

INTEGRATION OF LEARNING TECHNOLOGY IN SIERRA LEONE'S HIGHER EDUCATION SYSTEM: IMPLICATIONS AND CHALLENGES

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Abstract: This article examined the scope and relevance of integrating technology in Sierra Leone's higher education systems. It discusses the general scope of technology provision in HEIs across the country, and the effectiveness of the National ICT Policy in enabling effective delivery of targets like the Vision 2025 Plan to be achieved. The article also considers the implications of technology integration, more so for national delivery of effective pedagogic engagement and constraints faced by institutions in being effective at making the relevant impact to their stakeholders. The article concludes that integration of technology is an essential element for the effective delivery of flexible technology-mediated curriculum to students across the country, with the capacity for tutors / lecturers to identify differentiated teaching resources to cater for the variety of students' learning needs.

Keywords: Higher Education Institutions (HEIs); Sierra Leone; Learning Technology; Integration

Introduction

Sierra Leone, and more so after a decade of civil war which ended in 2001, have seen an expansion in higher education provision; this now incorporates both state and privately funded institutions under the provision / guidance of the 'Tertiary Education Commission (TEC)' as mandated by the government (Jackson, 2015a). The openness of higher education provision, particularly across all the different regions in the country is now making it possible for intended aspirants to develop the will power / determination to further their studies as a way of enhancing their prospects for job opportunities upon graduation.

The education system in Sierra Leone, particularly the three established universities (University of Sierra Leone, Njala University and University of Makeni [UNIMAK]) in the current 21st century is still predominated by the old style didactic method of teaching and learning. This means that students' chances of being able to access higher education services, for example, remote and flexible teaching and learning materials is very limited as a result of the limited provision by individual institutions. While universities within the British West African colonies (Ghana and Nigeria) are making advances in forging teaching and learning through the provision of modern / remote learning technologies (Sarfo and Yidana, 2016; Ajadi et al, 2008), the situation in Sierra Leone is still no way near in terms of enabling learners to expand their learning opportunities through flexibility in their learning opportunities.

Even though higher education institutions are making relevant strides in implementing ICT strategy for student access, the system is still based on the old didactic approach, whereby lecturers are recycling notes [legacy] created years back, without experiencing the impact of dynamism in the global education system; this in many parts of the world, and more so in most of the West African English speaking states is based on the concept of '*blended learning*' approach. The emergence of ICT, and more recently flexible learning resources and platforms (e.g., MOODLE) has made it very much possible for a mix of learning style to be made possible; this is based on the concept of blended learning (University of the Free State, n/d: 5; Jackson, 2015b), an approach incorporating variety of learning approaches, for example, face-to-face / didactic learning and the use of ICT to enhance learning opportunities for learners.

Upheavals experienced by the country in the early 1990s to 2002 (a decade of civil crisis) witnessed infrastructural damages in the entire fabrics of the Sierra Leone economy, and which resulted in a standstill in the entire education system, with some HEIs (Njala University college then) having to relocate as a result of the destruction caused to teaching and learning resources (Jackson, 2016a). At a time when the country was experiencing an upturn in its economic performance, then erupted the deadly Ebola virus which also ruptured the entire education system to a standstill (2016c), and thereby leaving the government cash-strapped in terms of making real technological investment in HEIs to enable them to compete in the global market in the 21st century education.

A Review of the Role of ICT in Higher Education

The advent of flexible learning technologies is making it possible for Higher Education Institutions (HEIs) across the world to adopt flexible blended learning to improve learning opportunities of students (University of the Free State, n/d: 5; Gunga and Ricketts, 2006; Jackson, 2016b). For countries, particularly developed economies like the UK, USA, Australia and the newly industrialised Asian economies with integrated access provision for students to experience flexible learning, students are able to access greater opportunities in improving their grades and leaning opportunities / skills (Cutrell et al, 2015 and Jackson, 2015b).

Research conducted by Massy & Zemsky (1996), also in Antonacci (2002, p. iii) have highlighted the strength of integrating technology into HEIs as an improvement to academic productivity, particularly in terms of economic productivity / economies of scale, whereby an increase in present investment has the potential of enhancing students' output and an increase potential of higher quality / calibre of student recruitment. This is seen as both in terms of students' individual productivity in learning, and also flexibility in teaching and learning styles through distance learning provision available via dedicated learning platforms like

MOODLE and MOOC (Antonacci, *ibid.*, and Jackson, 2015b). Scholars such as Twigg (2000) have argued in connection with cost implication of integrating technology at higher education level, but eventually allude to the fact that the overall gains are more in relation to a shift from focus on teaching and more in the enhancement of students' learning potential in accessing variety of learning opportunities (which incorporate blended and distance learning). As opposed to a more didactic / traditional classroom instruction setting where instruction is content based on a subject matter, Star (2001) according to Antonacci (2002: 13) proposes an alternative model in a situation whereby technology is used for content delivery prior to classroom / face-to-face teaching situation; this has the advantage of allowing more classroom time for processing of information as learners would have digested contents prior to classroom delivery, thereby giving more opportunity for discussion and classroom engagement.

All around the world digital technology is making its way in education, and more so in the new emerging economies in the Far East of Asia (China and India), where demand for higher education provision is on the increase as a result of adult learners seeking to engage in full time work and studies to increase their economic prospects (European Commission, 2014). Online technology is making it possible for learning (which used to confine to a specified location) to be accessed anywhere, and at any point in time with accessibility of technology devices like Laptops, Tablets and even mobile phones (Jackson, 2016b). As emphasised in the European Commission (2014: 10) report, technology integration into HEIs has created an opportunity for increased global diversity, and also '*enhanced collaboration between tutors and learners, and also improved tutor-tutor relationship through resource sharing*' (Jackson, 2015b).

Europe's effort has been geared towards encouraging HEIs to widen their curriculum provision through freely available resources like MOOC as a way of encouraging greater scope for lifelong learning, particularly for those who may see the need to engage themselves in continuous professional development and up-skilling (European Commission, 2014). Given the conservative approach of educational provision in western developed nations, more so in European nations, there has been a recognition of challenges faced, and hence the call for government policy and intervention to support and nurture culture change in meeting the 21st century demand for flexible education (European Commission, 2014: 11); such challenges may include doubts from traditional providers about quality of provision, but with greater intervention, there is a high scope for enhanced form of personalised learning and retention of students. Such integration has brought about high ramifications for pedagogical change through blended learning, incorporating technology-style learning with traditional classroom approach (Cutrell et al, 2015; Oliver, 2002).

As outlined by Bhasin (2012: 137), integration of digital classroom / technology in education (more so HEIs), requires highly skilled trained teachers / tutors, who nowadays are seen as facilitators of learning, rather than being the sole provider of knowledge; a summarised expression as a '*sage on the stage*', to being a '*guide by the side*'. The introduction of such technology facilities like MOOC and other freely open-source platforms like MOODLE is making it possible for teachers / tutors to perform such facilitating role, without much of the physical interaction with students as used to be the case without technology medium. According to Bhasin (2002: *ibid*). UNDP statistics in 2001 indicated that almost 80% of tutors / teachers were not well prepared to use technology in meeting the growing demand for technology integration in the pedagogy of teaching and learning in the current Information Age. As highlighted in some of the outcomes from Jackson's (2015b) study, and also as expressed by Bhasin (2012: *ibid*), professional development through '*pre-service and in-service training*' are strongly recommended strategies to support full integration of technology in the learning process of HEIs.

The integration of technology in HEIs in many parts of Africa, as demonstrated by Sife et al (2007) in Tanzanian universities is very low despite opportunities available for open-source technologies, and as stated, the conducive environment provided by the government through the enactment in 2003 of the "National ICT policy and the Tanzania Communications Regulatory Authority Act (URT 2003). As typical of many developing nations, and in particular many Sub-Saharan African nations, there are obvious challenges which includes "lack of administrative support, more so in financing the continuity of ICT implementation, inadequate technical support to meet the demand of installing systems, and difficulty associated with the transformational process of HEIs in the African regions; based on Ehrmann (1995), there seemed have been a driven focus on just the installation of ICT into HEIs as opposed to their being a focus in integrating ICT pedagogical rational and focus, particularly that which is geared towards the enhancement of learning through supported enhanced learning technologies.

The focus on technology literacy can also be seen as the need for integrating all forms of [easy means] technology into HEIs pedagogy around the world; historical definition of technology literacy based on Georgina and Olson (2008) originated from the U.S. Department of Education (1996, par.1), is stated thus: "*computer skills and the ability to use computers and other technology to improve learning, productivity, and performance—[technology literacy] has become as fundamental to a person's ability to navigate through society as traditional skills like reading, writing, and arithmetic*". Typical of HEIs in the current Information Age, which as dictated by high level of competition amongst institutions, Shackelford, Brown, and Warner (2004: 7) noted that technological literacy should provide an individual with the capacity to "design, develop, control, use and assess technological systems and processes". In this context, institutions should be able to provide the necessary means

(learning platforms such as MOODLE and MOOC) through which pedagogical engagement can be facilitated to enhance the learning experiences of students / learners irrespective of where they may find themselves.

The central tenet of the need for technology integration in HEIs is to enhance students' learning experiences, which is mostly encouraged through blended approach; that which is supported by the use of flexible learning technology (e.g., MOOC), and backed by the application of variety of Wifi connected gadgets like PDAs, Laptops and Tablets (Jackson, 2016b; Sarfo and Yidana, 2016). Online survey conducted in the US to ascertain the future of online teaching and learning in higher education shows that institutions are really embracing online education, with the number of students enrolling in colleges and universities rising rapidly (Kim and Bonk, 2006). It is seen from the outcome of this survey that many states and institutions around the US are developing strategies to allow the smooth integration of flexible means of technology supported learning, and most importantly eradicating the myth associated with the difficulties of using relevant technologies as a means of pedagogical engagement, that is the enhancement of teaching and learning experiences for learners irrespective of location.

National ICT Policy / Strategy in Sierra Leone

Prior to 2006, there was a non-existence of ICT Policy in Sierra Leone, which is seen as the backbone of a country's driver of heading towards the digital economy. The national ICT policy document which started in 2006 and completed in 2007 is a starting point in the way forward in recognising the importance of technology, particularly in the educational development of Sierra Leone, but its remit is rather restrictive and too general to enable due cognisance and importance to HEIs provision in the country (Ministry of Information and Communications, 2009).

The implication of a national ICT Policy / Strategy can serve its purpose in facilitating the way forward in the achievements of socio-economic objectives. The Sierra Leone government has been instrumental in working with countless stakeholders within the country, more so higher education institutions, and backed by the support of its link with regional institutions like the Economic Community of West African States (ECOWAS), a 15-Member States institution that assembled in Ouagadougou on the 19th January 2007 to formulate ICT policy under the Supplementary Act A/SA1/01/07 entitled the '*Harmonization of Policies and of the Regulatory Framework for Information and Communication Technologies (ICT)*' (Ministry of Information and Communications [MIC], 2009). According to an excerpt from MIC (2009: 12-13), the establishment of a national ICT specific policy use in Sierra Leone is based on three key objectives as outlined below:

Political objectives of the ICT policy

- To enhance better transparency and facilitate communication with citizens through E-governance;
- To integrate Sierra Leone regionally and globally through the use of ICTs;
- To re-brand the image of Sierra Leone by providing information on progress and achievements in Sierra Leone and to promote the distribution of culturally sensitive materials through various ICT channels;
- To comply with the provisions of ECOWAS and the World Trade Organisation (WTO) General Agreement on Trade and Services.

Economic objectives of the ICT policy

- To improve efficiency in the public sector through effective use of ICT infrastructure, applications and services;
- To enhance competitiveness in the private sector; To enable global economic integration;
- To create new opportunities for Sierra Leoneans to become ICT citizens equipped to take advantage of a knowledge-based economy;
- To encourage the transition of the informal market to the formal market through ICT tools;
- To promote and support indigenous and foreign entrepreneurship in Sierra Leone;
- To enable growth in key areas such as Agriculture, Tourism, Mineral Resources, and Infrastructure development.

Social objectives of the ICT policy

- To improve the basic living standard of Sierra Leoneans;
- To facilitate and support the universal freedom of affordable access to information;
- To identify and implement all relevant procedures related to cyber security, electronic security and data protection to protect ICT users;
- To improve the education system through e-learning;
- To provide better assistance in the health sector through e-medicine;
- To promote and sustain the national culture and tradition through e-learning and local content application/software development;
- To reduce poverty by improving free flow of business opportunity based information to underprivileged areas and facilitating the growth of small businesses through innovative solutions;
- To engage the Diaspora in the development of Sierra Leone through e-interaction; To use ICT tools to bridge the illiteracy divide;
- To subsidise access for high-speed Internet subscribers in schools and national education institutions.

Such policy objectives as outlined above has emanated from the bitter experience of a decade of civil crisis which ruptured the country's economic fabrics and infrastructural base. Nevertheless, concerted efforts made by the government (more so MIC) in engaging different stakeholders across the country is a step in the right direction in enabling ICT usage to be set

as priority in leading the country to a sustained level of growth through easy engagement with its global partners.

Access to the Internet is a key driver in enabling the National ICT Policy to be adequately realised, and which has proved problematic in enabling some of the above outlined objectives to be achieved. The country is still struggling in keeping pace with the rest of the world in its delivery of ICT, particularly in the areas of e-commerce and education services at all levels (Mangesi, 2007). Indeed, tremendous efforts have been made in introducing ICT in the national curriculum, particularly at secondary school level, and more importantly as a degree course in some of the HEIs in the country. The low bandwidth coverage and high costs of service provision is making it quite impossible for ICT provision to be effectively realised in the country.

Encapsulated in the National ICT Policy is the Vision 2025 for Sierra Leone, which recognised the importance of technology as an important element for the sustained development of the country as a whole. With reference to Section 6 of the document the Vision 2025 Plan, MIC (2009: 14) in its preparation of the National ICT Policy noted the relevance attached to *technology* with the following key objectives:

- *Encourage and improve the teaching of science and technology at all levels of education;*
- *Improve science and technology to increase productivity in all sectors of the economy, including the informal sector; and*
- *Improve the use of science and technology to facilitate decision-making at all levels of society.*

There is willingness on the part of people to be engaged in up-skulking themselves in mastering ICT usage and application in different areas of professional like, but the lack of logistic / financial support is rendering such a vision impossible. The country is lagging behind the rest of the world in its provision of ICT services at national level; this is very well pronounced in providers' inadequate capacity to manage and deliver continuity of service provision to its customers / users, particularly in the area of e-commerce and education in enabling effective technology pedagogic engagement to facilitate flexible teaching and learning in the current Information Age.

Even with the National ICT Policy and its supported Vision 2025 Plan in encouraging effective teaching of technology at all levels, institutions (schools, colleges and universities) are ill-equipped in ensuring learners are well prepared to enjoy the benefit of technology-mediated learning that encourages choice(s) towards flexible learning spearheaded by the incorporation of differentiated teaching methods. Educational institutions are inadequately prepared due to lack of logistic support to facilitate the continued and sustained delivery of the country's technology Vision 2025 Plan; there is no evidence of relevant infrastructural

capacities present in educational establishments to ascertain readiness, with the exception of few departments (in institutions like IPAM and Njala University) where ICT is reserved for the teaching of specific technology related courses. While instructors (particularly those with specialised qualifications in technology / ICT) are keen to do the job, while the relevant tools to support their actions are non-existent, which in effect is rendering their skills redundant / outdated (Mangesi, 2007).

21st Century Higher Education Experience of Learning Technology Usage in Sierra Leone

HEIs in Sierra Leone are still behind in terms of integrating ICT to promote flexible teaching and learning (DFID, 2014). The three established universities have all made their presence through the creation of a website, but not necessarily integrated with enhanced technology facility for students to experience flexible learning opportunities. The newest of the established universities University of Makeni (UNIMAK) have some means of integrated learning facility, but only limits to the embedding of relevant course materials like course outline for students to plan ahead of the academic calendar. There are also other relevant materials like links to (journal and other) publication materials produced by teaching staff members. Given the limited funding capacity of the university (only privately funded from donations and students Fees), the administration must be commended for making some good strides in the direction of improving the pedagogical experienced of learners.

On the same token, Njala University which became autonomous from the university of Sierra Leone in 2005 is also making a head way in terms of its thoughts about enrolling a dedicated learning platform (MOODLE) to improve flexible learning for students. Currently, the appointment of a dedicated Director of ICT is making it possible for relevant course materials to be embedded on the university's website, but limited in terms of its capability to be used flexibly for students to be able to interact collaboratively with tutors / lecturers in producing and submitting online learning materials. In order for collaboration to be facilitated, given the fact that the university hosts campuses across the country, it is very vital that a dedicated flexible platform is rolled out in the immediate future. The university has great potential of attracting good level of quality students given the fact that relevant courses are developed to cater for the market needs of professionals.

The University of Sierra Leone being the oldest HEI in the country has three major institutions, namely Fourah Bay College (FBC), Institute of Public Administration and Management (IPAM) and the College of Medicine and Allied Health Sciences (COHMAS). Currently, the university hosts a single website and from which the three institutions are linked with essential resources. The website lacked integrated facilities to allow integrated learning resources for the enhancement of flexible learning in the 21st century. IPAM as a dedicated ICT-based delivery institution has some capacity to support students learning

through flexible provision, but this is also restricted as financial resources required to forge such progress is restricted. There is still a long way to go, particularly for constituent institutions to keep pace with the integration of technology in their curriculum provision, which in a similar not as already mentioned, is due to lack of adequate financial resources to create relevant investments to support the delivery of technology mediated facilities.

Implications of Learning Technology Usage and Challenges

The integration of learning technology in HEIs provision in Sierra Leone as already addressed in earlier sections is the way forward, not only for students in the country, but also as a way forward in improving the learning experiences of students, particularly through the availability of collaborative features with both students and tutors. Learning technology, be it MOODLE or MOOC comes with great benefits to institutions and stakeholders like students, who may from time to time be required to complete work within specified period of time. The added benefit of integrating learning technology into HEIs provision is access through variety of flexible and blended learning resources, and more so the added benefit of students working at flexible pace with the support of differentiated materials relevant in meeting their learning needs.

Sierra Leone needs to catch up with its regional counterparts in the delivery of a 21st century technology style learning as opposed to the current high dependence on didactic / face-to-face delivery of courses. Research evidence around the world have shown that a well-supported flexible style learning resource such as MOOC or MOODLE has the advantage of increasing students' independence and scope for access to variety of learning materials (Attwell and Hughesm, 2010; Bingimlas, n/d).

There has been a call to support the initiatives of Open and Distance Learning (ODL) in Sierra Leone through the following outlined government directives (Alghali et al, 2005):

- *Training of teachers and other education personnel through distance education:* this is a rather brilliant initiative, in which it is expected that ODL training will halve the number of unqualified teachers in schools across the country. As part of this initiative, the extra-mural department at FBC, University of Sierra Leone is to establish partnership with the Legon University in Ghana to develop distance learning course in Youth diploma. Similarly, the MA course in Educational Administration is expected to benefit too as course participants would gainfully engage in a 12-month ODL course.
- *Training of educational administrators in distance education:* this is considered a step forward too, with participants gaining from recognised masters courses and also postgraduate diploma in distance learning education.
- *Establishment of ODL Resource Centre:* a joint initiated venture between the Ministry of Education and Technology (MIST) and UNESCO. A brilliant venture with the benefit of

enduring great attention is paid to the development of relevant technology mediated courses with the support of expert link from HEIs in the country.

- *Setting up of FM radio station*: relevant to ensure information relating to ODL is broadcaster
- *Technology-mediated learning*: the remit of this is mostly confined to video training involving science courses.

Technology integration in HEIs' provision has the capacity to support mixture of both flexible blended-style type learning, with completely ODL provision in a bid to ensuring that the country move in the right direction as far as education is concerned in the current Information Age. Technology mediated learning in present age must not only be restricted to science and technology courses, but extended to incorporate courses in Humanities, Liberal Arts and the Social Sciences (Jackson, 2015b).

The integration of technology mediated learning has positive ramifications in developing both staff and students' capacity to be continuously engage in collaborative teaching and learning, particularly when the right type of learning technology is used. Choice as to which technology mediated learning tool is used to support the integration of technology in HEIs provision should be left with individual institutions; for example, whether MOOC (a more video style learning tool) or MOODLE (a collaborative learning platform), and in some cases both, is actually based on an institution's vision and capacity to take learning beyond the remit of the classroom environment, and much more so, in giving learners the choice to access variety of teaching and learning materials that suit their learning needs.

In the modern age, technology integration in HEIs provision, particularly in Sierra Leone comes with the benefit of synchronising students' performance and progress on a continuous basis (Jackson, 2016b). With this, students' attainment is more likely to be tracked through collaborative working partnership between personal tutors and individual course tutors / lecturers. Students can express their concerns about course delivery, and which invariably can also help delivery contents to be differentiated to address specific needs of learners. In a situation whereby course contents are soundly differentiated, and learners' progresses tracked (online marking with constructive feedback) on a continuous basis by tutors, the positive implications will obviously outweigh the negatives, which in developing economies are more likely to be the obvious cases of poor monitoring and inadequate review of implemented systems.

Challenges is an obvious concern when thinking about implementing technology mediated system in an institutional setting. In developing countries, particularly in a country like Sierra Leone, the challenges are enormous, considering the bitter experiences the country has witnessed in the past decade or two; the civil war which left the country in destruct of

infrastructural base to support the delivery of an effective technology-mediated system, and more lately the impact of the killer Ebola epidemic that left the country cash-strapped of delivering essential services like educating the future generation. The current systems' network support and cost, particularly for publicly funded educational institutions pose serious challenges, as HEIs are really not in the right state to set themselves in a competitive state of (flexible) educational provision when compared to their English-speaking West African counterparts like Nigeria and Ghana. The lack of adequate funding provision from government is an obvious problem facing HEIs in Sierra Leone, in comparison to developed nations where funding is normal based on accessible use per students (Jackson, 2015b); the current lack of technology funding is making it quite impossible for HEIs to see the reality of meeting their dreams of implementing effective technology to support flexible teaching and learning (DFID, 2014).

The lack of basic ICT infrastructure and inadequate manpower skills is also a challenge facing HEIs in Sierra Leone. Computer-based courses are delivered in most HEIs in Sierra Leone, but the present state of systems seemed quite slow, and old to support current requirements to build an effective integrated technology provision for HEIs in the country. The major problem is attributed to the lack of adequate planning in terms of meeting current rise in students' population, and also assessing needs requirements to support effective teaching and learning (DFID, 2014). Institutions lack the necessary manpower skills-base to support continuity in ICT service provision; this in part may be attributed to the low investment capacity of the government in focusing attention to technology investment for educational institutions in the country.

Conclusion

The continuity of HEIs delivery of education in Sierra Leone is in no doubt dependent on the implementation of efficient technology based systems / platforms, expected to meet the needs of the 21st century flexible style education, with blended approach to teaching and learning. In other parts of the world there is sufficient to point to the fact about technology's impact in transforming education beyond the remit of the classroom environment (Jackson, 2015b and Star, 2001). With the deployment of a flexible-style technology based system (e.g., MOODLE), pedagogic experience will be limitless in terms of defining the location of learning; there is the capacity for high level of collaboration to take place between tutors and students, and with facilitation of learning fostered through the creation of differentiated style learning resources for students.

It is never too late to make a start, and so, appropriate steps / strategies must be set in place by government in the first place (to meet the country's vision for 2025), and in this case, through adequate investment to help address financial bottleneck, and also to the administration of individual HEIs, the introduction of an efficient strategic plan for the integration of

technology, in departments or units like the learning resource centre (LRC) to address resource requirements for all learners. The following recommended points will serve as a way forward in helping HEIs meet the requirements for technology implementation:

- Adoption of specific technology mediated platform to enhance flexible teaching and learning, while at the same time recognising the need for effective CPD to ensure teaching staff are fully equipped to address the needs of learners in the 21st century information age.
- The creation of access to basic computer facilities for students, with possibility of individual email account for all students serving as the initial base for collaboration between students and tutors / lecturers.
- Ensuring sufficient research is done by specialists to enable specific technology-based requirements to be set up by individual HEIs. This must take into consideration provision for increase in students' population and course provision so as to make it possible for efficiency to be established in a sustainable manner.

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