD).

The instrument was validated by four experts in educational technology and measurement and evaluation fields. The reliability of the instrument was determined. For Availability and Utilization of the recommended community resources, the Cronbach's alpha values of 0.65 and 0.67 were obtained respectively. The Cronbach's alpha value for teachers' perception of the use of community resources for Basic Technology was 0.74. A total of 959 questionnaires were administered to the sampled respondents from Oyo and Osun states. Out of 959 respondents, 821 of them fill and return the questionnaires given to them. This gives a percentage of 85.6% of the return. The copies of the completed questionnaires were collected from the respondents immediately, coded and analyzed. The research questions raised were answered using frequency count and mean, the hypothesis raised was tested using the t-test.

Results

Demographic Information of Respondents

Table 2: Distribution of Respondents by Gender

S/N	Gender	No. of Respondents	%
1	Male	459	55.9
2	Female	362	44.1
	Total	821	100

Table 2 shows that the male teacher respondents constitute a greater majority in the research sample than the female counterparts.

Research Question 1.

What are the available community supports for teaching basic technology?

Table 3:

Availability of Community Resources for Teaching Basic Technology

S/N	Community Resources	Availability				Interpretation
		A (2)	NA (1)	N	X	
1	Wood/Furniture workshop	578	243	821	1.70	A
2	Metal/Sheet Metal Workshop	480	341	821	1.59	A
3	Basic Tech. Workshop	556	265	821	1.68	A
4	Potter' Lodge	479	342	821	1.58	A
5	Sawmill	528	293	821	1.64	A
6	Hydropower Dam	221	600	821	1.27	NA
7	Electricity Transmission Station	437	384	821	1.53	A
8	Water Recycling Plant	397	424	821	1.48	NA
9	Water Works	443	378	821	1.54	A
10	Radio Transmission Station	438	383	821	1.53	A
11	Mechanic Workshop/Village	561	260	821	1.68	A
12	Blacksmith workshop	497	324	821	1.61	A
13	Airport Control Tower	221	600	821	1.27	NA
14	Local Food Processing Industry	558	263	821	1.67	A
15	Packaged Water Industry	511	310	821	1.62	A
16	Plastic Industry	270	551	821	1.33	NA
17	Rubber Processing Industry	218	603	821	1.27	NA
18	Electrician Workshop	542	279	821	1.66	A
19	Computer Training Centre/Cybercafé	547	274	821	1.67	A
20	Educational Resource Centre	521	300	821	1.64	A
21	Soap Processing Industry	340	481	821	1.41	NA
22	Motor Parts Dealer's shop	473	348	821	1.58	A
23	Others	191	630	821	1.23	NA
Grand means					1.53	A

As indicated by the results shown in table 3, and with a benchmark of 1.5, it appears that most of the identified community resources were available for teaching Basic Technology. Out of the 23 identified items, only 7 were unavailable. These are hydropower (1.27), water recycling plant (1.48), airport control tower (1.27), plastic industry (1.33), rubber processing industry (1.27), soap processing industry (1.41) and others (1.23). However, based on the grand mean of 1.53, it can be inferred that most of the required resources for teaching basic technology were available.

Research Question 2.

Do community resources use for teaching Basic Technology?

Table 4:
Utilization of Community Resources for Teaching Basic Technology

		U (2)	NU (1)	N	X	Interpretation
1	Wood/Furniture workshop	578	243	821	1.70	U
2	Metal/Sheet Metal Workshop	480	341	821	1.59	U
3	Basic Tech. Workshop	556	265	821	1.68	U
4	Potter' Lodge	340	481	821	1.41	NU
5	Sawmill	528	293	821	1.64	U
6	Hydropower Dam	221	600	821	1.27	NU
7	Electricity Transmission Station	191	630	821	1.23	NU
8	Water Recycling Plant	397	424	821	1.48	NU
9	Water Works	443	378	821	1.54	U
10	Radio Transmission Station	340	481	821	1.41	NU
11	Mechanic Workshop/Village	561	260	821	1.68	U
12	Blacksmith workshop	191	630	821	1.23	NU
13	Airport Control Tower	221	600	821	1.27	NU
14	Local Food Processing Industry	558	263	821	1.67	U
15	Packaged Water Industry	191	630	821	1.23	NU
16	Plastic Industry	270	551	821	1.33	NU
17	Rubber Processing Industry	218	603	821	1.27	NU
18	Electrician Workshop	191	630	821	1.23	NU
19	Computer Training Centre/Cybercafé	547	274	821	1.67	U
20	Educational Resource Centre	521	300	821	1.64	U
21	Soap Processing Industry	340	481	821	1.41	NU
22	Motor Parts Dealer's shop	473	348	821	1.58	U
23	Others	191	630	821	1.23	NU
Grand means					1.45	NU

As indicated by the results shown in table 4, and with a benchmark of 1.5, it appears that most of the identified community resources were not used for teaching Basic Technology. Out of the 23 identified items, only 10 were used. These are wood/Furniture workshop (1.70), Metal/Sheet Metal Workshop (1.59), Basic Tech. Workshop (1.68), Sawmill (1.64), Water Works (1.54), Mechanic Workshop/Village (1.68), Local Food Processing Industry (1.67), Computer Training Centre/Cybercafé (1.67), Educational Resource Centre (1.64) and Motor Parts Dealer's shop (1.58). However, based on the grand mean of 1.45, it can be inferred that most of the required resources for teaching basic technology were unutilized.

Research Question 3.

What is the Basic Technology instructors' perception of using community resources?

Table 5:

Teachers' Perception of the Use of Community Resources for Basic Technology

S/N	Statement	SA (4)	A (3)	D (2)	SD (1)	N	X
1	Comprehension Enhancement	534	179	71	37	821	3.47
2	Contents Simplificative	368	269	104	80	821	3.13
3	Local Technology Application.	414	288	79	40	821	3.31
4	Teaching Effectiveness.	415	282	84	40	821	3.31
5	Realistic Teaching and Learning Process	430	267	83	41	821	3.32
6	Practical Teaching Learning Enhancement	454	238	90	39	821	3.35
7	Indispensability for Basic Technology Contents.	326	307	137	51	821	3.11
8	Motivational Enhancement.	411	261	112	37	821	3.27
9	Learning Retention Enhancement	445	231	106	39	821	3.32
Grand Mean							3.29

The individual mean scores recorded by each item of the questionnaire range from 3.11 to 3.47 resulting into a grand mean score of 3.29 as indicated in table 5, with 2.5 as the benchmark, it can be inferred that secondary school Basic Technology teachers have a good perception of using local supports for facilitating Basic Technology instruction.

Hypothesis One

Ho₁: *There is no significant difference between male and female Basic Technology teachers' perception of the use of community resources for teaching Basic Technology.*

Table 6:

t-test of Male and Female Basic Technology Teachers' Perception of the Use of Community Resources

No.	X	SD	Df	T	Sig. (2-tailed)
Male	459	28.98	6.67	819	2.24
Female	362	29.93	5.20		
Total	821				

As indicated in the table 6, $t(819) = (2.24)$, $p = 0.025 < 0.05$. Since the p-value is less than the 0.05 level of significance, the null hypothesis is not accepted, meaning that there is a significant difference in male and female Basic Technology teachers' perception of the use of community resources for teaching the subject. The implication of this is that the observed high positive perceptions of the male and female Basic Technology teachers on the use of community resources for Basic Technology in classroom situations are not significantly different.

Discussion of Findings

The findings in this research established that most of the identified community resources were available but not put to use as expected for Basic Technology instructions. The perception of Basic Technology teachers towards the use of community resources in teaching was positive. This implies that

effort to make it work should, therefore, be made by all stakeholders at the Upper Basic School level. Moreover, there was no significant difference between male and female Basic Technology teachers' perception of the use of community resources in teaching Basic Technology in upper basic schools/junior secondary schools.

Conclusions and Recommendations

Depending on the findings of this study, it was observed that the utilization of community resources must be encouraged in basic technology instructions. This can be done through government and other stakeholders' support to schools. Community resources where available should be planned properly and effectively utilized in the classroom. Therefore, upper basic school teachers should endeavour to use their immediate environment/community resources in their lessons; Government, curriculum designers and educational planners should be motivated to intensify efforts in encouraging the use of real-life experiences and industrial visits in the teaching and learning processes; Government and curriculum designers should encourage teachers to change from teacher-centred pedagogy to a more effective learner-centred pedagogy in the teaching and learning process so that the importance of community resources can be seen by various stakeholders in education.

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COLLEGES OF EDUCATION STUDENTS' PERCEPTION ON E-EXAMINATION AS AN ASSESSMENT TOOL IN OYO STATE

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Abstract

Educational systems are thus looking to e-learning programs to help address educational challenges and to substantially improve the quality and content of their education. Integrating e-examination into existing educational system can, however, be a major challenge. This study investigated the Colleges of Education Students Perception on E-Examination as an Assessment Tool in Oyo State Nigeria. A sample of 1500 respondents who are 200 level students of the colleges of education in the state were selected using multi stage sampling technique. A structured questionnaire developed and validated by the researchers was used to collect data for the study. Descriptive statistics was used to describe the demographic data as well as research question while test of the hypotheses was done using inferential statistic. T-test was used to test hypothesis one and ANOVA was used to test hypothesis two at 0.05 level of significance. The result revealed that college of education students had positive perception on the use of e-examination as tool for assessment and that both gender and course of study are not barriers for colleges of education students' perception on the use of e-examination as an assessment tool. Based on the findings of this study, it was recommended that the college of education management should be ready to adopt the use of e-examination and that Provision should be made for facilities that will bring about effective adoption of e-examination in the college.

Keywords: E-examination, Perception, and Assessment

Introduction

The massive examination leakages, demand for gratification by teachers, bribe-taking by supervisors and invigilators of examinations have become a global phenomenon. This menace has resulted to general fallen standards of education, particularly among developing nations and Nigeria is not an exception. Consequent upon this, all Nigerian higher institutions are looking for a way out which has resulted to conducting Post-Entrance or Post-JAMB examination/screening because of lack of trust and confidence in the conduct of the entrance examinations, although the advent of web applications into the computing technology has brought about a significant revolution in our social life including the traditional system of education and examination.

Many institutions are beginning to re-evaluate their traditional methods and have considered providing pedagogical materials through the Internet. One important area of application of the web technology is in the development of web-based testing and assessment (Iyilade et al, 2005). Web-based testing and assessment systems offer greater flexibility than the traditional approach because test could be offered at different times by students and in different locations (Venon, Diana, and Fleet, 2004). More importantly, questions could be shuffled having the same structure and level but different contents. Basically, the electronic examination system involves the conduct of examinations through the web or the intranet and it reduces the large proportion of workload on examination, training, grading and reviewing. The set of questions often used in the e-examination system are multiple choice objective tests and quizzes that can be formally and easily evaluated online.

With the introduction of e-exams, institutions still grapple with serious issues including the preparedness of the learners coping with more technicalities associated with electronic examinations. Unfortunately, there is shortage of research on students' perception of e-exams in Nigeria. This study therefore seeks to take a critical look at how the adoption of electronic examination would have assisted Nigeria colleges of education especially in Oyo town in the evaluation phase of students' study circle as well as the architecture for electronic examination as implemented by their university counterparts. It is a fact that learners' attitude towards e-learning activities could be seen as the product of their perceptions of the usefulness of e-learning and the level of technical difficulty envisaged to be encountered while exploring the potentials of e-learning technology. In other words, the negative or positive perception of learners' ease of technology use and the value associated with its use in educational processes have greater influence on their intention to explore the potentials of the technology.

Learners' decision about the use of ICT for learning process is affected by factors such as demography, areas of specialization, gender, school type, intellectual enhancement, training, enabling environment, and individual's perception (Hochlehnert, Brass, Moeltner, & Juenger, 2011). Ayo, Akinyemi, Adebiyi, & Ekong. (2007) define e-examination as a system that involves the conduct of examinations through the web or the internet. E-assessment in its broadest sense is the use of information technology for any assessment related activity Ayo et al. (2007) also opined that e-examination reduces the large proportion of workload on examination, training, grading and reviewing, thus bringing about the ability for the institution to release examination results in record time. This is because where the lecturer would spend weeks marking scripts manually, the computer would grade the students as soon as they finish their paper.

Adebayo and Abdulhamid, (2008) opined that e-examination was introduced to address series of anomalies being encountered in the manual tests and that, the e-examination would remove all human errors recorded in manual examination and create opportunity for students to access their results immediately. With this, we have removed so many hiccups in the compilation of answer scripts and movement of examination papers from one part of the country to another. The examination is conducted now through the net and that, it would be difficult for students to carry out any form of examination malpractice. This paper assessed the college of education students' perception on e-examination in Oyo State.

Research Question

1. What is the college of education students' perception on e-examination in Oyo state?

Hypotheses

H_01 : There is no significant difference in the perception of COE students in e-examination based on gender.

H_02 : There is no significant difference in the perception of COE students in e-examination based on course of study.

Methodology

This study is a descriptive research, using survey method. The target population for this study consisted of all colleges of education students in Oyo state. Purposive sampling technique was used to select all 200level students in the three government owned colleges of education in Oyo state. As at the time of this research, the three colleges of education in Oyo state have a total population of 6000 students in 200 level. 1500 from 200 level students across the disciplines in the three colleges of education in Oyo state were sampled, representing 25% of the total population of the 200 level students using proportionate sampling technique which was deemed suitable by the researchers as being fair representative of the whole population. The research instrument was developed to elicit students' response on the use of e-examination. The instrument

went through validation by scholars in the field of educational technology, and reliability test before it was administered on the students. The test-re-test reliability method was used with reliability index of 0.88. A pilot study was carried out by using 50 students of 200 level students from Kwara state college of education, Ilorin. The researchers with four research assistants administered the research instrument to the participants and waited to collect the filled questionnaires to avoid attrition. Out of 1,500 students that were given questionnaire for the study, 1,432 were returned which is 95.5% and were used for the analysis, percentage was used to answer the research question while t-test statistic was used to test hypotheses 1 while ANOVA statistic was used to test hypothesis 2. They were tested at 0.05 alpha level.

Results

The results of data analysis of the study are presented in tables 1 to 5 below.

Table 1:

Socio-demographic variables of the respondents.

Variables	Frequency	Percentage (%)
Gender		
Male	617	43.1
Female	815	56.9
total	1432	100
Course of study		
Sciences	320	22.3
Languages	275	19.2
Arts and social sciences	288	20.1
Eccped	267	18.7
Voc. and tech.	282	19.7
Total	1432	100

Research Question 1: What is the college of education students' perception of e-examination in Oyo state?

Table 2:

COE students' perception on e-examination

S/N	Perceived use of e-examination	Mean (x)	
1.	The use of examination will be difficult for me	1.10	Rejected
2.	Using examination in the college is frustrating	1.15	Rejected
3.	The use of e-examination will reduce examination Malpractices	3.50	Accepted
4.	Power failure will hinder e-examination	1.40	Rejected
5.	E-examination will reduce examination stress	17	Accepted
6.	The use of e-examination will require additional computer Skill knowing about computer	2.84	Accepted
7.	The use of e-examination will make many students to fail	1.75	Rejected
8.	The use of e-examination impedes cognitive thinking	1.12	Rejected
9.	I think positively about using e-examination	3.20	Accepted
10.	The use of e-examination improves students academic performance	3.22	Accepted

Acceptance level = above 2.00; rejection level = below 2.00.

The responses in table 1 revealed that the decision on the statement that the use of e-examination is difficult was rejected (mean of 1.10). Most of the respondents disagreed with the statement generated under that using e-examination in college is frustrating. The statement was also rejected (mean 1.15). The

decision on item that e-examination will reduce examination malpractices was accepted (mean 3.50). The respondents still accepted that e-examination will reduce examination stress with mean score of 3.17. The respondents also accepted the statement that e-examination will require additional computer skills with average mean score of 2.84.

Furthermore, the respondents accepted that unstable power supply will hinder the use of e-examination in colleges with mean score of 2.70. The respondents rejected that e-examination impedes students' cognitive thinking with mean score of 1.12. Respondents also accepted that the use of e-examination will improve students' academic performance with mean score of 3.22. Respondents also rejected that e-examination will make students fail with mean score of 1.75 and lastly, the respondents also accepted that they think positively about using e-examination with mean score of 3.20.

Hypothesis One:

H_0 : Thus there is no significant difference in the perception of COE students in e-examination based on gender.

Table 2:

t-test of male and female COE students on their perception on e-examination

Gender	No	X	SD	DF	T	sig. (2-tailed)
Male	617	27.57	4.33	1430	.95	.35
Female	8152	7.52	4.62			
Total	1432					

According to table 2, $t(1423) = .95, = .35$. That is the result of t-value of .95 resulting in .35 significance value was greater than 0.05 alpha value. This means that the stated null hypothesis was not rejected.

Hypothesis Two

H_0 : There is no significant difference in COE students' e-examination perception based on course of studies.

In order to establish whether significant difference existed among COE students from different course of studies (Sciences, Arts & social sciences, Eccped, Languages & voc. & tech.)

Table 4:

The ANOVA of COE students' e-examination perception based on course of studies

	Sum of square	df	mean square	f	sig
Between groups	.195	4	0.68	.547	.750
Within groups	117.318	1427	.206		
Total	117.513	1431			

Table 4 revealed that there was no significant difference among colleges of education students perception based on course of study $F(4,1427) = .547, p = .75$, therefore meant that the null hypothesis was not rejected because the significant value (.75) was greater than the 0.05 alpha level.

Discussion of Findings

The findings of this study revealed that e-examination is not difficult. Though it may require some materials and skills for its conduct, it is still useful especially in this 21st century. This corroborates the

findings of Adegbija et al (2009) and the assertion of Attewell (2005), that adopting e-assessment has more radical implication than just changing the mode of assessment. Findings also showed that the respondents accepted that e-examination will reduce examination malpractice, that e-examination will reduce examination stress. This is against the expectations of some that e-examinations will create unnecessary tension on students because of its modus operandi. It is also true because examination leakages and impersonation will be drastically reduced because new technologies have made it impossible for students to cheat because each student is served with his/her own questions which may be different from the student sitting next to him. As found out by Adegbija et al. (2009) it was also shown that the use of e-examination does not impede cognitive thinking of students in as much it requires critical reading to cover all areas taught and even in detail in order to pass their examination. The study also, confirmed that unstable power supply hindered e-examination uses in colleges of education. And lastly, it was revealed that e-examination is not frustrating and that respondents think positively of using e-examination.

The findings indicated that college of education students had positive perception on the use of e-examination which was in agreement with findings of Olubiyi, Ajadi, and Inegbedion (2011) who revealed that the students' perception lies on reduction of examination malpractice, wide coverage of the scheme, academic performance among others. Olubiyi et al (2011) also reported the views of Prof.OluJegede as cited in Awosiyan (2010) that students academic performance is likely to improve since the students are likely to be more committed to their studies with a view that there might not be opportunity to cheat in examination; also because of fewer distractions in the examination hall they are likely to have more concentration since the students know that questions would cover almost every aspect of the scheme there is the tendency for them to study more.

The findings also, revealed that gender is not a basis for COE Students' perception on the use of e-examination.

Conclusion

This study examined college of education students' perception on e-examination. It was discovered that e-examination would solve the associated problems with traditional methods. The system has the potential to drastically reduce examination malpractices. E-examination has the advantage of being easy to administer, ability to offer instant results to applicants, devoid of paper work and long time in marking the scripts which in most cases are prone to errors and misplacement of some scripts due to the large answer scripts that have to be marked and accessed.

Recommendations

Based on the findings of this study, the following recommendations were made

1. The college of education management should be ready to adopt the use of e-examination
2. Provision should be made for facilities that will bring about effective adoption of e-examination in the college

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UNDERGRADUATES' PERCEPTION AND ATTITUDE TOWARDS THE USE OF MOBILE TECHNOLOGY FOR BLENDED LEARNING IN UNIVERSITY OF ILORIN, NIGERIA

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Abstract

This study examined undergraduates' perception and attitude towards utilization of mobile technologies for blended learning in University of Ilorin, Nigeria. The study was a descriptive design of the survey type. Random Sampling technique was adopted to select 339 undergraduate undergraduates from selected faculties in University of Ilorin. Data generated through a designed structured questionnaire were analyzed through frequency count and percentage. Three research questions were raised and answered using frequency count and percentage, while t-test was used to test the one hypothesis generated. The result revealed that (i) mobile technology facilitates blended learning for undergraduates to easily view course materials which make school work easily accessible and interesting, (ii) undergraduates use mobile devices for gaming, chatting, and socializing, instead of learning, (iii) there is no significant difference in undergraduate's attitude towards the use of mobile technology for blended learning based on gender $t(292) = 2.86$, $p > .05$. The study concludes that mobile technology has the potential to increase undergraduates' learning pace, accessibility and communication in a blended learning environment. Based on the findings, it was recommended that universities should increase the internet bandwidth. Lecturers should be encouraged to engage the undergraduates in a blended learning environment.

Keywords: Attitude, Blended Learning, Mobile Technology, Perception, Undergraduate

Introduction

Information and communication technology (ICT) plays a vital role in learner's achievement at all educational levels and its significance in education cannot be overemphasized. ICT are tools for both students and teachers. ICT has the potential of being used to meet the learning needs of individual students, increase self-efficacy and independence of learning among students and improve students' development. Through ICT, there is cooperative learning that assists students in gaining more knowledge and techniques as they interact with each other. Ogunlade (2015) defines ICT as a driver for change in higher education. ICT is being used effectively in education and learning environments, due to its spread of internet use that has different dimensions globally. Most countries have used the privilege of ICT to transform the structure of education programmes at all levels for disseminating instruction. The use of ICT in schools has widened accessibility to quality education and improved the management of education learning systems. ICT is considered a powerful tool for educational change and reform. ICT is used as productivity tools or enrichment resources to support the traditional teacher-led mode of instruction, optimize undergraduates-centred pedagogical methods, develop broad and generic skills, and provide quicker and easier access to more extensive and current information (Ogundairo, 2015).

Cobcroft, Towers, Smith and Axel (2006) opined that mobile technologies within the education context can allow undergraduates the opportunity to undertake ‘user-led education’, constructing knowledge, collaborating with peers and learning communities within and beyond the classroom or computer centre. Valk, Rashid, and Elder (2010) demonstrated how mobile technology-facilitated learning can give undergraduates in developing countries increased access to educational materials and services, particularly in rural and urban areas. Mobile technologies are new generation educational tools that afford creative use and instant access to a wealth of online resources (Pamela, 2011). They are ‘revolutionary’ devices that hold great potential for transforming learning. One of the benefits of mobile devices is that they enable learning anywhere, anytime. This allows a shift away from the industrial era model where the classroom is the central place of learning driven by the teacher and limited to instruction within the school day. Use of mobile devices encourages undergraduates’ interaction, the teacher is no longer at the centre of the learning process and the instructional time can transcend the school day. The portability of mobile devices provides users with access to a broader and more flexible source of learning materials than what is offered in classroom settings. With over 500,000 apps (mobile applications) available to download from the App Store, undergraduates have access to an abundance of learning materials for use on mobile devices (Shuler, 2012).

Advances in mobile technologies have enabled educators to send instructional messages in flexible ways. With mobile technologies, instructors and undergraduates can communicate through voice and image as well as text. Using mobile devices for educational purposes is becoming a common expectation of learners (Lan & Huang, 2012). Also, mobile technology supports independent learning and development of metacognitive skills in young learners (Sha, Looi et al. 2011). Wong (2012) supported that access to mobile technology allows undergraduates to design their own learning contexts in terms of when, where, how and their learning style thereby becomes increasingly self-directed.

Abdulrahman and Soetan (2018) defined mobile learning as a form of learning using wireless devices that can be used wherever the learner is with unbroken transmission signals. These include mobile devices like smart phones, tablet computers, laptops and persona digital aids (PDAs). It is also defined as the exploitation of ubiquitous hand-held technologies, together with wireless and mobile phone networks, to facilitate, support, enhance and extend the reach of teaching and learning. Nikana (2000) identifies several potential advantages of mobile learning which includes increased understanding of the material/curriculum content. Through different collaborative methods and delivery approaches, undergraduates are provided with an increased understanding and depth of knowledge regarding the material/curriculum content. Undergraduates’ motivation may increase through the use of mobile devices because undergraduates could be participating in group discussion and dialogue more often and receive quick and effective feedback, which reinforces learning and increases memory retention. Another view, however is that, increased motivation to learn will be directly associated with the use of the mobile device, rather than the task completed with it (Goodison, 2001).

Online learning has evolved from web-based and distance learning programs, which has come to represent the leading edge in rethinking course design and personalized instruction using digital content and innovative tools for instructional delivery. As social software provides interesting possibilities for building collaborative learning environments, the wireless networks allow flexibility in setting up learning environments where needed (Mikko et al, 2010). Undergraduates incorporate various means like blended

learning to study. Lalima and Kiran (2017) defined blended learning as an innovative concept that embraces the advantages of both traditional teaching in the classroom and ICT supported learning including both offline learning and online learning. It has the scope for constructive learning, collaborative learning and computer assisted learning. Blended learning is also referred to as hybrid learning that combines the best features of traditional schooling with the advantages of online learning to deliver personalized, differentiated instruction across a group of learners. Undergraduates in formal blended learning educational programs spend part of their time learning online and also have the benefit of face-to-face instruction and supervision to maximize their learning and to best fit their own needs (Allison et al, 2015).

According to Garrison and Kanuka (2004), the simplest model of blended learning “is the thoughtful integration of classroom face-to-face learning experiences with online learning experiences” aiming at taking advantage of a synchronous face-to-face situation and the asynchronous, text-based Internet. Kose (2010) suggested a more advanced way of utilizing the idea of blended learning by connecting the possibilities of face-to-face situation and online environments in several ways, both simultaneously and non-simultaneously. Garfield (2005) expressed that the innovation of technology-based learning continues to challenge educators to develop new teaching and learning methods. Unfortunately, many teachers and undergraduates resist change in teaching and learning with new technology because they do not think of themselves as part of a new learning culture. Clarke, Zimmermann and Svanaes (2013) submitted that undergraduates perceived mobile technology as a tool that facilitates access to personalized learning content with the ability to learn outside traditional classroom settings.

The perceived level of integrating mobile technology into blended learning among undergraduates in higher institutions has increased greatly over the years, ranging from the use of social apps to utility apps and likes (Yeboah & Ewur, 2014). Undergraduates understand that mobile technology enables them to create their own understanding of content. However, Mather (2015) noted that lack of structure on use of mobile devices can negatively impact undergraduates’ learning. If undergraduates find their mobile devices useful, they tend to integrate in into their task, routines and even learning.

Undergraduates’ perception towards a blended learning environment may have an effect on their behaviour, which is referred to as attitude. Attitude is defined as an individual behaviour or feeling about something, formed in a situation influenced by cognitive process of information. Attitude is divided into three categories namely: cognitive, affective and psychomotor. Bada (2017) defined attitude as an umbrella expression covering such concepts as preferences, feelings, emotions, beliefs, expectations, judgments, appraisals, values, principles, opinions, and intentions. Consequently, adoption or rejection of a specific behaviour may be affected by attitude. However, undergraduates’ perception and attitude towards a learning environment determines the amount of learning that will take place. It was further expressed that undergraduates’ attitudes to the use of mobile technology for learning is positive as it is used to support teaching and learning.

Yet for such initiatives (blended learning) to improve undergraduates’ learning and teaching effectiveness, these initiatives must be accepted by undergraduates. Cavus and Ibrahim (2009) expressed that undergraduates’ attitude and perception is essential for effective implementation of mobile technology in learning. Maniar, Bennett, Hand, and Allan (2008) posited that small screen size was found to create cognitive disadvantages related to undergraduates’ attention and visual perception. However,

undergraduates have also reported wanting to have more options to make learning tools more convenient so they can study when and where they want to. Typically, the use of personal devices affords undergraduates' ownership of learning, which may lead to positive language learning experiences (Kukulska-Hulme, 2009).

Many educational institutions have implemented ubiquitous or required laptop, notebook, or tablet personal computing programs for their undergraduates. Yet, limited evidence exists to validate the acceptance of this implementation among undergraduates. In that regard, the objective of this research is to determine undergraduates' perception and attitude towards the use of mobile technology for blended learning. The research contributes to a better understanding of the introduction of information technology (IT) based initiatives in education with a particular emphasis on mobile technology and blended learning.

Research Questions

The study sought answers to the following research questions:

1. How do undergraduates perceive the use of mobile technology for blended learning?
2. What is the attitude of undergraduates towards the use of mobile technology for blended learning?
3. Does gender have influence in undergraduates' attitudes towards the use of mobile technology for blended learning?

Research Hypothesis

H_0 : There is no significant difference in the undergraduate's attitudes towards the use of mobile technology for blended learning based on gender

Methodology

The study was a descriptive research of the survey method. The survey was conducted to collect the data on undergraduates' perception and attitude towards the use of mobile technology for blended learning. From a total of fifteen faculties in University of Ilorin, eight faculties were randomly selected, while 50 respondents were purposively selected from each faculty, which comprised 400 respondents. However, from the 400 copies of the questionnaire administered, only 339 copies were found usable for the purpose of this research. The instrument for this study was a researcher designed questionnaire titled: "Undergraduates perception and Attitude towards the use of mobile technology for blended learning in University of Ilorin". The questionnaire was divided into three (3) sections. Section A consisted of demographic information of the respondents while Section B and C sought information on the variables selected from the study. The questionnaire consisted of twelve (12) questions and modified Likert attitudinal scale with reference option of SA = Strongly Agree, A = Agree, SD = Strongly Disagree, D = Disagree. The questionnaire was chosen as the research instrument for this study because it is useful for gathering data in real time from a large sample within a short period of time.

Data obtained through the questionnaire was subjected to descriptive and inferential statistics. The descriptive analysis (frequency count and percentage) was used to answer the research questions while t-test was used to answer the research hypothesis. Data collected was coded and analyzed using Statistical Package for Social Sciences (SPSS) version 20.0 for windows at 0.05 level of significance.

Table 1:
Distribution of respondents

Demographics	Frequency	Percentage%
GENDER		
Male	166	49%
Female	173	51%
Total	339	100.0
FACULTY		
Agriculture	43	12.7%
Arts	44	13%
Communication and Information Science	47	13.9%
Education	44	13%
Life Science	44	13%
Management Science	39	11.5%
Physical Science	40	11.8%
Law	38	11.2%
Total	339	100%
AGE		
15-18 years	50	14.7%
19-22 years	170	50.1%
23-26 years	78	23%
27 and above	41	12.1%
Total	339	100%
LEVEL		
100 level	21	6.2%
200 level	160	47.2%
300 level	102	30.1%
400 level	56	16.5%
Total	339	100%

The demographic information of respondents who took part in the study in table 1 revealed that 166 (49%) respondents were male while 174 (51%) respondents were female. This indicates that more female than male respondent took part in the study. Based on demographic faculty factor, 43 (12.7%) respondents were from Agriculture, followed by Arts with 44 (13%) respondents, 47 (13.9%) respondents were from Science, 44 (13%) respondents were from Education, 44 (13%) respondents (13%) were from Life Science, 39 respondents (11.5%) were from Management Science, 40 (11.8%) respondents (11.8%) were from Physical science, while 38 respondents representing (11.2%) where from Law. This shows that the majority of the respondents were from faculty of Communication and Information Science. The age distribution of the respondents revealed that 50 (14.7%) respondents falls within the age range of 15-18 years, 170 (50.1%) respondents were in range of 19 – 22 years, 78 respondents (23%) falls within the age range 23-26, while 41 (12.1%) respondents fall within the age range of 27 and above. This shows that majority of respondents are between the ages 19 – 22years. This is followed by the year of study of

respondents which indicates that 21 (6.2%) respondents of those surveyed are in 100 level, while 160 representing (47.2%) respondents are in their 200 level of study. Also, 102 (30.1%) respondents are in their 300 level of study, while those in their 400 level year of study account for 56 (16.5%) respondents respectively.

Results

Research Question 1: How do undergraduates perceive the use of mobile technology for blended learning?

Table 2:

Undergraduates' perception on the use of mobile technology for blended learning

S/No	Items	Strongly Disagree (%)	Disagree (%)	Agree (%)	Strongly Agree (%)
1	The learning activities and assignments of courses taught with mobile technology met my learning expectations	46 (13.6%)	77 (22.7%)	126 (37.2%)	90 (26.5%)
2	I can easily view course materials on my mobile phones which make school work easily accessible and interesting	20 (5.9%)	56 (16.5%)	147 (43.4%)	116 (34.2%)
3	Blended learning through mobile technology gave me more opportunities to reflect on what I had learnt	33 (9.7%)	112 (33%)	74 (21.8%)	120 (35.4%)
4	My university provides the resources necessary for undergraduates to succeed in blended courses	57 (16.8%)	156 (46%)	85 (25.1%)	41 (12.1%)
5	Blended learning helped me to understand the course content better	29 (8.6%)	96 (28.3%)	140 (41.3%)	74 (21.8%)
6	Blended learning through mobile technology is not time consuming, not expensive and not very tasking.	77 (22.7%)	123 (36.3%)	85 (25.1%)	54 (15.9%)
7	The use of mobile technology creates an easy communication within the undergraduates and lecturers.	34 (10%)	100 (29.5%)	39 (11.5%)	166 (49%)

The result from table 2 indicates that respondents agreed that the learning activities and assignments of courses taught with mobile technology met their learning expectations with 216 (63.7%). Also, 263 (77.6%) respondents indicated that they can easily view course materials on their mobile phones which make school work easily accessible and interesting. However, 194 respondents (57.2%) agreed that blended learning through mobile technology gave them more opportunities to reflect on what they had learnt; while 145 respondents (42.7%) disagreed with this statement. 213 respondents (62.8%) indicated that universities do not provide the resources necessary for undergraduates to succeed in blended courses. Also, respondents agreed that blended learning through mobile technology is time consuming, expensive and very tasking with 200 (59%). 205 respondents (60.5%) agreed that the use of mobile technology creates an easy communication within the undergraduates and lecturers. From the responses as interpreted, it was deduced that undergraduates can easily view course materials on their mobile phones which make school work easily accessible and interesting. Also, blended learning through mobile technology helps in retaining knowledge

and understanding the course content better. The use of mobile technology creates an easy communication between the undergraduates and lecturers.

Research Question 2: What is the attitude of undergraduates towards the use of mobile technology for blended learning?

Table 3:

Undergraduates' attitudes towards the use of mobile technology for learning

S/No	Item	Strongly Disagree (%)	Disagree (%)	Agree (%)	Strongly Agree (%)
1	The use of mobile technology motivates undergraduates to perform excellently in their academics	21 (6.2%)	101 (29.8%)	92 (27.1%)	125 (36.9%)
2	Undergraduates are eager to learn more about the topics been taught in class with the use of mobile technology.	50 (14.7%)	36 (10.6%)	233 (68.7%)	20 (5.9%)
3	There is increase in the undergraduate's performance since the integration of blended learning.	53 (15.6%)	120 (35.4%)	112 (33%)	54 (15.9%)
4	Undergraduates put in a great deal of effort to learn to use the social networking application of participating in classroom discussions.	56 (16.5%)	50 (14.7%)	88 (26%)	145 (42.8%)
5	Undergraduates primarily use mobile technology for gaming, chatting, and socializing.	30 (8.8%)	95 (28%)	141 (41.6%)	73 (21.5%)

The result on table 3 on undergraduates' attitudes towards the use of mobile technology for blended learning showed that, 215 respondents (64%) agreed that the use of mobile technology motivates undergraduates to perform excellently in their academics, while 122 representing 36% disagreed with this statement. Also, undergraduates are eager to learn more about the topics being taught in class with the use of mobile technology with 253 (74.6%) respondents supporting this claim. However, 51% of the total respondents disagreed that there is increase in the undergraduates' performance since the integration of blended learning. 233 respondents (68.8%) agreed that undergraduates put in a great deal of effort to learn to use the social networking application of participating in classroom discussions, while 106 respondents (31.2%) disagreed with this statement. Also, 214 (63.1%) respondents agreed that undergraduates primarily use mobile technology for gaming, chatting and socializing, while 125 (36.8%) respondents disagreed with this claim.

It can be deduced from Table 3 that the use of mobile technology motivates undergraduates to perform excellently in their academics, thereby making them eager to learn more about the topics taught in class using blended learning. Furthermore, undergraduates primarily use mobile technology for gaming, chatting and socializing, instead of learning.

Hypothesis Testing

$H_0:$ *There is no significant difference in the undergraduates' attitudes towards the use of mobile technology for blended learning based on gender*

Table 4:

Undergraduate's attitudes towards the use of mobile technology for blended learning

Variable	N	X	SD	Df	t	Sig	Remarks
Male	98	3.11	0.895	292			
Female	102	3.03	0.884		2.86	0.511	Accepted

Table 4, revealed that $df = 292$, $t = 2.86$, $p = 0.511$. This means that the hypothesis was accepted. This was as a result of t-value of 2.86, resulting in 0.511 p value greater than 0.05 significant alpha level. By implication, the stated hypothesis established that there is no significant difference in the undergraduate's attitudes towards the use of mobile technology for blended learning based on gender.

Discussions

This study investigated undergraduates' perception and attitudes towards the use of mobile technology for blended learning in University of Ilorin. It examined the perception and attitude of undergraduates towards the use of mobile technology for learning, and the influence of gender on undergraduates' attitudes towards the use of mobile technologies for blended learning.

Findings showed that the overall learning activities and assignments of courses taught with mobile technology met the undergraduates' learning expectation as the learning activities and experiences are found to be more interesting, fun and engaging. Also, undergraduates can easily view course materials on their mobile phones which make school work easily accessible and interesting. Furthermore, blended learning through mobile technology helps in retaining knowledge and understanding the course content better. The findings further established that using mobile technology for blended learning is not time consuming, not expensive and not very tasking. Communication between undergraduates and lecturers is a vital factor in blended learning environment, mobile technology creates an easy communication between undergraduates and lecturers. This is consistent with the findings of Cobcroft, et. al. (2006) and Pamela (2011) who opined that mobile technologies gives undergraduate the opportunity to undertake 'user-led education', collaborate with peers and afford creative use and instant access to a wealth of online resources.

The second finding in this study showed that undergraduates showed positive attitudes towards the use of mobile technology for blended learning as they can easily view course materials on their mobile phones which make school work easily accessible and interesting. Undergraduates sees mobile technology as a tool that motivates them to perform excellently in their academics. Despite this, the general usage of mobile technology is not tailored towards learning.. Rather, it is primarily used for gaming, chatting and socializing, instead of learning. It is of note that blended learning through mobile technology helps in retaining knowledge and understanding the course content better. This is in line with the findings of Svanaes (2013) who expressed that undergraduates used mobile technology as a tool to facilitates access to

personalized learning content which aids learning outside traditional classroom settings. The third finding indicated that there is no significant difference in the undergraduates' attitudes towards the use of mobile technology for blended learning based on gender.

Conclusion and Recommendation

It was concluded that mobile technology has the potential to increase undergraduates' learning pace, accessibility and communication in a blended learning environment. Mobile learning facilitates learning as it enables the undergraduates view course materials easily, access online materials and makes learning interesting. Furthermore, undergraduates that were primarily using mobile devices for gaming, chatting and socializing instead of learning, have a positive attitude towards the use of mobile devices for learning. Finally, gender has no influence on the undergraduates' attitudes towards the use of mobile technology for blended learning. The study therefore recommended that: i) Universities should increase the schools' internet bandwidth in order to foster effective blended learning environment and; ii) Lecturers should be encouraged to engage the undergraduates in a blended learning environment.

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ACCESSIBILITY AND THE UTILIZATION OF ONLINE TOOLS FOR LEARNING AMONG UNDERGRADUATES OF NATIONAL OPEN UNIVERSITY IN SOUTH-WEST, NIGERIA

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Abstract

Online learning tools refer to any program, app, or technology that can be accessed via an Internet connection and enhance a teacher's ability to present information and a student's ability to access that information. To be successful in a distance education environment, distance education students must use online learning tools in their day to day learning activities. This study examined the accessibility and the utilization of online tools for learning among undergraduates of National Open University in South-west, Nigeria. The study was limited to NOUN undergraduates in South-west, Nigeria. A total of 294 undergraduates were sampled in Lagos and Ibadan NOUN study centres. A researcher-designed questionnaire with reliability coefficient of 0.84 was employed. Mean and standard deviation values were used to answer research questions, while t-test was used to test the hypothesis at 0.05 level of significance. Findings of this study revealed that few online tools were accessible for learning by NOUN undergraduate, online tools were sparsely utilized for learning by NOUN undergraduates, there was no significant difference between male and female undergraduates in the utilization of online tools for learning. The study concluded that only few online tools were accessible for learning but they were utilized by the undergraduates. It was therefore recommended among others that trainings and workshops should be organised for students on the benefits and use of online tools for learning.

Introduction

Education is seen as a reflection of the society. The word ‘education’ is used wholly for the development of individuals in the cognitive, affective, and psychomotor domains (Amaele, 2003). Additionally, the five main national goals as stated in the Nigerian constitution, which formed the basis of the National Policy on Education (Federal Republic of Nigeria, FRN, 2013), are to build a free and democratic society; a just and egalitarian society; a united, strong and self-reliant nation; a great and dynamic economy; and a land full of bright opportunities for all citizens. Education also has not been left out in the penetrating influence of ICT (Ifinedo, 2006). The researcher added that higher education settings across the world have been embracing Information and Communication Technology (ICT) in teaching-learning process with determination to engage in collaborative learning and gain access to information for both students and their instructors.

The emergence of ICT and the introduction of globalization has ensued the transformation of communication, teaching and learning process. This has brought about radical changes in the educational needs of people and society at large, and is reflected in the developing requirement for extra specializations in teaching (Freeman, 2004). ICT is significantly modifying the ways things are done in nearly every field of human activity. In Nigeria, as well as in other countries of the world, ICT has taken over the operation of every facet of life such as Banking, Agriculture, Law, Medicine, Communication, Sports and Games. Information and Communication Technologies (ICTs) have turned out to be within a very short time, one of the basic edifices of contemporary society. Lots of countries now regard understanding concepts of ICT

and learning basic ICT skills as central part of education, alongside reading, writing and numeracy (Daniels, 2002).

Information and Communication Technology might be viewed as the blend of Informatics technology with other related technology, specifically communication technology (United Nations Educational, Scientific and Cultural Organization (UNESCO, 2008). The several types of ICT tools available that are of relevance to education include teleconferencing, audio conferencing, email, radio broadcasts, audiocassettes, television lessons, CD ROMs, interactive radio counseling and voice response system have been used in education for numerous purposes (Bhattacharya & Sharma, 2007). The field of education has been affected by ICTs, which have unquestionably affected teaching, learning, and research (Yusuf, 2005). As a result, the use of ICT will not only enhance learning situations be that as it may, likewise get ready cutting edge for future lives and careers (John & Wheeler, 2008). Countless number of teachers will be saddled with the responsibilities and skill sets for future teaching involving high levels of ICT and the need for more facilitative than didactic teaching roles (UNESCO, 2008).

Cabero (2009) pointed that the flexibility in time-space represented by the incorporation of ICT into teaching and learning processes contributes to an upsurge in the interaction and reception of information. Such possibilities suggest changes in the communication models and the teaching and learning strategies utilized by educators, offering approach to new situations that favour, individuals and collaborative learners. The utilization of ICT in instructive settings as well as independent learning goes about as an impetus for change in this area. By their extreme nature, ICTs are instrument that empower and bolster independent learning (Charles, 2012).

Encouraging the development of a society through distance education is one of the strategies progressively adopted lately by governments around the world to encourage economic development at the local, state and national levels. Encounters both nationally and internationally have proven that conventional education is greatly unable to meet the demands of today's socio-educational milieu, particularly to developing nations like Nigeria (Afolabi, 2003). In Nigeria, there exists a wide gap between the requests for spots in the educational system at the tertiary level and the available spots. This absence of capacity has brought to limelight the issue of Open and Distance Learning (ODL) as a ground-breaking and cost effective way to deal with the educative procedure.

Distance education, also known as open or distance learning is a form of education in which there is usually a separation between teachers and learners. Therefore, it is one which includes the use of printed and written word, the telephone, computer conferencing or teleconferencing used in bridging the physical gap between the instructor and the learner. Online tools are the learning tools that its transmission take place through internet connected devices; while distance learning concept occurs where students and teachers do not need to be in the same place at the same time. To conquer any hindrance between participants in the teaching and learning process, ODL offers organized learning where the instructor and students separated by time and space, using instructional materials such as television and radio broadcasts, CD ROMs, audio and video cassettes, print materials, as well as multimedia devices such as computers and satellites transmission (Peat & Helland, 2002).

Research Questions

1. What are the accessed online tools for learning by undergraduates in NOUN?
2. What are the undergraduates' uses of online tools for learning in NOUN?
3. Does gender have an influence on undergraduates' use of online tools for learning in NOUN?

Research Hypotheses

$H_01:$ There is no significant difference between male and female undergraduates' use of online tools for learning in NOUN.

Methodology

The study adopted a descriptive research design of the survey type. The population for this study comprised all undergraduates of National Open University in South-west Nigeria. The target population for this study was all NOUN undergraduates in Lagos and Oyo states study centres. The study centres were purposively selected for their active open and distance education programmes. More so, they were densely populated among other study centres in South-west Nigeria; thereby giving more sample population. Random sampling technique was also adopted for the selection of the respondents. A total of 294 undergraduates were sampled in Lagos and Ibadan NOUN study centres and the breakdown shows that Lagos study centre has 50, 200, Ibadan NOUN study centres has 18, 000. Hence, based on the estimated population of 68, 200 undergraduate for the study, research advisors model (2006) was used to select 382 undergraduates at 95% confidence level. 281 undergraduates were selected from Lagos study centre; while 101 undergraduates were selected from Ibadan study centre. This further allowed the researcher have a manageable sample size for the study is presented in Table 1:

Table 1:

Sampling Frame of Undergraduates in NOUN Lagos and Ibadan Study Centres Using Research Advisors Model (2006).

NOUN study centres	Estimated Population	Research Advisors (Sample Size)
Lagos study centre	50, 200	281
Ibadan study centre	18, 000	101
Total	68, 200	382

The research instrument that was used for this study was a researcher-designed questionnaire on assessment of the use of online tools for learning among undergraduates of National Open University in South-west Nigeria. The questionnaire was structured in a clear and simple language to enable student provide relevant answers to the questions based on their personal views. The questionnaire items were constructed to specifically reflect the research questions for the study. The questionnaire was divided into three sections A, B and C. Section A contained demographic information such as name of NOUN centre, level and gender; while section B obtained responses from undergraduates on online tools used for learning in NOUN, designed to elicit responses based on accessibility of online tools, in which "access (A)", "do not access (DA)" was used as the response mode. Section C consisted of items on undergraduates' use of online tools for learning, which elicited responses from the respondents based on their use of online tools for learning.

The researcher-designed questionnaire was validated by five lecturers in the Departments of Educational Technology and corrections recommended were effected before the reliability of the research instrument was determined through a pilot study conducted in NOUN, Ilorin study centre. A total of twenty (20) undergraduates that were not part of the main study were randomly selected for the pilot study. This is to enable the researcher determine the degree of consistency of the research instrument when used for the main study. Cronbach Alpha was used to analyse and test the reliability coefficient at 0.05 level of significance. The reliability value on accessible online tools was given as 0.71, the reliability value on use of online tools was given as 0.85. The instrument was thereafter randomly administered 382 respondents by the researchers. A total of 382 copies of questionnaire were distributed to undergraduates at the two NOUN study centres in South-west, Nigeria. However, 294 were returned as valid and thus amounting to about 77% response rate. Mean and standard deviation values were used to analyze and answer research questions, while *t*-test was used to test the hypotheses at 0.05 level of significance.

Results

Table 2:
Respondents' Percentage Distribution Based on Study Centre

NOUN Study Centre	Frequency	Percentage	Cumulative Percentage
Lagos Study Centre	207	70.4	70.4
Ibadan Study Centre	87	29.6	100
Total	294	100.0	

Table 2 reveal that, two hundred and seven (207) respondents which is 70.4% were from Lagos study centre, Lagos state, while eighty-seven (87) respondents which represents 29.6% were from Ibadan study centre, Oyo state. The data collected, therefore reveals that Lagos study centre has the highest number of respondents.

Research Question One: What are the accessible online tools used for learning by undergraduates in NOUN?

Table 3:

Respondents' Access of Online Tools for Learning

Online Tools	Mean	Std. Deviation
E-mail	1.13	.163
Google drive	1.24	.427
Online Radio	1.67	.471
Online Television	1.73	.444
Slide Presentations	1.38	.486
E-books	1.47	.373
Learning Management System (LMS)	1.57	.490
Course Management System (CMS)	1.63	.481
Interactive Video Conferencing	1.60	.491
Search engines (Google.com, Ask.com)	1.39	.284
Mobile Phone	1.45	.206
Blogs	1.27	.446
Audio-Visuals resources	1.52	.500
Dropbox	1.49	.501
Social Media	1.07	.252
Grand Mean	1.44	

Table 3 shows NOUN undergraduates' access based on each of the online tools listed on the table. Item one revealed that most of the undergraduates did not access E-mail, with a mean score of 1.13. Item 2 showed that only few undergraduates accessed Google Drive, with a mean score of 1.24. Item 3, with a mean score of 1.67 revealed that undergraduates accessed online Radio. Item 4 revealed a high level of undergraduates' access of online Television with a mean score of 1.73. Item 5, with a mean score of 1.38 showed that not many undergraduates accessed Slide Presentations. It is revealed on item 6 with a mean score of 1.47 that undergraduates accessed E-books. Item 7 and 8 showed that undergraduates a high number of undergraduates accessed Learning Management System (LMS) and Course Management System (CMS), with mean scores of 1.57 and 1.63 respectively. Interactive Video Conferencing, search engines and mobile phones which are Item 9, 10 and 11 respectively revealed high accesses as it has mean scores of 1.60, 1.59 and 1.39 respectively. Item 12 showed that Blogs were not accessed by undergraduates, with a mean score of 1.27. Item 13 disclosed that undergraduates access Audio-Visual resources, with a mean score of 1.52. The mean score of 1.49 on item 14 revealed that undergraduates accessed Dropbox and item 15 showed that undergraduates did not access Social Media, with a mean score of 1.07.

The grand mean score of undergraduates' access of online tools for learning was found to be 1.44. Therefore, considering the benchmark of 1.5, it can be deduced that e-mail, Google drive, slide presentations, search engines, blogs and Social Media were sparsely accessed by NOUN undergraduates in South-west, Nigeria. On the other hand, online Radio, online Television, E-books, Learning Management System (LMS), Course Management (LMS), Interactive Video Conferencing, Mobile Phone, Audio-visual resources and Dropbox were highly accessed by NOUN undergraduates in South-west, Nigeria.

Research Question Two: What are the undergraduates' uses of online tools for learning in NOUN?

Table 4:

Respondents' Uses of Online Tools for Learning

S/N	Uses of Online Tools for Learning	Mean	SD
1	I use email facility to communicate with my lecturers and colleagues.	1.85	.872
2	I use Google drive for collaborative learning with my colleagues.	2.03	.925
3	I use Google drive for storing documents online.	1.92	1.015
4	I use Dropbox to share files with lecturers and colleagues.	2.46	.993
5	I use Slide presentations for my assignments and seminar presentations.	2.10	.990
6	I use E-books to access online materials.	2.56	.740
7	I use Learning Management System (LMS) for my tests and examinations.	2.59	.866
8	I use Course Management System (CMS) to access my course materials.	2.52	.869
9	I conduct searches online using search engines like Google.com, Ask.com.	2.59	.786
10	I use mobile phones to interact with lecturers and colleagues for immediate feedback.	1.75	.896
11	I use Interactive Video Conferencing for real time Audio-Visual chats with my lecturers and colleagues.	2.40	.989
12	I visit educational blogs for further studies.	1.85	.893
13	I connect with experts and professionals in my field using the Social Media.	1.95	.884
14	I do not use online Television for my learning activities due to costly internet subscription.	2.22	.943
15	I do not listen to online instructional radio due to unstable internet facilities.	2.27	.934
16	I do not use mobile phones for learning purpose to avoid distractions.	2.60	1.026
17	I do not use Audio-Visual resources to view or listen to instructional audio-visual packages due to epileptic power supply.	2.36	1.012

Table 4 showed the mean scores of undergraduates' use of online tools for learning. Using a benchmark of 2.5 of 4 point Likert scale, responses of NOUN undergraduates in South-west, Nigeria did not reflect a positive response to the use of online tools for learning based on the grand mean of 2.28 of items on the table. This implies that from item 1, few numbers of undergraduates in NOUN use email facility to communicate with their lecturers and colleagues with a mean score of 1.85. As shown on item 2 and 3, few undergraduates of NOUN used Google drive for collaborative learning with their colleagues and for storing documents with mean scores of 2.03 and 1.92 respectively.

The respondents showed high score in the use of Dropbox to share files with lecturers and colleagues, Slide presentations for their assignments and seminar presentations, E-books to access online materials, Learning Management System (LMS) for tests and examinations, and Course Management System (CMS) to access course materials, as revealed on items 4, 5, 6, 7, and 8 with mean scores of 2.46, 2.10, 2.56, 2.59 and 2.52 respectively. Item 9 and 10 were based on the respondents' conduct of searches online using search engines like Google.com, Ask.com, and their use of mobile phones to interact with lecturers and colleagues for immediate feedback, revealed mean scores of 2.59 and 1.75 respectively. This

implies that respondents made searches online through the use of search engines, but only few used mobile phones to interact with lecturers and colleagues.

As shown on item 11 and 12, mean scores of 2.40 and 1.85 revealed that a significant number of NOUN undergraduates used interactive video conferencing for real time Audio-visual chats with lecturers and colleagues, while few of the respondents visited educational blogs for further studies. Based on item 13, NOUN undergraduates hardly connect with experts and professionals in their field using the social media, with a mean score of 1.95. Items 14 and 15 revealed mean scores of 2.22 and 2.27 respectively, the mean scores are slightly below the benchmark mean score, which implied that most of the respondents did use online television for learning activities due to costly internet subscription and also did not listen to online instructional radio due to unstable internet facilities.

On the other hand, respondents did not use mobile phones for learning purpose to avoid distractions with a mean score of 2.60, as revealed on item 16. With respondents' mean scores close to the benchmark score, it is revealed on item 17 and 18 that respondents did not use audio-visual resources to view or listen to instructional audio-visual packages due to epileptic power supply and also did use Google drive for word processing because of weak internet signal to retrieve files, with means scores of 2.36 and 2.39 respectively. On item 19, with a mean score of 2.48, it is revealed that respondents did not use social media for instruction to avoid unnecessary interferences during online study. Respondents agreed that they did not like to use online tools for learning activities because they are costly and unaffordable, with a mean score of 2.70 as revealed on item 20.

The grand mean score of 2.28 which is below the required benchmark indicated that NOUN undergraduates did not have a positive response to the use of online tools for learning.

H_0 : There is no significant difference between male and female undergraduates' use of online tools for learning in NOUN.

Table 4:

t-test Analysis on Male and Female Undergraduates' Use of Online Tools for Learning.

Gender	N	Mean	SD	Df	t	Sig(2-tailed)	Remark
Male	159	2.16	.40				
Female	135	2.06	.45	292	1.94	.53	Accepted
P>0.05							

It can be inferred from table 4 that there was no significant difference between male and female undergraduates' use of online tools for learning. This is revealed in the results of the hypothesis tested; df (292) $t=1.94$, $p>0.05$. That is, the result of t -value of 1.94 resulting in .53 significance value was greater than 0.05 alpha value. Therefore, the hypothesis was not rejected. The above result implies that the stated null hypothesis was established thus: there is no significant difference between male and female undergraduates' use of online tools for learning.

Discussion of Findings

This study assessed the use of online tools for learning among undergraduates of National Open University in South-west, Nigeria. Undergraduates' access of online tools was examined in research question 1. It was found that some online tools have low access by undergraduates for learning. It was

revealed that out of the 15 listed online tools, only 9 which were Online Radio, Online Television, E-books, Learning Management System (LMS), Course Management (LMS), Interactive Video Conferencing, Mobile Phone, Audio-visual resources and Dropbox were highly accessed; the remaining 6 online tools recorded low access. This finding is in support of a finding of Liebenberg, Chetty and Prinsloo (2012) on students' access to and skills in using technology in an open and distance learning context, which revealed that a large proportion of students were not accessing online tools for the purpose of learning. Unrecorded interactions with respondents revealed that large populations of NOUN students depended on computer business centre operators who produce course materials in hard copies for students' use; this disclosed why online tools have low access. Considering the benefits of accessing online tools for learning, students should endeavor to access these tools to help them in their day to day learning activities.

The use of online tools for learning by undergraduates was examined in research question 2. It was found that a great number of undergraduates were not using online tools for learning. This conformed to the conclusion made by Okorafor and Icu (2012) that students were not exhibiting positive attitude to e-learning, and thereby recommended that NOUN students' portal should contain the necessary online tools for their learning. Although this study was not concerned with students' use online tools for purposes different from learning, there appears to be some other non-academic purposes that students are more interested in, than using online tools for learning; as a large population of students possessed computer or mobile phone that can be used to access online tools.

It was observed by the researcher in the course of data collection for this study that students of NOUN also attend physical classroom lessons; by implications, NOUN is not operating on a full time online education. The result recorded in the use of online tools for learning by undergraduates can be linked with students' option of physical classroom lesson. If students' interest can be directed to the use of online tools for learning, there will be positive educational consequences.

The influence of gender in the use of online tools for learning by undergraduates as investigated in this study revealed that male and female undergraduates did not use online tools for learning. This implies that males' use of online tools is not different from females' use of online tools. This is in contrast with a research by Thanuskodi (2013) that concluded male students to be more technologically inclined than their female counterparts. Therefore, online tools should be used by all students, regardless of gender.

Conclusion

This study assessed the accessibility and the utilization of online tools for learning among undergraduates of National Open University in South-west, Nigeria. The result obtained from the data gathered and analyzed indicated that online tools have low access for learning by undergraduates in NOUN. The few online tools that were accessed showed that undergraduates only access online tools to attend online lessons or class through the use of Online Radio, Online Television, E-books, Learning Management System (LMS), Course Management System (CMS), Interactive Video Conferencing, Mobile Phone, Audio-visual resources and Dropbox. Findings on the utilization of online tools for learning revealed that undergraduates were not using online tools for learning; only few used online tools for sharing files with lecturers and colleagues.

Recommendations

On the basis of the findings, the following recommendations were made:

1. Government through the Federal Ministry of Education and National Open University of Nigeria should encourage students to use online tools for learning by providing the technologies needed.
2. Trainings, workshops and conferences should be organized for students in NOUN to educate them on the benefits of using online tools for learning; they should also be trained on its use.
3. Lecturers in NOUN should endeavour to improve learners' interest in the use of online tools for learning by integrating it in the teaching process; this will help the students realize the usefulness of online tools in their academic activities.
4. Adequate funding should be provided to make online tools accessible at an affordable rate in terms of electricity, internet facilities among others.

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SECONDARY SCHOOL STUDENTS' PERCEPTION, ATTITUDE AND READINESS TO ADOPT BLENDED LEARNING IN INSTRUCTION IN OYO METROPOLIS

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Abstract

Blended learning has been proved to bring improvement in the teaching learning process. However, it has been observed that no nation, especially developing countries have adopted this technological innovation for instructional purpose, hence, this study's investigation of the secondary school students' perception, attitude and their readiness to adopt blended learning in instruction. The target population was the senior secondary school students. Three schools were randomly selected from each of the three local government areas in Oyo metropolis. Twenty senior secondary students were randomly selected from each of the school totalling 180 in all. Questionnaires were administered to all the 180 students and the data collected was analysed using frequency counts and means(x). The findings based on the three research questions raised revealed that the student's perception towards the usefulness of blended learning was positive, the attitude was positive and the students were ready to adopt blended learning. It was therefore recommended amongst others that seminars, workshops, in-service trainings and conferences should be organized for teachers for blended learning approach to have a smooth take off.

Keywords: Blended learning, Perception, Attitude, Readiness.

Introduction

Traditionally, Teaching has been viewed as a process of delivering to students what is required without any opportunity for questioning. This means that the teacher has the monopoly of knowledge required to be imparted. However, in the modern sense teaching is an attempt to help someone acquire a change of attitude, knowledge, ideal, skills or appreciation (Adedapo, 2004). Mkpanang (2005) explained that the concept of teaching implies that a set of stimuli is initiated and regulated by an individual who has been professionally trained to do so. Ayodele (2002) opined that what is learnt by students is a function of how it is taught. Successful teaching therefore requires that the students make sense out of what they are taught. There is therefore a growing consensus among education leaders, researchers and educators around the world that teaching and learning must change to help students develop the skills they will need to succeed in the 21st century (Ananiadou & Claro, 2009).

The traditional teaching method as good as it is, has its shortcomings. According to Lalima and Dangwal (2017), traditional teaching is failing to meet the individual needs of all the students in the class basically due to improper pupil teacher ratio and it is not adapting itself to meet the challenge of teaching physically challenged students. Moreover, children from deprived groups, from the areas that are geographically isolated and medically unfit students are not able to gain benefit from this formal traditional mode of teaching. Courses are also not regularly revised, books are not updated and teachers are not interested in upgrading their knowledge and professional skills.

Olasedidun (2014) opined that to address the inadequacies of traditional teaching, innovative tools will have to be used in teaching. The use of innovative methods in educational institutions has the potential

not only to improve but also to empower people, strengthen governance and galvanize the effort to achieve the human development for the country. The concepts of paperless and penless classroom are thus emerging as an alternative to the old teaching learning method. There is now a democratization of knowledge and the role of the teacher is changing to that of facilitator. Technology and ease with which it can be accessed have changed the way we live and work. Today's students will not only compete with students that sit next to them but also with their peers from across the globe.

The educational system at present is in a transition stage. To meet the challenges of expansion and for catering to individual need, it is trying to adopt new technologies and exploring new paths to reach the goal of quality educational opportunities for all. At the same time due to various factors like deficient budgets, lack of facilities, advantages of face to face interaction, it is not completely ready to leave the traditional modes of knowledge transfer (Lalima & Dangwal, 2017). The use of technology to augment teaching and learning is therefore inevitable. The increased access to technology in the classroom has improved the potential for teachers to optimize student learning through a combination of both online learning programme and face-to-face student/teacher interaction. Blended learning is therefore an approach that is gaining increased attention by teachers and administrator to optimize the use of technology in their classrooms.

Dziuban, Hartman and Moskal (2004) defined blended learning as a pedagogical approach that combines the effectiveness and socialization opportunities of the classroom with the technologically enhanced active learning possibilities of the online environment, rather than a ratio of delivery modalities. According to Downes (2008), it is an essentially traditional in-class learning supplemented by online activities and resources. In addition, Stacey and Mackey (2009) defined it as the combination of technology and traditional face to face instruction while Christensen, Horn and Stacker (2003) described it as a formal education programme in which a student learns at least in part through online learning with some element of student control over time, place, path and/or pace and at least in part at a supervised brick-and-mortar location away from home.

Blended learning is not about technology itself; it is about the shift in the instructional model to personalized, student-centred learning to ensure each student's success(Patrick, Kennedy & Powell, 2013). Adopting a blended learning approach offers the appeal of combining different learning elements using the power of ICT while retaining a human touch (Department of Education and Early Childhood Development, 2012)

Blended learning models, developed from early experimentation, place the student at the centre of the learning process, harnessing the power of technology to create more engaging, efficient and success-oriented learning environments. In these models, educators quickly identify gaps in learning and differentiate instruction to ensure that failure is not an option. The common blended-learning programmes include rotation, flex, A la Carte and enriched virtual. The rotation model has four sub-models which are station rotation, lab rotation, flipped classroom and individual rotation (Horn, staker and Christensen, 2014).

The advantages of blended learning as highlighted by Lalima and Dangwal (2014) are listed as:

- a) As part of learning is done through ICT, online or offline mode, so teachers and students get more time in the classroom for creative and cooperative exercise.
- b) Students gain advantage of online learning and CAI without losing social interaction element and human touch of traditional teaching
- c) It provides more scope for communication.
- d) Students become more techno savvy and they gain enhanced digital fluency
- e) Students have more strengthened professionalism as they develop qualities like self-motivation, self-responsibility and discipline.
- f) It updates course content and so gives new life to established courses.

However, the implementation of blended learning is not an easy task. Certain fundamental preparations in all the teaching learning process elements (teacher, student, content and infrastructure) will be required. Some of the basic requirements include well trained teachers; teachers with the scientific attitude; teacher with wider outlook and positive approach toward change; complete facilities like well-furnished computer laboratory, internet connection, provision for video chatting; students having access to internet on their private computer; flexibility in the system; fully aware and agreed parents; and formative evaluation and continuous internal assessment. (Lalima & Dangwal, 2017).

If blended learning will be relevant within an education context, the students' perception of the usefulness, attitude and their readiness to use it must be looked into. Anderson and Dron (2011) explained that the responsibility of a teacher is not just to define, generate or assign context, but it is to help learners build learning paths and make connections with existing and new knowledge resources.

Perception is the process by which organisms intercept and organize sensation to produce a meaningful experience of the world (Falade, 2011). Attitude is an accumulation of information about an object, person, situation or experience... a disposition to act in a positive or negative way toward some object. It is the controller of actual behaviour of an individual, consciously or unconsciously (Littlejohn 2002). Readiness means planning to do something. It is a matter of willingness from the heart. Olumorin (2008) explained that successful integration of ICT depends not only on awareness and availability but also on the extent to which instructors are willing to use it. Hence the need for this study, perception, attitude and secondary school students' readiness to use blended learning in teaching.

Statement of the problem

The integration of new mobile technology and online media is proving highly effective in helping schools meet the expectations of 21st century learners while addressing the challenges of limited resources and the special needs of many students. However, not everyone is happy with the term blended learning. Oliver and Tingweln (2003) in their article "Can blended learning be redeemed?" argued that blended learning is ill-defined and muddled as a description of particular forms of teaching with technology. Moreover, there is a growing worldwide trend in initiatives that are explicit about the availability of learning anywhere, anytime. The underpinning notion is that teachers will need to be up-skilled quickly to cope with the virtual learning opportunities in the classroom. This study therefore, sought to find out secondary school students perception, attitude and readiness to adopt blended learning in instruction.

Research Questions

This study attempted to answer the following questions:

1. What is the perception of secondary school students towards the usefulness of blended learning in instruction?
2. What attitude do secondary school students have towards adopting blended learning in instruction?
3. Are secondary school students ready to adopt blended learning in instruction?

Methodology

Descriptive survey design was adopted for the study to find out the perception, attitude and readiness of secondary school students to adopt blended learning approach in instruction. The target population for the study consisted of all senior secondary school students particularly those in Oyo metropolis comprising of Oyo East, Oyo West and Atiba Local government areas of Oyo State. Three schools were randomly selected from each of the Local government area making nine schools in all. Twenty students were then randomly sampled from each of the school totalling 180 in all. The instrument for this study was a questionnaire tagged Student's Perception, Attitude and Readiness towards Blended Learning Questionnaire adapted from the previous study of Olasedidun (2014). Items were selected based on their relevance to perceived usefulness, attitude and readiness to adopt blended approach in instruction. The questionnaire contained two major sections. Section I dealt with the students' biographical information while section II was sub-divided into three to take care of the three research questions. Each of these subdivisions contained 5 items. The response mode for the items was likert response modes of strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). The instrument was given to educational evaluation and computer experts for validity. The reliability of the instrument was determined section by section based on the three major variables. For perceived usefulness, the chronbach's alpha was 0.87, attitude 0.93 and readiness, 0.89.

The researcher personally administered the copies of the questionnaire to senior secondary school students in all the nine sampled secondary schools with the help of the vice-principals and teachers in each of the school. The questionnaire were given to the students and with the assistance of the teachers, the researcher was able to collect back all the questionnaires in each of the schools. The analysis and interpretation of data obtained through the questionnaire was done using descriptive statistical design. The frequencies were converted to mean (x) to answer the research questions. Section II that contained items to answer the research questions was ranked 4 for Strongly Agree, 3 for Agree, 2 for Disagree and 1 for Strongly Disagree for questionnaire items that were positively worded and vice versa for items that were negative worded.

Results

Research Question 1: What is the perception of secondary school students towards the usefulness of blended learning in instruction?

Table 1:

Analysis of students' perception towards the usefulness of blended learning in instruction.

S/N	Perceived usefulness of blended learning	Mean(\bar{x})
1.	Blended learning will make me finish the content of each subject early	3.40
2.	The teaching learning process will be easier with the use of blended learning	3.34
3.	Blended learning will reduce stress and tension inherent in classroom teaching	2.98
4.	The use of blended learning will improve my academic performance	3.26
5.	Blended learning will make lesson more interesting	3.29
Grand mean (\bar{x})		3.25

Table 1 reveals that making students complete the content of each subject early was ranked highest having the mean score of 3.40 out of 4. The lowest mean score was 2.98 (approximately 3.00) with the statement that blended learning will reduce stress and tension inherent in classroom teaching. However, the grand total mean score for perceived usefulness was found to be 3.25. Using 2.0 as the average benchmark, it can then be inferred that secondary school students perceived the usefulness of blended learning in instruction positively.

Research question 2: What attitude does secondary school students have towards adopting blended learning in instruction?

Table 2:

Analysis of students' attitude towards adopting blended learning in instruction.

S/N	Attitude towards using blended learning	Mean(\bar{x})
1.	Blended learning is not adequate for secondary school	3.06
2.	I will never offer a subject that will force me to use blended learning	3.42
3.	Online environment are not meant for teaching and learning	2.86
4.	Blended learning will make students to become lazy	3.29
5.	Many students will fail if blended learning is adopted in secondary school instruction	3.17
Grand mean (\bar{x})		3.16

Table 2 reveals that students did not agree with the statement that they will never offer a subject that will force them to use blended learning with the highest mean score of 3.42 out of 4. The lowest mean score was 2.86 with the statement that online environment are not meant for teaching and learning. However, the grand mean score for the attitude of students was found to be 3.16. Using 2.0 as the average bench mark, it can be deduced that the students have positive attitude towards adopting blended learning in instruction.

Research Question 3: Are secondary school students ready to adopt blended learning in instruction?

Table 3:

Analysis of students' readiness to adopt blended learning in instruction.

S/N	Readiness to adopt blended learning	Mean(\bar{x})
1.	I wish I never have anything to do with blended learning	3.52
2.	I will always prefer normal classroom learning	3.40
3.	I can never be convinced to use blended learning	3.47
4.	I will rather drop out from school than to adopt blended learning	3.61
5.	Atrocities that people perform online will never make me adopt blended learning	3.38
Grand mean (\bar{x})		3.48

Table 3 reveals that students will never decide to drop out from school because of the adoption of blended learning with the highest mean score of 3.61 out of 4. The lowest mean score of 3.34 with the statement that atrocities that people perform online will never make me adopt blended learning. The grand mean score for the readiness to adopt blended learning was found to be 3.48. With 2.0 as the average bench mark, it can be inferred that secondary school students are ready to adopt blended learning in instruction.

This study found out that:

1. The perception of secondary school students towards the adoption of blended learning in instruction is positive.
2. Secondary school students have positive attitude towards the adoption of blended learning in instruction.
3. Secondary school students are ready to adopt blended learning in instruction.

Discussion

Conclusion

Through a combination of online learning and more customized face-to-face direct instruction, students will be opportune to experience student-centred learning, teacher mentoring as well as the opportunity to self-direct their learning. Moreover, blended learning has a very high potential to help teachers better address the needs of the students. However, teachers must be encouraged to be ready to adopt the blended learning approach to be able to achieve the aforementioned benefits.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. The government should be ready to provide equipment that will make online learning possible in all secondary schools.
2. Seminars, conferences and workshops should be organized for the teachers who are to help in the implementation of the blended learning approach.

3. Students should be encouraged to be focused when online and should strictly use the equipment for academic purposes only.

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PRIMARYSCHOOL TEACHERS' PERCEPTION ON THE USE OF DIGITAL STORYTELLING BOARD FOR INSTRUCTION IN OYO METROPOLIS.

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Abstract

Teachers are the most important agents for the successful implementation of educational programme. They play vital roles on educational innovations and their application in teaching and learning process to assist learners in the acquisition of concrete and rewarding school experience, primary school teachers are not an exception. This study examined the primary school teachers' perception on the use of digital storytelling among the lower basic pupils of Oyo metropolis. A descriptive survey research design was adopted. The population for this study covered all lower basic teachers in Oyo metropolis. Multi stage Sample technique of four legs was used to select sample for this study which comprised 150 respondents sampled through a stratified random sampling technique. The instrument was a questionnaire titled "Digital Storytelling Primary School Teachers Perception on It Use (DSPSTPOU)" with a reliability Of 0.90. The data collected were analysed using mean for the research questions while hypotheses were tested using t-test statistic. The findings of the study showed that primary school teachers' perception on the use of digital storytelling is low. Also, the study revealed that there is no significant different between male and female ($t=0.12, p>0.05$) and experienced and less experienced primary school teachers' perception on the use of digital storytelling ($t=0.27, p>0.05$). Based on these findings, it was recommended that primary school teachers should be encouraged to use digital storytelling as medium for interacting with the pupils. Regular workshops, seminars, and in-service training should be organised to improve teachers' efficiency on the usage of digital storytelling.

Keywords: Digital storytelling board, Perception, Lower basic classes.

Introduction

There is a growing consensus among educators and researchers around the world that teaching and learning must change to help students develop the skills they will need to succeed in the 21st century (Ananiadou & Claro, 2009; Partnership for 21st century skills, 2004; Scheuermann & Pedro, 2009). While specific goals for change vary, common themes include developing problem solving and team working skills and using technology to support more powerful learning. Although there are inspiring examples of innovative teaching promoting this kind of learning, research continues to show that in most places, classroom practice lags behind goals (OECD, 2009; Law, Pelgrum&Plomp, 2010). The sources of this gap between the rhetoric of change and the realities of classroom range from lack of access to resources and training to lack of clear expectations in systems that are still organised and inclined towards traditional measures of achievement. Most students still experience instruction that is largely lecture-based and extensive national education investments in technology have not yet resulted in widespread transformation of learning opportunities.

Education is a light that shows humankind the right direction to surge. The purpose of education is not just making a student literate but adding rationale thinking, knowledgeability and self sufficiency. When there is willingness to change, there is hope for progress in any field. Creativity can be developed and innovation benefits both students and teachers (Damodharan&Rengarajan, 2009).The innovative ideas, according to Damodharan and Rengarajan (2009) include the multimedia learning process, mind gap, teaching with sense humour, Z to A approach, mnemonics, words-words approach, role playing and scenario analysis based teaching, among others. According to them, information technology is dramatically altering the way students, faculty, and staffs learn and work. Technology has started changing the classroom experience. Information and communication technology (ICT) has brought many innovations in the field of teaching and also made a drastic change from the old paradigm of teaching and learning. The concepts of paperless and penless classroom are emerging as an alternative to the old teaching learning method. There is now a democratization of knowledge and the role of the teacher is changing to that of facilitator.

With ICT, studies have been made easy in a way that it can be carried out in groups or in clusters (Orunmoluyi, 2012). One can study whenever he wants and irrespective of where one may be. With ICT, people can connect online to do desired tasks .According to Yusuf (1997), computer has been a useful tool in teaching and learning process just as it has been in administrative process. The advent of introduction of ICT in educational settings all over the world and over the decades shows that the educational benefits of ICT cannot be underestimated. Supporting this view, Tinio (2003) opined that the effective integration of ICT into the educational system is a complex, multifaceted process that involves not just technology but curriculum and pedagogy, institutional readiness, teacher competencies and long-term financing, among others. ICT has bridged the gap in time and geographical locations; that which was a typical and natural constraint of the traditional system of imparting knowledge. The influence of ICT has permeated every aspect of human life and endeavour (Olagunju, 2010). The teaching and learning process has been dramatically altered by the convergence of a variety of technological, instructional and pedagogical developments in this century (Marina, 2001; Smith, 2002).

Yusuf (2005) noted that ICT provides opportunities for student teachers, academic and non-academic staff to communicate with one another more effectively during formal and informal teaching and learning. ICT is affecting the way education is delivered and how researches are conducted. Observers have predicted that with ICT, the role of teachers will change from being ‘transferers’ of a predefined body of knowledge to being ‘mentors’ and ‘managers’ of the learning environment (Mcintosh, Oliveras, Sullivan & Whitson, 1996). Various arguments about the benefits of the adoption and use of information and communication technology at elementary institutions have been put up. Many are of the opinion that ICT will enable academics to prepare their students for future challenges in a more effective manner (Pritchard, 1996).

There was a debate on whether it is really the use of a particular delivery technology or the design of the instruction that improves learning (Clark, 2001; Kozma, 2001). It has long been established that specialized delivery technologies can provide efficient and timely access to learning materials. However, Clark (1983) as explained by Orunmoluyi (2012) claimed that technologies are merely vehicles that deliver instruction, but do not themselves influence students’ achievement. As Clark noted, meta-analysis studies on media research have shown that students gain significant learning benefits when learning from audio-visual or computer media, as opposed to conventional instruction; however, the same studies suggest that the reason for those benefits is not the medium of instruction, but the instructional strategies built into the learning materials.

Kozma (2001) argued that the particular attributes of the computer are needed to bring real-life models and simulations to the learner; thus, the medium does influence learning. However, it is not the computer per se that makes students learn, but the design of the real - life models and simulations, and

students' interaction with those models and simulation. The computer provides the means through which the instruction is communicated to the learners (Clark, 2001). According to Ifinedo (2005), the impact of ICT in education in Africa is still very low compared with developed world. A good number of researchers have carried out investigations to substantiate why Africa and other developing countries are still backward technologically in this computer age. Digital storytelling combines the art of telling stories with a mixture of digital media, including text, pictures, recorded audio narration, music and video. These multimedia elements are blended together using computer software, to tell a story that usually revolves around a specific theme or topic and often contains a particular point of view (Tolisano, 2015).

The technology has steadily grown in attractiveness and is currently being practised in a myriad of locations, including schools, libraries, community centres, museums, medical and nursing schools, businesses and more. In educational settings, teachers and students from all levels of education are creating digital stories on every topic imaginable, in almost all areas of human learning from art to zoology, and numerous content areas in between. Digital storytelling board has also become a worldwide phenomenon, with practitioners from across the globe creating digital stories to integrate technology into the classroom, support language learning, facilitate discussion, increase social presence, and more (Yuksel, Robin, and Yildrim (2014). But digital storytelling is not yet popular in Nigerian schools. Teachers can not shy away from the reality that DSB plays a decent role in students' academic achievement. Pedagogically, this refers to beliefs about if, when and how technologies fit within teaching and learning, the teaching methods and strategies teacher use to teach. The view had always been that there is no concrete method of using technologies.

However, African countries have come to realize that they have to move with the trend of technology globally for the varieties of advantages it offers. Ifinedo (2005) carried out a research to determine the readiness of some African countries which are Botswana, Cote d'Ivoire, Egypt, Ghana, Kenya, Mauritius, Nigeria, South Africa and Tunisia. The result of the research on the readiness of Africa revealed that Africa is right below the ladder in the global networked economy. However, some African countries are making efforts to be technologically alive. Nigeria launching her first communication satellite on July 7, 2011 is a tremendous effort towards the right direction. Therefore there is no doubt that teachers are indispensable stakeholders for successful teaching and learning with technologies and their perception on the use of digital storytelling for instruction is inevitable, if re-defining education through technologies and innovative pedagogies is going to be achieved.

Research Question

1. What is the perception of primary school teachers towards the use of digital story board for instruction?

Research Hypotheses

H_01 : There is no significant difference between male and female Primary school teachers' perception on the use of digital storytelling board for instruction.

H_02 : There is no significant difference between experienced and less experienced Primary school teachers' perception on the use of digital storytelling board for instruction.

Methodology

The descriptive survey research design was used in the study. This is necessary to be able to explain the variables in the study based on information gathered. The research was conducted in Oyo metropolis. The population was all Lower Basic teachers in Oyo metropolis. A sample of one hundred and fifty Lower Basic teachers were sampled using multi stage sampling technique of four legs which include purposive,

simple random, stratified and proportionate sampling techniques. Purposive sampling technique was used to select all public primary schools in Oyo metropolis, at stage two, simple random technique was used to select five primary schools from each of the four local government areas in Oyo metropolis, proportionate sampling technique was also used to select 10% of Lower Basic teachers from each school while stratified sampling technique was used to group the participants along gender and years of teaching experienced lines. A questionnaire titled “Digital Storytelling Primary School Teachers Perception on Its Use (DSPSTPOU)” was used for data collection. The questionnaire was divided into two sections. Section A deals with information about demographic data about the respondents while Section B contains items on teachers’ perception on digital storytelling and was on a four point Likert scale. To validate the instrument, copies of the questionnaire were given to four Educational technology experts in Federal College of Education (Sp), Oyo to ensure content validity. Its reliability was established using test-retest technique and a reliability index of 0.90 was obtained. Mean score was used to answer the research question while hypotheses were tested using t-test statistic at 0.05 significant level.

Results and Discussions

Research Question 1: What is the perception of primary school teachers towards the use of digital storytelling board for instruction?

Table1:

Analysis of Primary school teachers’ perception on the use of digital storytelling board

S/N	e-learning Versatility Level	Mean (x)
1.	Using digital storytelling board for teaching and learning will enhance teachers’ effectiveness in teaching jog	1.53
2.	The use of DSB will reduce stress and tension associated with teaching and learning in school	1.47
3.	DSB usage in school will reduce students’ seriousness	1.19
4.	Contribution of DSB has made teaching and learning process easier	1.08
5.	Using DSB will make my lesson more difficult	1.22
6.	The use of DSB in teaching will be too complex, hence jeopardize teacher efforts	0.55
7.	I wish I never have anything to do DSB	1.03
8.	I can never be convinced to make use of DSB in teaching	0.49
9.	I will rather leave teaching in school than use DSB to teach	1.00
10.	The use DSB will take more of my time and has no impact on increased teaching effectiveness	0.98
Grand mean		1.06

Table 1 reveals that using digital storytelling board for teaching and learning will enhance teachers’ effectiveness in teaching job ranked highest with mean score of 1.53 out of 4. The lowest mean score was 0.49 with the statement that I can never be convinced to make use of digital storytelling board to teach. However, the grand mean score for primary school teachers’ perception on the use of DSB for instruction was found to be 1.06. Using 2.0 as the benchmark, it can then be inferred that primary school teachers’ perception on DSB for instruction is low

H_0 : There is no significant difference between male and female Primary school teachers’ perception on the use of digital storytelling board for instruction.

Table 2:

t-test of male and female Primary school teachers' perception on digital storytelling board.

Gender	No	X	SD	DF	T	Sig.
Male	66	47.09	3.59			
Female	84	47.07	3.63	148	0.033	0.79

Table 2 indicates that the *t*-value, $t(148) = 0.033 < p < 0.05$, of male and female mean score of primary school teachers' perception on the use of DSB for instruction was not significant. Meaning that there was no significant difference between the male and female primary school teachers' perception on DSB for instruction. By implication the stated null hypothesis is accepted. This was as a result of the *t*-value of 0.033 resulting in .79 significance value which was greater than 0.05 alpha value.

H_02 : There is no significant difference between experienced and less experienced Primary school teachers' perception on the use of digital storytelling in instruction.

Table 3:

t-test of experienced and less experienced Primary school teachers' perception on digital storytelling board.

Years of teaching experience	N	MEAN	SD	df	t-cal	sig
1-5	28	31.53	6.15	148	-.58	.56
6 & above	122	31.76	5.93			

Table 3 reveals that $t(148) = -.58$, $p = .56$. This means that the stated null hypothesis is accepted. This was as a result of the *t*-value of -.58 resulting in .56 significance value which was greater than 0.05 alpha value. By implication, the stated null hypothesis is established thus: There is no significant difference between experienced and less experienced primary school teachers' perception on the use of DSB for instruction.

Discussion of Findings

The perception of primary school teachers on the use of digital storytelling board for instruction was examined using research question 1. The result of the mean score established that primary school teachers had negative perception on the use of DSB for instruction. These findings corroborated Orunmoluyi's (2012) claim that technology are merely vehicles that deliver instruction but do not themselves influence the teaching learning process. Kozma (2001) also argued that it is not the computer per se that influences the teaching learning process but the design of the real-life models and simulations which students interact with. However, Kwache (2007) also had it that the coming of technologies had in immense measures challenged the traditional way of teaching and learning.

The influence of gender on primary school teachers' perception on the use of DSB for instruction was examined with research hypothesis 1. The results of the *t*-test established no significant difference between male and female primary school teachers' perception on the use of DSB for instruction. These findings on gender supported the earlier findings of Olumorin (2008) who could not find any form of gender influence on lecturers' attitude and use of ICT. However, the results contradicted the findings of Chen and Tsai (2005) who reported that males exhibited more favourable attitudes toward web-based learning than females.

The influence of years of teaching experience of primary school teachers' perception on the use DSB for instruction was examined by hypotheses 2. The results of the t-test established no significant difference between experienced and less experienced primary school teachers' perception on the use DSB for instruction. These findings on years of experience aligned with earlier findings of Wang (2012) who reported that continued reluctance on the part of Visual Art teachers to integrate technology was age and experience.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Additional research is needed on the use of digital storytelling board for instruction especially in primary schools.
2. Primary school teachers should be given capacity building opportunity on how to use digital storytelling board for instruction.
3. Governments at all levels should provide needed tools for the use of DSB for instruction

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DEVELOPMENT AND VALIDATION OF COMPUTER SIMULATION FOR EFFECTIVE TEACHING OF BIOLOGY AT SENIOR SECONDARY SCHOOL IN LAGOS STATE

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Abstract

Information and Communication Technology (ICT) competence has become a necessity. Unfortunately, most today's teachers are "digital immigrants" thus they find it difficult to use technology for instructional delivery. The development of instructional package that promotes individualization of instruction is very crucial. The study developed, validated, and determined the effectiveness of computer simulation package for teaching senior secondary school biology. The study adapted mixed research methods. A total of 202 SS2 biology students was purposively selected. The package was validated by ten (10) educational technology experts, ten (10) computer experts, and fifteen (15) experienced biology teachers and trial tested on one hundred (100) purposively selected SS2 biology students. Seven instruments: COSIP, TTM, BAT, ETEVI, COMPEVI, BIOTEVI, and BIOSVI were used to collect relevant data. While BAT yielded reliability coefficient of $r = 0.89$, the Cronbach's alpha reliability coefficient used to determine the internal consistency of the validation instruments yielded reliability coefficient as follows: ETEVI (0.76), COMPEVI (0.96), BIOTEVI (0.83), and BIOSVI (0.73). Mean, standard deviation, and ANCOVA were used to answer the research questions and test the hypothesis. Experts agreed that the package was appropriate and suitable for studying biology; the mean achievement score of students taught using the package was higher than those taught using the traditional teaching method. This implies that schools should in addition to academic skills; inculcate basic ICT skills into their students. This will not only enhance their academic performance, but increase their flexibility, job mobility, and self-reliance.

Key words: simulation, tutorial, instructional package, design based research, and design models.

Introduction

In this era of globalization and digitization, Information and Communication Technology (ICT) competence is essential for everyone to survive. Thus, the ability to access and use information is no longer a luxury, but now a necessity (Adomi & Kpangban, 2010). This is why many sectors and organizations are training and re-training their employees to make them competent in the use of computers and other ICT facilities. More so, most students receive information through visual sources like computers even outside the school environment. This necessitated the application of ICT tools like the computer for instructional purposes. Asogwa, Muhammed, Asogwa, & Ofoegbu (2016) asserted that the integration of computers into the classrooms in Nigerian secondary schools is already common, widespread, and accepted. They allow students to learn depending on their own ability; the speed, pace, and time they need, such that smart ones learn faster and take less time while average ones learn more slowly and take more time. The computer presents tasks to the students, points out their errors, and offers suggestions for help. The teacher monitors

their progress, responds immediately, quietly and privately without disturbing the class. This point is further elaborated by the “cognitive theory of multimedia learning”. It states that learning can be more successful if both channels of **human working memory** (visual and verbal/acoustic) are used for information processing at the same time. In other words, students learn more deeply from words and pictures than from words alone (Mayer, 2001). The use of computers for instructional purposes takes a number of formats: computer based instruction (CBI), computer based learning (CBL), Computer Enhanced Learning (CEL), Computer Aided Learning (CAL), Computer Assisted Instruction (CAI) among others. However, Gambari & Adeghenro, 2008; Osemwinyen, 2009; Yusuf & Afolabi, (2010) opined that CAI is one of the most effective instructional strategies for developing interest, positive attitude, promoting retention ability and improving students' achievements.

CAI as a unique instructional tool has the ability to combine text, images, audio, video, animation and simulation in the same medium. Apart from motivation, it has the potential of increasing student's attention and curiosity (Kocakaya & Gonen 2010). It is a self-learning technique that requires the use of computer to present the instructional material and monitor the learning that takes place. Skinner, and Thorndike, the proponents of programmed instruction, believed that with the help of teaching machines, stimulus-response relationship, negative and positive reinforcement, and the role of immediate feedback, students could learn twice as much in the same time and with the same classroom ((Kirkwood, & Price, 2013; Ramatu, Oluwole, & Ahmed, 2015). The application of CAI in teaching and learning can take several modes/techniques: tutorial, drill and practice, learning games, simulation, problem solving, assessment, and demonstration/presentation (Çepni, Taş & Köse, 2004, and Yusuf & Afolabi, 2010). Of all these modes, simulation according to Adebayo (2011) is one of the most effective.

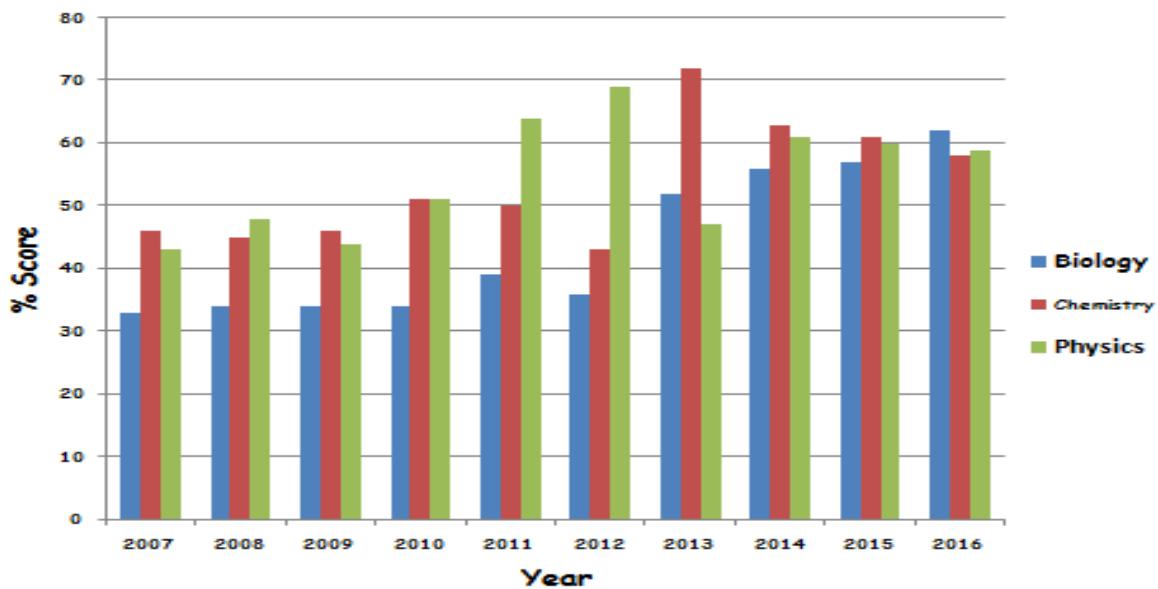
The word simulation can mean mimicry, making working replicas or representations of machines for demonstration or analysis of problems that clearly illustrate real life or hypothetical situations (Krulik, 2010). It is an imitation of real phenomenon. According to the *University of Central Florida* (UCF) Institute for Simulation and Training, simulation can take any of the following styles: life simulation, virtual simulation, constructive simulation, physical simulation, and process simulation. Simulation approach is an effective method of teaching science subjects (Olele, 2008). In their empirical study, Ramatu, Oluwole, & Ahmed (2015) found that students taught arithmetic progression through computer simulated instructional package had a better learning outcome than their counterparts taught using conventional lecture method. In the same vein, Adebayo, & Oladele (2016) in their study investigated the effects of computer simulation instructional strategy on students' academic achievement. They found a significant main effect of treatment on students' achievement. This result was similar to the finding of Umoke & Nwafor (2014); and Elangovan, & Ismail (2014). Simulation exposure increased students' understanding (Varma & Linn, 2012) and reduced their misconceptions about learned concepts (Meir, Perry, Stal, Maruca, & Klopfer, 2005). Features of simulation mode such as visualization of movement and colour can provide a real learning environment into science lessons. Learning through visualization helps students to build mental representation of the concept in their long term memory. Abstract concepts such as chromosomes and DNA structure; circulatory system, arteries, capillaries, and veins can be made clearer, easier, and meaningful for better performance among students. Thus, the use of simulation can promote active learning, privacy of instruction, self-directed learning, and enhance academic achievement of the students.

Academic achievement can be seen as an outcome of education, serving as a yard stick to measure the extent to which students, teachers, or institutions have been able to achieve the educational goals they

set. It can be measured through examination and continuous assessment. For some years now, the academic achievement of students has been of major concern to educators, policy makers, and other stakeholders in education. Olumurewa (2016) lamented on student's poor performance in West African Examination Council (WAEC) examinations. The statistics of students' performance in the major sciences (physics, chemistry, and biology) between 2007 and 2016 (figure 1) shows that Biology enjoyed highest number of student enrolment compared with Chemistry and Physics but recorded the least percentage of credit passes within the period.

Figure 1:

Bar chart showing students' performance in SSCE in the major science subjects between 2007 and 2016.



Biology is a core subject for all students who wish to study medicine and surgery, nursing, biochemistry, micro-biology, physiology, pharmacy, radiography, veterinary medicine, biological sciences, etc at higher education level (JAMB, 2013). It is the most preferred science subject because the subject matter touches all aspects of life process which is of great interest to the students. The curriculum content emphasizes field studies, guided discoveries, laboratory techniques and skills along with conceptual thinking (NERDC, 2009), intended to provide a modern biology course that will meet the needs of the student and the society in general. As précis as the curriculum is, most teachers have failed to incorporate technology in its application. They still adopt the traditional teaching method characterized by the use of whiteboard, marker, posters, and charts (Igweh, 2012). The teacher adopts a one-to-many relationship with the students and in most cases, evaluates their responses from their facial expression and attitude. This method has been jettisoned by scholars because it encourages rote learning (Ozcan, Yildirim & Ozgur, 2012); exposes students to misconceptions and cycles of cramming and regurgitation of information. It seems to lack proper engagement and interactive styles. Therefore developing of suitable instructional package for the study of the subject is of paramount importance.

The design and development of a good instructional package requires an appropriate instructional system design (ISD) model. Such model will clearly spell out the present state and needs of the students, define the end goal of instruction, and create some "intervention" to assist in closing any existing gap.

According to Gustafson (1981) cited in Branch & Dousay, (2015), ISD models have been categorized into three: classroom-oriented model e.g. Morrison, Ross, and Kemp; product-oriented model such as Seels and Glassgow; and system-oriented model e.g. Dick, Carey, and Carey. However, all the ISD models took their root from ADDIE model and is therefore considered to be the most commonly used (Shibley, Amaral, Shank, & Shibley, 2011). ADDIE is an acronym for the five phases of Analysis, Design, Development, Implementation, and Evaluation. From literature reviewed, biology lessons were overloaded; students in the class were heterogeneous in terms of their learning abilities; there was lack of innovative teaching method and suitable instructional software; traditional teaching method was still in vogue. These may have led to recycling of wrong ideas, misconceptions, cramming and regurgitation of information, rote learning and low achievement. Hence, the application of ICT in form of instructional package into teaching and learning can introduce the needed radical change. It does not only promote active learning but provides opportunities to construct and understand difficult concepts through repeated demonstration in a student controlled environment. Though there are many commercially developed instructional packages, most of them do not satisfy local content. They are not strictly in conformity with the curriculum and may not adequately address the objectives and scope of instruction set by individual teachers.

Research Questions

The following research questions were raised to guide the conduct of this study:

1. What are the processes involved in developing computer simulation for learning some concepts in biology?
2. How do experts rate the developed instructional package for learning of biology?
3. What is the comparative mean achievement scores of students taught biology with the package and traditional teaching method?

Research Hypothesis.

The following hypothesis has been formulated at 0.05 level of significance to guide this study.

H_0 : There will be no significant main effect of treatment on the academic achievement of students in biology.

Methodology

Research Design

Mixed research method (qualitative and quantitative) was adapted for this study. The qualitative method adopted design-based research (DBR) approach which incorporated experts' suggestions on how to enhance the adoption of the developed package for instruction in Nigerian secondary schools. For the quantitative method, a quasi-experimental design of pre-test and post-test, non-equivalent control group design was utilized. Intact classes were used.

Sample and Sampling Technique

A sample of 202 SS2 biology students made up of 107 males (52.97%) and 95 females (47.03%) were selected. To compose this sample, multi-stage sampling technique was used. Firstly, random sampling technique was used to determine two educational districts out of the six districts in Lagos State. Six pieces of papers each bearing the name of a district were folded and reshuffled. Two out of the six with the inscription "yes" were selected. Secondly, purposive sampling technique was employed to select the two schools that participated in the study from the two sampled districts. Only the streams/arms of SS 2 classes that offered biology participated in the study.

Research Instruments

Seven research instruments: two of them were treatment instrument used to engage the students in the teaching strategies, while the remaining five were measurement scale used to collect relevant data. They include;

1. **Computer simulation package (COSIP):** a self-instructional package developed for use by students in the experimental group.
2. **Operational guide for traditional teaching method (TTM):** a lesson plan designed by the researcher to guide the biology teachers on how to deliver the instructional content to the students in the control group.
3. **Biology Achievement Test (BAT):** adapted from WAEC and NECO past questions and Nwana (1980). It was made up of 25 multiple choice items covering the concepts under study. Each of the stems of the BAT had four options lettered from A - D as possible answers to the question. Students were required to indicate the option that carried the correct answers by circling such option. It was administered to the participating students as pre-test, and post-test after reshuffling the numbers. Each item attracted two marks if answered correctly but zero mark if answered wrongly. Thus, the obtainable score per student was fifty (50%).
4. **Educational Technology Experts' Validation of Instrument (ETEVI):** adapted from Koledafe (2011), it was designed to elicit response from educational technology experts under the following sub-headings: typology, legibility, navigation, interface, functionality, packaging, and durability of the developed instructional package. It also contained a blank space where respondents were required to write their suggestions that could enhance the adoption of the instructional package for teaching and learning of biology in Nigerian secondary schools
5. **Computer Experts' Validation of Instrument (COMPEVI):** adapted from Falode (2014), it contains items that sought the opinion of computer experts on the suitability of the package and useful suggestion on how to improve on the package.
6. **Biology Teachers' Validation of Instrument (BIOTEVI):** a 10 item questionnaire adapted from Olumorin, Orunmoluyi, Fakomogbon, & Yusuf, (n.d.). It was used to evaluate the appropriateness of the instructional package for the learning of the selected biological concepts.
7. **Biology Students Validation of Instrument (BIOSVI):** adapted from Gambari, & Yusuf, (2014), contained items on the opinion of the student about the instructional package under the following sub-headings: content, navigation, interactivity, feedback, and screen design. It also reflected on students' preferences toward the use of the package compared to traditional methods of learning.

Data Analysis

Descriptive statistics was used to analyze the data collected in the course of the study. For research questions one, detailed information on the processes of development of the instructional package was discussed. Mean was used to answer research question two and three, while Analysis of Covariance (ANCOVA) was used to test hypotheses at a significance level of 0.05. This statistical instrument was considered most appropriate for the study due to its ability to remove differences in the initial status of the experimental and control groups that often results when intact classes are used (Uzoagulu, 2011).

Results

Research Question 1:

What are the processes involved in developing computer simulation for learning some concepts in biology?

Creation of a successful learning experience that can engender transfer of knowledge requires an appropriate instructional design before the actual development. As stipulated by ADDIE model, the design stage involved two phases – analysis (process of defining what to be learned) and design (process of specifying how it is to be learned).

A. Analysis: at this stage, the biology content, the learners, the present methods, and media of instruction were analyzed. From literature reviewed, biology lessons were overloaded because the content was voluminous. Students in the class were heterogeneous in terms of their learning ability. To adequately address their learning differences has been difficult. More so, they hardly received immediate feedback to their responses in tests and examinations. There was lack of innovative teaching method; rather the traditional teaching method was still in vogue. Students' poor academic achievement was linked to this teaching method. With reference to media, suitable instructional software was not used for studying the subject. This did not only cause recycling of wrong ideas, but could have led to misconceptions, cramming and regurgitation of information. It encouraged rote learning, and caused negative attitude of the students towards learning of the subject.

B. Design: was concerned with specifying of learning objectives and forming learning “blue-print” that would direct the development of instructional materials, assessment instruments, exercises, content, subject matter analysis, lesson planning, media, and methods. The content and instructional objectives of the package were derived from the National Curriculum for Senior Secondary School (Federal Ministry of Education as derived from the National Policy on Education, 1977, 1981, 1999, & 2007). More so, each of the three modules covered by the package had specified behavioural objectives indicating what the students should be able to do after going through the content of each module. Following the principle of multimedia learning, the script for the development stage was written. Other materials: validation instruments, evaluation instruments, storyboard, and media were formulated. The decision on how to deliver the content of the instructional package to the selected sample was also taken.

At the development stage, three phases were involved:

C. Development: For this study, the researcher wrote the script for the selected biological concepts, and developed a storyboard to show the visual plan of the package before sending it to a computer animator for programming. For the narration, the researcher read the content of each slide, recorded the voice and synchronized it with the respective slide using the “insert” command of the authoring tool (Articulate Storyline 360). The package comprised of three modules in line with the three biological concepts under study. Each module contains between 27 - 50 slides covering:

- i. home page,
- ii. title page (for each module),
- iii. learning objectives,
- iv. how to study the module,
- v. content (broken down into units per module), and

- vi. end of unit test (for each unit).

The package was programmed using Articulate Storyline 360, Adobe flash player, published on html platform and burnt into CD-ROMs. Instructional guideline and evaluation instruments were also developed at this stage.

D. Implementation: The researcher approached the Tutor general/Permanent secretary of the participating districts to seek permission to use their schools for this study. The CD-ROMs were installed into the computers in the computer laboratory of schools designated as experimental group. As a self-instructional package, the students were guided to study the content on their own.

E. Evaluation: each unit in the module had an “end of unit test” to help ensure mastery of the unit before the student proceeded to the next unit/module. At the end of the learning process the students were evaluated to ascertain their learning outcome.

Research Question 2:

How do experts rate the developed instructional package for studying biology?

- i. **Educational Technology Experts:** ETEVI adapted from Koledafe (2011) was administered on ten educational technology experts to determine the quality of the developed instructional package and seek their opinion on how to improve on the package. They suggested the inclusion of hyperlinks to improve navigation and interactivity as well as providing room for students to practicalize building of the DNA model. Table 1 shows their mean rating of the package out of a maximum mean score of 5

Table 1

Mean Rating Scale of the package by Educational Technology Experts.

S/N	A. Typology	Mean Rating
1	The appearance of characters on the screen	4.5
2	Sequence of information on the screen	4.3
3	Consistency of the position of information on the screen	4.5
4	Brevity of the slide content	3.8
Grand Mean		4.3
B. legibility		
5	Use of readable font size	4.5
6	Consistency in the use of upper and lower cases	4.5
7	Clarity of figures, tables, and animations	4.6
8	Conventional assignment of colour codes	4.1
9	Audibility of the narration	4.0
Grand Mean		4.3

C. Navigation		
10	The package allows learners to move around freely in different units	4.2
11	Learner controls slide change and time of learning	4.5
12	The package encourages easy movement to and from the home page to the modules.	4.1
Grand Mean		4.3
D. Interface		
13	The package has attractive homepage	3.9
14	The package has appropriate slide layout	4.4
15	The package has well organized interface	3.9
Grand mean		4.1
E Functionality		
16	The package encourages immediate knowledge of result	4.6
17	The concepts and vocabularies are relevant to the learner's ability	4.8
18	The package information depth and scope are in line with stated modular objectives	4.8
19	The interactivity of the package corresponds to the maturity of the students	3.9
20	The package inspires students to apply what they have learnt rather than memorize it.	4.6
Grand Mean		4.5
F. Packaging		
21	The package can be uploaded to server for larger learners in real time	4.4
22	The instructions on how to use the modules are clear and self-explanatory	4.6
23	The package can be used with personal digital assistants (PDAs)	4.5
Grand Mean		4.5
G. Durability		
24	The content can be updated and/or modified with new knowledge that will appear soon after the development of the package	4.4
25	The package allows storage (save) in CD-ROM, cloud computing and other external storage devices	4.4
Grand Mean		4.4

As indicated in Table 1, typology and navigation had a grand mean of 4.3 each; interface had a grand mean of 4.1. In the same vein, functionality and packaging had grand mean of 4.5 each, while durability had grand mean of 4.4. This rating by educational technology experts confirmed the suitability of the instructional package for learning biology.

ii. Computer Experts: a twelve item questionnaire (COMPEVI) adapted from Falode, (2014) was administered on ten computer experts selected from the sampled schools to determine the appropriateness of the package with reference to flexibility, novelty, and speed. In their suggestion on how to improve the package for its adoption, they opined that the package should be downloadable for easy access anywhere.

and at any time. It should be burned into CD-Rom instead of flash drive to avoid possibility of virus distribution. Their mean rating of the package out of a maximum mean score of 4 is highlighted in table 2.

Table 2:

Mean Rating Scale of the package by computer experts.

S/No	Item	Mean Rating
Flexibility		
1	The developed instructional package can run on different operating system platforms	3.3
2	The package has features that can allow online accessibility	3.3
3	The package has features that can make it accessible on mobile devices	3.7
Grand Mean		3.4
Novelty		
4	The application of instructional package is a new idea in my school	3.9
5	The biology instructional package is new to biology students in my school	3.8
6	The biology instructional package is new to biology teachers in my school	3.7
7	This instructional package is new to ICT staff in my school	3.6
8	The Software used to develop this package is not already known to my school computer programmers	3.7
9	ICT staff in my school are competent and skilled to develop and modify the package	3.5
Grand Mean		3.7
Speed		
10	Playing the animation video in the instructional package does not take time to complete	3.7
11	Transiting from one slide to another in the package does not take time to achieve	3.9
12	Installation and set up of the instructional package on computer systems does not take time to complete	3.5
Grand Mean		3.7

Table 2 indicated that the flexibility of the instructional package had a grand mean of 3.4 out of a maximum mean of 4. In the same vein, novelty and speed had a grand mean of 3.7 respectively. By this rating, the computer experts confirmed the suitability of the instructional package for studying of biology.

iii. Biology Teachers: a questionnaire, BIOTEVI adapted from Olumorin, Orunmoluyi, Fakomogbon, & Yusuf, (n.d.) was administered on fifteen biology teachers, most of them WAEC team leaders, to determine the suitability of the package for studying the selected concepts. In their suggestion on how to improve the package for its adoption, they noted that an adjustable audio button should be introduced to control distraction when many students are making use of the package at the same time and in the same location. They added that the substrate of the mushroom should be shown for clarity. Above all, they agreed that the

package could help the students to have a clearer view of what they learnt. Table 3 shows the mean rating of the package by these experts out of a maximum mean score of 5.

Table 3:
Mean Rating Scale of the package by Biology teachers.

S/no	Item	Mean rating
1	The content of the package adequately covers the selected biological concepts for senior secondary school biology syllabus	4.7
2	The various sub-topics are sequentially arranged to allow for transitional learning.	4.6
3	The language/terminologies used are adequate enough for the students to understand.	3.8
4	The content of each module relates directly to the objectives of senior secondary biology.	4.7
5	The “end of unit tests” is relevant to the content of the respective units.	4.2
6	The feedback of the “end of unit tests” are accurate	4.1
7	The pictures and tables are reasonably clear and self-explanatory.	3.6
8	The animations, to a large extent, projects and explains what they are intended to explain.	4.7
9	The narration is clear and satisfies local bias.	4.1
10	The package is well designed and self-instructional.	4.3
Grand Mean		4.3

The grand mean ratings ($m = 4.3$) indicated an above average score. This is a confirmation by the biology teachers that the package was very appropriate for learning the subject.

iv. Biology Students: a questionnaire, BIOSVI adapted from Gambari, & Yusuf, (2014) was used to ascertain the opinion of the students in terms of the content, navigation, interactivity, feedback, and screen design of the package. It also reflected on their preferences toward the use of the package compared to traditional methods of learning. Table 4 shows their mean rating of the package out of a maximum mean score of 4.

Table 4:
Mean Rating Scale of the package by Biology students.

S/No	Item	Mean
Content of the package		
1	The content of the package has been well organized (arranged in order)	4.0
2	The diagrams/illustrations in the package are very clear to me.	3.3
3	It was easy to understand the lesson because information was presented from simple to more difficult one.	3.3
Grand Mean		3.5

Navigation of the package		
4	From the main menu, I can click to move to any of the three modules.	3.4
5	The PREVIOUS key enables me to revisit the previous section(s) of the lesson.	3.6
6	The NEXT key directs me to go to the next section of the lesson.	3.5
7	The OPTION keys allow me to select the correct option.	3.4
Grand Mean		3.5
Interactivity of the package		
8	It is not difficult to operate the package with computer keys and icons.	3.3
9	This package permits me to repeat any section, pause and continue an animation view.	3.0
10	Frequent display of “end of unit questions” does not interrupt the learning process.	3.3
11	This package enables me to apply what I have learnt rather than memorize it.	3.4
Grand Mean		3.3
Feedback from the package		
12	This package displays the word “correct” when I select correct option for a question.	3.6
13	This package displays the word “incorrect” when I select wrong option for a question.	3.6
14	This package allows me to proceed to the next unit only if I have exhausted the end of unit questions.	3.5
Grand Mean		3.6
Screen design of the package		
15	The use of proper lettering (fonts) in terms of style and size make the information legible.	3.2
16	The colours used for the various presentations are very attractive.	3.2
17	The animations (moving picture) in the package assist in understanding the lessons better.	3.3
Grand Mean		3.2
Students' preferences toward the use of the package compared to traditional methods of learning		
18	Studying biology with an interactive package is more preferable than using text books.	3.3
19	The activities provided in this package are more effective compared to normal classroom instruction.	3.2
20	I will suggest to my friends to use computer package in studying biology instead of textbooks.	3.3
21	I prefer to study biology with an interactive package with my teacher acting only as a facilitator.	3.3
Grand Mean		3.3

Table 4 indicated that the content of the instructional package had a grand mean of 3.5 out of a maximum mean of 4. In the same vein, navigation had a grand mean of 3.5; interactivity 3.3; feedback 3.6; and screen

design 3.2. With a grand mean of 3.3, the students confirmed their preference towards the use of the package when compared to the traditional method of teaching.

Research Question 3:

What is the comparative mean achievement scores of students taught biology with the package and traditional teaching method?

Table 5

Achievement of students taught with the developed instructional package and those taught using the traditional teaching method.

Groups	N	Pretest	SD	Posttest	SD	Mean Gain
		\bar{X}		\bar{X}		
COSIP	102	16.8	7.8	31.1	6.5	14.3
TTM	100	16.7	5.0	18.3	8.4	1.6

From table 5 control group (TTM) recorded a mean score of 16.7 and standard deviation (SD) of 5.0 in the pre-test but had a mean score of 18.3 and SD of 8.4 in the post-test with a mean gain of 1.6. Likewise, COSIP had pre-test mean score of 16.8 with SD of 7.8 and a post-test mean score of 31.1 and SD of 6.5. A mean gain score of 14.3 was recorded. This indicated that students exposed to the instructional package achieved more than those exposed to the traditional teaching method.

H₀₁: There will be no significant main effect of treatment on the academic achievement of students in biology.

Table 6:

Summary of analysis of covariance (ANCOVA) for test of significance of three effects: treatments, gender, and interaction effect of treatments and gender on students' achievement in biology.

Source	Type III Sum of				
	Squares	Df	Mean Square	F	Sig.
Corrected Model	8323.231 ^a	6	1387.205	27.405	.000
Intercept	23841.297	1	23841.297	471.003	.000
Pretest	107.172	1	107.172	2.117	.147
Treatment	8147.470	2	4073.735	80.480	.000
Error	14932.359	295	50.618		
Total	209812.000	302			
Corrected Total	23255.589	301			

Table 6 showed that an F ratio of 80.480 was obtained with an associated probability value of .000. Since the associated probability value of .000 was less than 0.05 set as the level of significance, the null hypothesis was Rejected. This implied that a significant difference existed between the achievement of students taught

biology using the instructional package and those taught with traditional teaching method ($F = 80.48$; $P < 0.05$).

Discussion

The ADDIE instructional design model adapted for this study has been considered by other researchers to be the most commonly used (Shibley, Amaral, Shank, & Shibley, 2011). Bolaji (2016) carried out a study on evaluation of a ubiquitous collaborative mobile learning model for teaching mole concept in chemistry in Nigerian secondary schools. In the study, the content derived from the National Curriculum had the instructional package designed using this model. However, Olumorin, Orunmoluyi, Fakomogbon, & Yusuf (n.d.) had a different approach. Though they believed that most of the current instructional design models were spin-offs or variations of the ADDIE model, yet in their study on the assessment of a physics computer-assisted instructional package for teaching selected topics in secondary schools in Nigeria they used Dick and Carey ISD model. In the same vein, Anunobi, Gambari, Alabi, & Abdullahi (2017) carried out a study on the development and validation of web-based courseware for junior secondary school basic technology students in Nigeria. They adopted Dick and Carey instructional system design model.

From literature reviewed, a number of packages have been developed using different authoring tools. In their study on the effects of computer assisted instruction on secondary school students' performance in biology, Yusuf, & Afolabi, (2010) developed a package using Dream weaver and flash written in Hypertext Markup Language (html) with illustrations converted to Graphic Interchange Format (GIF). In the same vein, when Gambari, & Yusuf (2014) conducted a study on development and validation of computer instructional package on physics for secondary schools in Nigeria, they developed a package using Macromedia Dreamweaver 8 in addition to Microsoft Word, Macromedia Fireworks 8, and Macromedia Flash 8. AlSultan, Lim, MatJafri, & Abdullah (2006) developed CAI package on remote sensing processing using Macromedia Flash. In other research works, (Gambari, Ezenwa, & Anyanwu, 2014; Yusuf, Gambari, & Olumorin, 2012) Macromedia Dreamweaver 8, micro-media flash, fireworks 8, flash and MS office software were used. From the above reports, it can be deduced that much emphasis have been laid on the afore-mentioned authoring tools. The researcher therefore deemed it fit to explore other options such as Adobe Captivate, Active presenter, Articulate Storyline, Camtasia, Letora, etc. Articulate Storyline 360 was adopted for the development of the instructional package for this study. The output offers the learners the chances of evaluating learned concepts using computer based test (CBT). It provides immediate feed back and an opportunity for the user to review answered questions. The package developed using this authoring tool can be published on html platform, web-page, CD-ROM, Android phone, learning management system (LMS), etc to beat the restriction of time and distance and enhance durability.

The developed package was rated very high by experts thus confirming its suitability and appropriateness for learning of the subject. This finding is supported by Asogwa, Muhammed, Asogwa, & Ofoegbu (2016). They posited that the integration of computers into the classrooms in Nigerian secondary schools is already common, widespread, and accepted for instructional purposes. Apart from motivation, literature shows that instructional package has the potential of arousing student's interest, stimulating positive attitude, promoting retention ability and improving their achievements (Yusuf & Afolabi, 2010). It increases students' attention and curiosity (Kocakaya & Gonen 2010). More so, simulation exposure reduces misconceptions about learned biology concepts (Meir, Perry, Stal, Maruca, & Klopfer, 2005). Tekbiyik, & Akdeniz, (2010) added that since science has many theoretical and abstract concepts which are difficult to understand easily, students need some visual media and hands-on materials in order to learn

better. This is why Adekunle (2008) in Okobia (2011) noted that when the students are given the chance to learn through more senses than one, they learn faster and easier.

Students exposed to COSIP achieved more than those exposed to TTM. This is a confirmation of the principle of the cognitive theory of multi-media learning. The theory stated among other things that students learn better from **words and pictures** than from words alone; from **animation and narration** together than only from animation or narration or on-screen text. The finding is also supported by Olafare (2011) who reported in his study that computer instructional package enhanced performance of students in cultural and creative art. The result is in line with the findings of Gambari, Ezenwa, & Anyanwu (2014). They examined the effects of two modes of computer-assisted instructional package (animation with text and animation with narration) on the achievement of students taught solid geometry. Comparing their post test scores, they found a significant difference in favour of animation with narration. The findings of this study negate the report of Anyanwu (2003). In his study on the effectiveness of instructional materials in teaching of Social Studies in some selected post primary school in Owerri educational zone, he asserted that learners are not acquainted with computer assisted instructional package and by consequence, may not contribute to improved performance.

Conclusion

Most teachers in today's classrooms are "digital immigrants", as such they find it difficult to use technology for instructional delivery. In this era of globalization and digitization, ICT competence has become a necessity. This implies that schools should in addition to academic skills; inculcate basic ICT skills into their students. Since experts rated the Computer Simulation Package (COSIP) designed and developed for the purpose of this study very high, it implies that the package is suitable and appropriate for learning of the subject. It was found to meet up with the required standards of instructional design and development process. The self-instructional format, visualization and interactivity feature of the package made it very attractive and interesting. It will not only enhance the academic performance of the students, but increase their flexibility, job mobility and self-reliance.

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EFFICACY OF FLIPPED CLASSROOM APPROACH ON PSYCHOMOTOR SKILLS ACHIEVEMENT OF STUDENTS IN BASIC TECHNOLOGY

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Abstract

The study examined efficacy of flipped classroom approach on psychomotor skills achievement of basic technology students in Nigeria within the blue print of the pre-test and post-test non-equivalent control group quasi-experimental and survey research design. Four research questions and three null hypotheses guided the study. Experimental group was taught with flipped classroom approach while the control group received instruction with the conventional teaching approach for eight weeks. Two instruments; basic technology psychomotor achievement test (BTPAT) with KR-21 reliability coefficient of 0.84 and structured questionnaire on Likert type was used for data collection. Results showed that significant difference exist between the achievements of student taught basic technology using flipped approach. Although, students in the flipped group perform significantly better than students in the conventional group. Also, significant difference exist between the achievement of male and female students with female students performed slightly better than male students. Also, significant difference exist between high, medium and low achievers with high achiever perform better than medium and low achievers. The flipped classroom approach make teaching interesting, easy, and students learn at their own pace, it also give teacher insights into students learning difficulties. It is thus recommended that flipped classroom approach should be used by basic technology teachers in Nigeria schools

Key Words: flipped classroom approach, achievement, basic technology, conventional teaching approach

Introduction

The most important role of TVET is enhancing economic, social and industrial development. It is therefore, an important approach in preparing human resources within the educational economic system. It is believed that TVET can equip men and women for the job market or self-employment, thereby increasing their self-reliance and self-confidence. TVET is therefore seen as a means to promote human resource development and consequently, can be regarded as a panacea to combat ever increasing poverty problem in the country. TVET is a form of education that is planned to impart knowledge, skills (competencies), right attitude, autonomy of identity, perseverance, and character and the work ethic into learners in readiness for work and general employment. This in turn leads to productivity, social inclusion and economic development (UNESCO-UNEVOC, 2013) TVET has been found to provide central pedagogical strategies for transmitting inexperienced young people from school-life to realities of working-life. TVET is a learner centered approach to teaching in which the learner and the activities to be learnt are the central issues in basic technology.

Basic Technology is one of the pre-vocational subject within the area of Technical Vocational Education and Training. Basic Technology as stated by the National Policy on Education (FRN, 2013) is one of the compulsory pre-vocational subjects at the Junior Secondary School (JSS) in Nigeria which aimed to prepare students for future career. It covers counselling on career choices, skills gaining and professional ethics. Therefore, Basic Technology is designed to provide: pre-vocational orientation in technology; basic

technological literacy for everyday living and stimulate creativity. In fact, this is the major reason why the Basic Technology curriculum was revised to reflect the national policy orientation of teaching technology and the world globalization trends in education. The responsibility of every nation and school is to provide opportunities for all to acquire technological literacy and this is in line with the current goals of the National Economic Empowerment and Development Strategies, (NERDC, 2007) (FRN, 2013). The revised Basic Technology Curriculum covers the following themes: You and Technology (ICT inclusive), Safety, Materials and Processing, Drawing Practice, Tools and Machines, Applied Electricity and Electronics, Energy and Power, Maintenance and Building. The contents under each theme are made to reflect the basic nature of technology; where the knowledge, skills, creativity and attitude needed by the students are explained in details.

Academic Achievement is the extent to which a learner is profiting from instructions in a given area of learning i.e., achievement is reflected by the extent to which skill or knowledge has been imparted to student. Academic achievement also denotes the knowledge attained and skill developed in the school subject, usually designated by test scores (Karthigeyan & Nirmala, 2012). Students' achievement refers to performance in a school subject as designated by a score or mark obtained in an achievement test. According to Anene (2005) achievement is quantified by a measure of the student's academic standing in relation to those of other students of his age. There has been much concern about the apparent drop in the standard of technical education at the secondary school level in Nigeria. Stakeholders in TVET have always been concerned in the academic achievement of students. Students' achievement level as a cause of differential learning outcome has attracted the attention of educational researchers and industries. In Nigeria classrooms, students with different achievement levels are mixed together and given same treatment without considering their individual differences (Yusuf, 2004). Innovative teaching strategies such as virtual classroom that could cater for individual differences and bridge the gap between students' achievement levels should be encouraged. Studies revealed that high ability students do perform better than the medium and lower ability students (Aluko, 2004; Fajola, 2000; Gambari, 2010; Yusuf, 2004).

As new technologies become available, they are often embraced in educational innovation to enhance traditional instruction and in order for teachers to focus on instruction and address all the demands placed upon them in a technologically advanced society, many have turned to alternative approaches to instruction. The flipped classroom approach is one of the most recent and popular technology-infused teaching in which learning new concepts takes place at home while practice is conducted in the classroom (Unal & Unal, 2017). According to Milman (2012), embedding technology and meeting students on their terms has become a popular way to address all of the challenges and because of that the flipped classroom has emerged as a method of instruction that is growing in popularity. Flipped classroom is defined by the Flipped Learning Network (2014) as an instructional method that moves direct instruction outside of the classroom in order to make room in the classroom for a more interactive learning environment where students can actively engage in the content. Flipped classrooms refer to the practice of assigning lectures outside of class and devoting class time to a variety of learning activities (Sarah & Matthew, 2016) flipped classroom is characterized by course structure: instructional content e.g., prerecorded class lectures is assigned as homework before coming to class. In-class time is then spent working on problems, advancing concepts, and engaging in collaborative learning (Findlay-Thompson & Mombourquette, 2014).

The flipped classroom is defined as shifting direct learning out of the large group learning space and moving it into the individual learning space, with the help of one of several technologies (Hamdan, McKnight, McNight, & Arfstrom, 2013). The main objective of the flipped classroom approach is to shift the learning of new content and concepts to before class in the form of videos and spending in-class time applying the material through complex problem solving, deeper conceptual coverage, and peer interaction (Gajjar, 2013; Gojak, 2012; Sarawagi, 2013; Strayer, 2012; Tucker, 2012). A flipped classroom, therefore is explained as a method of instruction where the teacher creates a video of the concept or procedure to be introduced and has students view the video at home before class as their homework. In a flipped classroom approach, students engage with lectures or other materials outside of the class to prepare for an active learning experience in the classroom. Before class time, students are asked to watch short online lecture

videos prepared or selected by their teachers followed by small online activities (a short quiz, online discussion, one paragraph summary, and concept map, among others). During the class, students are asked to engage in concepts by participating in individual and/or group activities with the guidance of the teacher.

Furthermore, In principle, the in-class time would then be freed up to allow students to engage in tasks that allow for deeper learning around the content in which students can discuss topics with their peers, collaborate around project-based learning activities, or modeling activities while the teacher facilitates the experience (Milman, 2012). Removing the instructional content from in-class time allows the teacher more time for one-on-one engagement with individual students (Roehl, Reddy & Shannon, 2013), also equally important, in the flipped classroom model is student-centered (McLaughlin, Roth, Glatt, Gharkholonarehe, Davidson, Griffin, & Mumper, 2014). That is, students are responsible for watching lectures on their own and coming to class prepared for in class activities and discussion. One of the most common means of moving instruction outside the classroom in a flipped classroom format has been to require students to watch prerecorded video lectures or screencasts prior to attending class (Abeysekera & Dawson 2015) Because the lecture is such a large portion of a class even within the flipped classroom, it seems reasonable to examine whether prerecorded lectures have any impact, deleterious or positive, on learning.

What is interesting about the flipped classroom approach to instruction for technical teachers is the instructional time gained within the scheduled class time (Brunsell & Horejsi, 2013). By using flipped classroom instructional approach, teachers are able to use class time to develop understanding in students. They are able to present students with more meaningful tasks that develop problem-solving skills. Students are then able to collaborate, justify, and defend their processes while the teacher facilitates and guides them. Students are able to walk away from the experience more engaged in their own learning and with the ability to analyze new situations by thinking critically about technology concepts and ideas (Brunsell & Horejsi, 2013). The benefits of the flipped classroom approach according to Unal & Unal (2017) include the following: (i) students move at their own pace, (ii) doing homework in class gives teachers better insight into student difficulties and learning styles, (iii) teachers can more easily customize and update the curriculum and provide it to students 24/7, (iv) classroom time can be used more effectively and creatively, (v) teachers using the method report seeing increased levels of student achievement, interest, and engagement, (vi) learning theory supports the new approaches, and (vii) the use of technology is flexible and appropriate for 21st century learning.

Gender has been identified as one of the factors influencing student's psychomotor achievement in vocational education (Howden, 1998) and the issue of gender has assumed prominence in TVET discourse. Gender is a sense of awareness of being male or female. It is a behavioral pattern and attitude perceived as masculine or feminine within culture (Coleman, 2002) Howden (1998) remarked that disparities exist between male and female student's performance in technical vocational education, hence an attempt was made to understand how the flipped method of classroom instruction can lead to improved student psychomotor achievement and creativity in basic technology subject and improve student perceptions about technical subjects in order to encourage course consumption in the future.

Statement of the Problem

Technical vocational education and training in Nigeria has come under scrutiny in recent years due to low psychomotor achievement of students as observed by various examination bodies. . Available reports from chief examiners of Junior WAEC organised by National Examination Council (NECO) and Basic Education Certificate Examination (BECE) in their appraisal report attest to the poor performance among basic technology students. National data released by junior examination certificate showed that 66% of all junior secondary school students that took the junior WAEC exam perform below the benchmark with a score of 50. Based on this data, 66% of all junior school students that took exam in 2012 were underprepared to take science and technical subjects at senior secondary school, which will lead to low enrolment in science and engineering courses in tertiary institutions.

The National Examination Council (NECO) have blamed the poor performance of basic technology students in Nigeria on old-fashioned approaches to the teaching of the subject. As an attempt to part ways with the old fashioned methods, stakeholder has recommended more stimulating, problem based innovative teaching strategies. Yet, there is evidence as confirmed by Omeje (2002) that a large number of basic technology teachers still teach conventionally. It does appear as if these innovative approaches have not been sufficiently portrayed as an effective alternative to the conventional method, both for achieving better learning psychomotor skills, creativity in basic technology and for sustaining students' interest in the subject. Therefore, the problem of this study posed as a question is: How would the use of flipped classroom approach can lead to improved student psychomotor achievement, creativity in basic technology and sustain students' interest in technology and engineering courses.

Research Questions

1. What is the difference in the mean achievement scores of students taught Basic Technology with Flipped Classroom Approach and those taught with Conventional Teaching Approach?
2. Is there any difference in the mean achievement scores of Male and Female students in Basic Technology?
3. Is there any difference in the mean achievement scores of high, medium and low achiever students using Flipped Classroom Approach and Conventional Teaching Approach?

Research Hypotheses

1. There is no significant difference in the mean achievement scores of students taught Basic Technology with Flipped Classroom Approach and Conventional Teaching Approach.
2. There is no significant difference in the mean achievement scores of Male and Female students in Basic Technology.
3. There is no significant difference in the mean achievement scores of high, medium and low achiever students using Flipped Classroom Approach and Conventional Teaching Approach.

Methodology

The study adopted a pre-test, post-test, non-equivalent control group quasi-experimental design using non-randomized, non-equivalent, pretest, posttest experimental research design. Quasi experimental is an experiment where randomization of subject and control groups is not possible (Nworgu, 2006). The researchers randomly assigned intact class to experimental and control group. This was necessary in order not to disrupt the normal classes of students and time table. Two levels of independent primary variables (experimental and control groups), two levels of gender (male and female) and three levels of academic achievement (high, medium and low) were investigated on students' performance in basic technology. Survey research design was also used to determine students' perception of flipped classroom approach. The research design layout is as shown in Table 1.

Table 1.
Research Design Layout

Groups	Pre-test	Treatment	Post-test
Experimental	O1	Flipped Classroom Approach	O2
Control	O3	Conventional Approach	O4

Participants

Purposive sampling technique was used to select two schools in Educational Districts four of Lagos State for the study. The schools were sampled based on (facilities and manpower), school type (private schools), gender composition (co-educational schools). The two schools were randomly assigned to

experimental group (flipped classroom) and control group (conventional teaching) respectively. Intact classes of the students classified into gender (males and females) and achievement levels (high, medium and low) were used. Both the pre-test and post-test were administered under similar conditioned to both the experimental and control groups. The distribution of sample for the study is shown in Table 2.

Table 2.
Distribution of Sample for the Study

Groups	Gender		Achievement Levels		
	Male	Female	High	Medium	Low
Flipped Classroom Approach	39	28	19	44	08
Conventional Teaching Approach	33	30	12	37	10

From Table 2, the groups comprised a total of 130 students, 67 students were exposed to Flipped Classroom Approach (FCA) (Experimental Group), 63 students were exposed to Conventional Teaching Approach (CTA) as a delivery medium (Control group). 72 male and 58 female. Students were stratified into academic levels (high, medium and low) based on their performance in the last promotion examination in basic technology subject. The high level students, in this study were the ones whose average scores in previous school examination in basic technology fall within the upper 75% above. The medium achievement level students' scores were within the middle 50% above, while students whose scores fall within the lower 25% were classified as students in low achievement level.

Research Instruments

The instrument for determine psychomotor achievement was basic technology psychomotor achievement test (BTPAT). TBTPAT, which was used to test psychomotor achievement of students was developed by the researchers. The BTPAT consists of two sections. Section 1 consists of students' Bio data. The Bio data was designed to obtain the students' data such as Name of school, class, sex, stratum of student. Section 2 of BTPAT was used as pretest and posttest consist of 50 multiple choice items with option A to D selected from past junior secondary school examination (JSSE) question papers in Basic Technology and covered topics related to tools, machines, process, pictorial drawing, and orthographic projection as contained in the junior secondary school year three syllabus. These topics were chosen because students performed poorly in junior secondary school certificate examination in Nigeria. The initial 50 items of BTPAT was subjected to content and face validation by two lecturers from Science and Technology Education Department, Technology subject teachers; and test and measurement specialists from Educational Foundation Department, University of Lagos, Akoka, Lagos.

The validation entailed checking the BTPAT items against the topics and content of the lesson plan, language editing and appropriateness of test to target participants. Ten items were removed based on experts recommendation and the face validated BTPAT was tested for difficulty index and discrimination power. Items with difficulty power 0.4-0.6, discrimination power of 0.2 and above, and distractor index of negative was retained (Akinsola & Awofala, 2009) based on this, five items were removed leaving the final 40 items for the BTPAT which was piloted at Federal Government College, Ijanikin, Lagos. The reliability coefficient of TDAT was to be 0.84 using Kuder Richardson (KR-21) each item on BTPAT was scored 2 marks, thus a total score of 80 marks was obtainable.

Procedure

The researchers prepare two (2) sets of lesson plans for the teaching of the topics set out for the study. These lesson plans were prepared from the units in the test blue print. Each set contains eight (8) lesson plans that lasted for eight weeks and for eighty minutes duration. One set of lesson plan was written based on flipped classroom approach and the subject teacher in the experimental group applied this lesson plan at different stages of instructional process, while the second set was prepared based on conventional method in teaching basic technology. One week intensive training programme was organised for the teachers of the experimental group that were involved in the study. The conduct of the study took place during the normal school lesson periods.

On the first day, before the lesson commenced, BTPAT, was administered as pretest to both the experimental and control group after, which proper teaching commenced by using the prepared lesson plans. The experimental group was taught with flipped classroom approach lesson plans, while the control group was taught with conventional teaching approach lesson plans. Each lesson lasted for eight minutes and treatment lasted for 8 weeks. At the end of the treatment, the re-ordered BTPAT was administered on both as posttest. In order to prevent halo effect which might result from over familiarity with the pretest. The scores obtained from both groups were compared to determine the efficacy of teaching approach that were used in the study.

In experimental group 67 students were exposed to use of flipped lesson approach, the lesson planning process involve getting the package ready. Researcher start with the objective, by breaking it into lessons that students need to be able to see. Usually, the first two lessons are really very basic and a review of something that they should know from previous lesson. From there, teacher break that objective apart so that they cover each of the lessons knowing that are a lot to facilitate in between. Then from there a day to two days before every lesson researcher make sure that the presentation is ready. Teacher makes different slides that can be run through and which more just helps teacher stay organized and gives the students a visual to have at the front of the room. The instructional strategies with the flipped classroom and putting the lessons on videos, they have the options to pause and rewind and replay it.

Flipped lessons were delivered after creating eight week lesson plans (unit), Researchers created content videos with different approaches depending on the lesson content of their traditional lectures using presentation software (PowerPoint & Keynote) to present lesson content with teacher commentary. Also, researchers selected screen capture software (Screencast & Matic) to record their computer screens accompanied by teacher voice commentary. They used standard video cameras (camcorder) to record themselves teaching the lesson content in front of a white board. The length of the videos varied from 25 to 40 minutes. After the videos were created, they were uploaded into the classroom websites (Moodle Learning Management System) and allowing students to view them at home in place of homework. Students then are able to come into class with prior knowledge of the new learning and are able to interact with more authentic tasks and problems then they might otherwise be able to do at home on their own.

The control group consisted of 63 students who were taught using conventional teaching approach, in this method, the teacher presented information on the selected topics to the whole class while learners listened and carry out the necessary task and assignment at the end of each lesson. The topics taught in the experimental and control group lasted for eight weeks.

Table 3:

Test Item Specifications in Basic Technology

S/No	Topics	Level of Cognitive Domain			Total
		Knowledge	Comprehension	Application	
1	Use and maintenance of hand tools	2	2	2	6
2	Machines	2	2	2	6
3	Pictorial drawing	2	2	2	6
4	Orthographic drawing	2	2	2	6
5	Construction of simple project	2	2	2	6
Total		10	10	10	30

Method of Data Analysis

Data collected were analysed using appropriate descriptive and inferential statistics of the statistical package for social sciences (SPSS) programme. In testing for possible post-experimental difference in achievement and male and female students the analysis of covariance (ANCOVA) was used and hypothesis was tested at 0.5% level of significance.

Results

Research Question One: What is the difference in the mean achievement scores of students taught Basic Technology with Flipped Classroom Approach and those taught with Conventional Teaching Approach?

Hypothesis One (H₀): There is no significant difference in the mean achievement scores of students taught Basic Technology with Flipped Classroom Approach and those taught with Conventional Teaching Approach

Table 4a:

Result of statistical analysis of pre-treatment and post-treatment achievement scores based on instructional approach experimental (Flipped Classroom) and control (Conventional)

Instructional Approach	Pre-Test		Post-Test		Mean Difference	
	Mean	SD	Mean	SD	N	
Flipped Classroom Approach	8.413	1.681	12.857	1.848	67	4.444
Conventional Teaching	7.925	1.550	11.791	2.591	63	3.866

The results in table 4a above shows that the experimental group taught Basic Technology with Flipped Classroom Approach had a mean score of 8.413 (SD=1.681) in the pre-test and a mean score of 12.857 (SD=1.848) in the post-test making a pre-test, post-test mean difference of 4.444. Meanwhile, the control group taught Basic Technology with Conventional Teaching Approach had a mean score of 7.925 (SD=1.550) in the pre-test and a mean score of 11.791 (SD=2.591) in the post-test making a pre-test, post-test mean difference of 3.866. This shows that students in experimental group taught Basic Technology with Flipped Classroom approach perform better than the students in the control group taught Basic Technology using conventional approach. Hence, Flipped Classroom approach is more effective when compared with the conventional teaching approach.

Table 4b:

Result of statistical analysis of pre-treatment and post-treatment achievement scores based on instructional approach Experimental (Flipped Classroom) and control (Conventional) Groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	128.876 ^a	2	64.438	38.469	.000
Intercept	34.312	1	34.312	20.484	.000
Posttest	121.165	1	121.165	72.335	.000
Method	.025	1	.025	.015	.902
Error	212.731	127	1.675		
Total	9001.000	130			
Corrected Total	341.608	129			

a. R Squared = .377 (Adjusted R Squared = .367)

Analysis of post treatment achievement scores of the students in the experimental and control groups using the Analysis of Covariance as contained in table 4b above shows that an $F(1, .015) = .902$, $p > .05$ for the main effect (treatment) was significant, this indicates that the method of instruction produced a significant effect on the achievement scores of students when covariate effect (pre-test) was controlled. The result indicates that there was significant difference between students exposed to flipped classroom than those exposed to conventional teaching approach.

Research Question Two: Is there any difference in the mean achievement scores of male and female students in Basic Technology?

Table 5a:

Results of statistical analysis of pre-treatment and post-treatment achievement scores based on gender.

Gender	Pre-Test		Post-Test		Mean Difference	
	Mean	SD	Mean	SD		
Male	7.931	1.689	12.083	2.141	72	4.153
Female	8.162	1.627	12.308	2.316	58	4.146

The results in table 5a shows that male students had a mean score of 7.931 ($SD=1.689$) in the pre-test and a mean score of 12.083($SD=2.141$) in the post-test making a pre-test, post-test mean difference of 4.153. Meanwhile, the female students had a mean score of 8.162 ($SD=1.627$) in the pre-test and a mean score of 12.308 ($SD=2.316$) in the post-test making a pre-test, post-test mean difference of 4.146. This shows that both groups benefited from the treatment, with female students slightly performed better than male students.

Hypothesis Two (H₀₂) There is no significant difference in the mean achievement scores of male and female students in Basic Technology.

Table 5b:

Results of statistical analysis of pre-treatment and post-treatment achievement scores based on gender.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	131.790 ^a	2	65.895	39.885	.000
Intercept	37.863	1	37.863	22.918	.000
Posttest	123.180	1	123.180	74.559	.000
Gender	2.939	1	2.939	1.779	.185
Error	209.818	127	1.652		
Total	9001.000	130			
Corrected Total	341.608	129			

a. R Squared = .386 (Adjusted R Squared = .376)

Analysis of post-treatment of male and female students taught Basic Technology using Analysis of Covariance as contained in Table 5b above shows the difference in means between the two groups was statistically significant ($F= 1.779$, $p=.185$), hence it was concluded that significant difference exist in the achievement of male and female students in Basic Technology. The hypothesis two is therefore rejected.

Research Question Three: Is there any difference in the mean achievement scores of high, medium and low achiever students using Flipped Classroom Approach and Conventional Teaching Approach?

Table 6a.

Results of statistical analysis of pre-treatment and post-treatment achievement scores based on high, medium and low achievers in flipped group and conventional group

Levels	Pre-Test		Post-Test		Mean	
	Mean	SD	Mean	SD	N	Difference
High	9.742	1.210	15.258	1.154	31	5.516
Medium	7.765	1.381	11.914	0.964	81	4.148
Low	7.222	1.517	9.000	2.401	18	1.778

Table 6a showed that high, medium and low achievers benefited from the treatment. However, there was difference in their mean scores, High Achievers student taught Basic Technology had a mean score of 9.742 ($SD=1.2102$) in the pre-test and a mean score of 15.258 ($SD=1.154$) in the post-test making a pre-test, post-test mean difference of 5.516. Meanwhile, Medium Achievers students had a mean score of 7.765 ($SD=1.3809$) in the pre-test and a mean score of 11.914 ($SD=0.9643$) in the post-test making a pre-test, post-test mean difference of 4.148, and Low Achievers` student had a mean score of 7.222 ($SD=1.517$) in the pre-test and a mean score of 9.000 ($SD=2.401$) in the post-test making a pre-test, post-test mean difference of 1.778. This implies that all the groups benefited from the treatment, with high achievers having better mean gain score than medium and low achievers.

Hypothesis Three (H_03) There is no significant difference in the mean achievement scores of high, medium and low achiever students using Flipped Classroom Approach and Conventional Teaching Approach.

Table 6b.

Results of statistical analysis of pre-treatment and post-treatment achievement scores based on high, medium and low achievers in flipped group and conventional group

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	140.384 ^a	3	46.795	29.301	.000
Intercept	16.540	1	16.540	10.357	.002
posttest	34.366	1	34.366	21.519	.000
levels	11.533	2	5.767	3.611	.030
Error	201.224	126	1.597		
Total	9001.000	130			
Corrected Total	341.608	129			

a. R Squared = .411 (Adjusted R Squared = .397)

Analysis of post-treatment of high, medium and low achievers students taught basic technology using the Analysis of Covariance as contained in Table 5b above shows that, main effect of treatment on achievers level indicates that $F(3.611) = .030$, $p = < .05$ for the main effect was significant at 0.05 level. This indicates that there were significant difference in the post-test mean scores of the high, medium and low achiever

students. This implies that the use of flipped classroom approach was influenced by the achievement levels as the initial advantage at the pretest had been statistically controlled using ANCOVA.

Discussion

The result presented in table 4a&b showed significant main effect on students' achievement in basic technology. The result indicate that students achievement in basic technology was greatly improved when they taught with flipped classroom approach than when they taught with conventional teaching approach. This finding is supported earlier findings () which associated improved content learning and achievement of learner to learner-center teaching strategies. The conventional teaching approach has not only been condemned for underscoring teacher activities at the expense of students' participation. (Gambari, Balogun, & Alfa, 2014) and (Awofala, Arigbabu & Awofala, 2013) but it could have a damaging influence on students' achievement in basic technology. The flipped classroom approach was found to be more effective in promoting and increasing students' achievement in basic technology than conventional teaching approach in the study because flipped classroom approach frees up instructional time traditionally spent on passive instructional techniques and makes room for more authentic, modeling, and project-based learning experiences (Strayer, 2007; Tucker, 2012) which added to the achievement in basic technology. This supports the assertion of salvin (1995) regarding the effectiveness of the incentive and task structure associated with flipped classroom approach. The similar studies have associated the effectiveness of flipped classroom approach to the opportunities it gives students to discuss, solve problems, create solutions, provide ideas, help each other and improve achievement and perception (Awofala, Arigbabu & Awofala, 2013)

The significant effect of gender on student achievement in basic technology as indicated in Table 5a&b was in agreement with the work of researchers who believe that gender stereotyping is still dominant in the Nigerian educational system. (Awofala 2010, Awofala 2008). Gender based difference are due to individual's perception of owns ability and sex role stereotyping (Schiefele & Csikszentmihalyli 1995). The result of present study suggested non-existence of differential existence between boys and girls within and outside might and gender difference in basic technology achievement might disappearing. The present study result implied that flipped classroom approach could be used to advance learning and close gender disparity in learning in basic technology. Thus, these learning approaches could be used to captivate the attention of the students. It can also be attributed to the fact that these approach implore the use of various stimuli (images, sounds and movement) and address the needs of diverse types of learning (visual, psychomotor, and affective).

Analysis of levels of achievements result contained in Table 6a&b showed significant effect of treatment on students' level of ability in basic technology. The results of hypothesis three reveals that there is a significant difference in the mean achievements in favor of high achievers taught basic technology with Flipped Classroom Approach. This result agrees with the findings of Aluko (2004) in chemistry, Fajola (2000) in biology, Gambari (2010) in physics and Yusuf (2004) in social studies which revealed that high ability students do perform better than the medium and lower ability students. Flipped classroom is student-centered (McLaughlin et al. 2014). That is, students are responsible for watching lectures on their own and coming to class prepared for in class activities and discussion.

Majority of students agreed that the flipped classroom approach was a valuable learning experience in general, and they perceived the flipped materials adequate to achieve the learning goals. Furthermore, the results suggest that a flipped learning method fostered students' participation more effectively than conventional teaching. With regard to the perception, this research reveals that the flipped-classroom methodology had a significant influence on students' perception toward the basic technology.

Conclusion

The study was design to examine the efficacy of flipped classroom approach on psychomotor skills achievement and perception of students in basic technology. It also examine the influence of gender and levels of achievement as a moderator variables on the dependent measure. The study found that flipped classroom approach was very effective in enhancing students' achievement in basic technology than conventional teaching approach. Gender is not a factor in students' achievement as shown in the study,

putting succinctly, irrespective of the nature of gender students will record improve achievement in basic technology when flipped classroom approach is employed in teaching basic technology. Also, the level of achievement was also improve with use of flipped classroom approach, both high, medium and low achievers benefited from use of flipped approach. The result indicate that flipped is a workable alternative to use of conventional approach in teaching basic technology in Nigerian junior secondary schools. It is believed that if flipped classroom approach is well utilised in teaching basic technology in junior secondary schools, students will develop the required psychomotor skill and creativity as outline in basic technology objectives and further empower students to further their career in engineering and applied sciences programme.

Recommendations

Based on the result of the study, the following recommendations were made:

1. Basic technology teachers should be motivate to make use of flipped classroom approach in their teaching as the method will empower teachers to cater for diverse students in classroom and ultimately developing the psychomotor skills and creativity in students
2. Government through ministry of education and technical education board should support basic technology teachers by organising training and seminars for teachers on how best to make use of flipped classroom approach and ensure conducive learning environment.
3. Basic technology teachers should be encouraged in Nigerian schools especially for teaching technological based and other practical oriented courses. This could be achieved if government and other TVET stakeholders could provide adequate infrastructure and training of teachers on its usage

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INVOLVING STAKEHOLDERS IN BLENDED LEARNING: OPPORTUNITY TO SCALE NEW PRACTICES IN HIGHER EDUCATION

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Abstract

The objectives of blended learning at a global stage and Nigeria in particular are yet to be achieved due to perceived attack one way or the other. Indeed, such attack has put educators on their toes to search for probable solutions to classroom and online training format called blended learning which is recently described as the best way to train learners. Some of the benefits to gain can be how learning blend would reduce costs and provide them with greater flexibility, while retaining the effectiveness achieved by convincing the learners of the usefulness of blending learning methodologies. It is expedient to consider the work environment and learning preferences of the target audiences when designing a learning approach. Use of Learning Management System (LMS) may be very useful in this circumstance as a tool to implement blended learning strategy. In other words, it was all asynchronously (accessed any time) without the real-time guidance of a teacher but the gap between methods used seems deficient without interaction between the two parties, that is, the teacher and learners. However, synchronous approach (as the teacher is teaching) may be a solution to the problem through online management systems. Therefore, this study strikes a balance between the problems at hand through some related research on ground. Recommendations made include adequate re-training of teachers in LMS-driven initiatives in education sector and sound policy environment which encourages educators and learners in LMS.

Keywords: Blended learning, asynchronously, synchronously, opportunity, attack, higher education, Nigeria

Introduction

Scholars like Wicks, (2015) have written about blended learning in recent years. As the term implies, it is a blend of two or more learning methods. According to Lothridge, (2013) it is a learning technique where a learner learns at least in part through delivery of content and instruction via digital and online media with some element of control over time, place, path, or pace. Blended learning brings the classroom and technology together to offer a better way of learning. At the same time, blended learning refers to the use of technology to complement classroom sessions and strengthen the teaching/learning process through practice and the application of concepts learned in the classroom. It is worthy of note that computer-mediated instruction is added to, or combined with, more personal face-to-face instruction. This allows learners to have more control over the learning situation, choosing the time and/or place (for example, home versus school); their path (what they learn); and their pace (the rate at which they absorb content) unlike a conventional classroom session which is conducted by an instructor using traditional instruments such as chalk and board.

The major advantage of blended instruction is to overcome the shortcomings of online instruction and utilize various instructional sequencing and delivery strategies to enhance learner satisfaction while achieving increased learning outcomes (Doo; Michael & Virginia, 2005). Blended learning, sometimes known as hybrid learning, is a teaching and learning model that has a face-to-face class combined with an online component. Blended learning can be complex in setting from easy-to-use to easy-to-prepare in free online filing systems to more sophisticated online or blended learning platforms that offer many exciting

features. These more sophisticated platforms require teacher and student time to learn to use them, and teacher time to find, select, upload, and store lessons or other learning resources (David& Carmine, 2014)

Blended learning can statistically be a situation where 30-79% describes blends online and face to-face delivery. Where a substantial proportion of the content of the course is delivered online and typically has some face-to-face meetings. There are lots of benefits that are embedded in the blended learning. Blended learning may be more effective for mature learners who are into higher education than only face-to-face learning or only online learning. In the analysis of Glenda (2014) data from the Texas Educating Adults Management System (TEAMS) show that adult learners who engage in blended learning outperform learners who only attend a traditional classroom, and learners who receive more than 50% of their contact hours at a distance. With blended learning in place, learning delivery is very quick and efficient in an online platform and an instructor delivers the learning materials and imparts teaching based on instructional content. Course materials can be accessed via online by merely using an electronic device connected to the Internet. These materials can equally be updated at will. Blended learning can be a combination of online instruction and face-to-face learning where students in remote locations can have face-to-face interactions with their facilitator through web conferences (digital classrooms).

Blended learning can be described as a comprehensive and complex situation that requires proper planning before implementation. It is all about introducing correct personalizing learning model that can match student, schools and societal needs. It is not all about having knowledge of using computer or acquiring skills, but competencies in applying it to blend. There are two important categories of blended learning, it can be rotation or flex model. Despite the fact that blended learning has grown in acceptability there are notable attacks within the region. Such as growing shortage of teachers coupled with cost and time savings, possible replacing of human resources with digital media, relying heavily on technology to deliver online learning experiences, reliability of digital tools and online assets, and frequent updating for meaningful impact. Technical difficulty experienced by technician can be a serious barrier in achieving desired result. Most importantly, this study shed light on opportunities and attack on the above learning practices in higher education. Adults are the target audience to be considered because they are mature in mind to handle blended learning.

Without any gainsaying in this learning situation this question calls for answer. Leaders can either be a facilitator, instructors or teachers who are to lead learners through the materials. There a lot of complex topics that need expertise approach like the stakeholders mentioned above. They are to offer immediate in-depth explanations or opinion to immediate response to questions as they are asked. Self-paced training, on the other hand, is more of an individual pursuit and gives the learner control over when to move ahead in the material (Michael & Heather, 2014). Capacity competence of the leaders or stakeholders must be developed throughout the education system before blended learning can be practised successfully. The aspects of stakeholder's development are:

1. Facilitators: They are the key factors in the teaching learning process, it is important to develop them in the use of Information Communication and Technology. This will include professional development in blended learning skills and application, how to integrate blended learning into the curriculum, instructional design, educational theories supporting blended learning etc. These can be done through the training, workshops and in-service facilitator training programmes. If blended learning must be successful, then, plans must include cost of maintaining and keeping the equipment in usable state, sustainability in terms of technologies, political, social and economic dimensions of the blended learning integration. In case of technological sustainability, it has to do with choosing technology that can serve for a long time. While political sustainability deals with policy environment and management of the change process involved in integration. Social sustainability involves all the stakeholders

- (facilitators, students, parents, who use or are interested in the use of the technology must be considered.
2. Education Administrators: leaders determine the success of blended learning. Undermining attitude of the administrators will affect the blended learning process. In other words, administrators must be versatile in the use of blended learning, having broad understanding of administrative, curricular, technical, finance and social dimension of blended learning in education.
 3. Trained Technical Support: To sustain the blended learning programme requires technical support. These persons require competence in ICT installation, operation, maintenance and networking security. They can be hired or employed as members of staff. Sometimes there can be technical breakdown leading to loss of money and time.
 4. Content Developers: These are specialists in content development which include instructional designers, scriptwriters, audio and video production specialists, programmers, multimedia, course authors and web developers. Involvement of these stakeholders is very important in planning the curriculum in blended learning.

A learning Management System is a soft-ware based platform that facilitates the management, delivery, and measurement of educational organization of e-learning programs. LMS is a very useful tool to implement blended learning strategy because it can help to schedule the instructor-led training (ILT), conduct pre-classroom learning activities, facilitate learner collaboration, evaluate learners online and generate reports to analyze the learning.

Gains and Opportunities of using Blended learning

1. Flexibility: Blended learning provides room for maximum change in content presentation where complex topic can be interactively conducted in the classroom, while other ones can be set aside for online. Certainly, convenience about time and how it can be favourably done in online are factors to be considered so that learners can participate as expected.
2. Effectiveness: Garrison and Kanuka (2004) conclude that blended learning has the proven potential to enhance both the effectiveness and efficiency of meaningful learning experiences. With a well-planned blended learning strategy, instruction can be effectively and quickly deliver to a larger audience.
3. Efficiency: With digital assets such as videos and recordings and eBooks, the potential for re-use is huge. One can easily help more people get up-to-speed after the initial rounds of training have passed.
4. Cost-effectiveness: Most of the stakeholders like strategies that can save the organization money and blended learning is one of them. Including more online options in teaching and learning program saves on travel and missed work. When users are hosting live events online, one can eliminate employee and instructor travel costs. When the venue is the user's own desk, that's clearly a savings over large rooms.
5. Personalization: Any training that is not well implemented can create an isolating, cookie-cutter, impersonal learning experience. But the good news is that a well-crafted blended solution can provide a seamless transition from classroom to computer or vice-versa. You can design ways of continuing discussion themes and personalizing content to a person's specific job or interests.
6. Extended reach: Creating a blended learning strategy reduces classroom teaching time. By digitizing the expertise of talented instructors or subject-matter experts, one can reach more people with high-quality content at a fraction of the cost. That frees up knowledgeable instructors to offer more classes, or create more training content, or work on other things.

7. Coverage of all learning styles: It's always important to take learning styles into account when designing training for adults. Effective blended learning is "best of all worlds" solutions that can help one cater to all learning styles through a variety of mediums and techniques.

Horton (2000) proposes new practices such as online components that combine face-to-face and online elements for a certain course and familiarize students with face-to-face sessions, online courses defined by students in class and supported by the teachers for in-class presentations. Alotaibi (2013) opines that utilization of technology in physical classrooms offer extra resources for the students and this is expected to enhance learners' confidence and competence as well as improve the quality of learning.

Within this framework, it is an expected outcome that strategies and technologies employed in the blended learning environment positively contributed to students' critical thinking dispositions and levels (*Thorne, 2003*). Critical thinking is an opportunity derivable from the learning environment and also individuals' ability to think openly, independently and rationally. Indeed, individuals cannot improve their critical thinking levels on their own. Now, it is largely a responsibility of stakeholders to help individual acquire opportunity (critical thinking) (Lothridge, 2013).

Bonk and Graham (2006) analyzed students' opinions about blended learning environment and their findings proved that students have general positive opinions about blended learning environment. The result of the study also proved that high interaction between students and instructor exist in this type of environment. This study is in line with the *Garrison and Kanuka (2004)* which indicated high demand for face-to-face interaction in online learning. *Yushau (2006)* conducted a research study on the effects of blended-learning on Mathematics and Computer attitudes in Pre-calculus algebra and found that subjects have positive attitude towards Mathematics and Computer. *Young (2008)* also found significant effect of blended learning on students, outcomes but this study revealed no significant effect of blended learning on students' attitude towards science.

In another development, *Garrison, and Kanuka (2004)* studied the effects of traditional, blended and e-learning on students' achievement in higher education and explored positive effect of the three methods in terms of students' achievement favouring the blended-learning method. The result revealed that no significant difference was found between the e-learning and traditional learning groups in terms of students' achievement. *Wicks (2015)* studied the effect of a blended e-learning environment on students' achievement and attitude towards using e-learning in teaching and learning at the university level and found insignificant difference between the instructional treatments in gain scores of the achievement test. However, the results in the attitudes scale showed in favour of blended e-learning method. Blended learning model contributed more to the students' biology achievement than traditional teaching methods did and students' attitudes towards the internet (*Young, 2008*). *Alotaibi (2013)* taught the experimental group by using blended learning, while the control group and the control group in higher education. Blended-learning environments affect positively on students' achievement.

In all, researches carried out in this area showed that various studies have been conducted on blended learning, and the results of these studies showed that the new practice was positively effective in general classrooms. Thus, the objective of the study is to determine the opportunity embedded in blended learning in higher education. As laudable as this subject matter is there are still some challenges that are facing the smooth running of the blended learning. Economic dimension involves the cost of acquiring and maintaining the acquired technology. Inability of facilitators to flow with the purpose of the use of ICT in blended learning is an attack. However, facilitator should be developed more on the use of ICT tools in blended learning rather than on teaching tools.

Conclusion

Blended learning tools when innovatively applied in higher education are very strategic in achieving the opportunity to scale new practice in achieving the goals of higher education which include reaching every individual with educational information so as to change negative learning attitudes and practices and wellbeing of individuals and stakeholders. Blended learning provides opportunities for many who are constrained by time and distance to acquire training and be certified in higher education through distance learning. Internet web sites and apps have been successfully applied in making higher education easily accessible to all learner.

Recommendation

Based on the study, the following recommendations are made;

1. Training should be conducted for all the stakeholders on the skills required for blended learning for effective integration in the higher institution.
2. Applications should be created and made available for students in their mobile device as well as android instead of laptops.
3. There should be effective communication of training skills and independent learning skills for the facilitators and students so as to be able to face any challenges posed by practices and strategy.
4. Tertiary institutions should provide free wifi for students to be used for academic purposes.
5. The authority of higher institutions should restructure their instructional delivery technology to take into consideration individuals and group needs of the students in order to make the programme less cumbersome.
6. Learners should be assigned training on an individual basis or according to their learning skills or styles.
7. Adequate re-training of teachers in LMS-driven initiatives in education sector as well as sound policy environment which encourages educators and learners in LMS should be made available.

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