IJAAR PUBLISHING® DOI: 10.46654

International Journal of Research in Education and Sustainable Development | ISSN: **2782-7666**
Vol. 1, Issue 6 (June, 2021) | www.ijaar.org
Journal DOI: **10.46654/IJRESD**
Article DOI: **10.46654/IJRESD.1619**

ADOPTION AND IMPLEMENTATION OF ATUTOR OPEN-SOURCE LEARNING CONTENT MANAGEMENT SYSTEM IN IGBINEDION UNIVERSITY OKADA – NIGERIA

By

[1]Ivongbe, Matthew Ihaza (PhD)
Igbinedion University, Okada – Nigeria
Tel: +2347038586809
eMail: matthew.egbochie@iuokada.edu.ng

[2]Omorogbe, Harry Osasu
Igbinedion University, Okada – Nigeria
Tel: +2348037170685
eMail: omorogbe.harry@iuokada.edu.ng

[3]Ekhaguosa, Vincent Osamuyimen
Igbinedion University, Okada – Nigeria
Tel: +2347030122622
eMail: vekhaguosa@iuokada.edu.ng

ABSTRACT

This paper investigates the opportunities offered by the adoption of ATutor Open-Source LCMS for e-Learning and the challenges associated with implementing it at the Igbinedion University Okada with very poor ICT infrastructure and skilled personnel. The paper used the Distributed learning model which defines the instructional processes that allows instructor, students, and contents to be located in non-centralized locations so that instruction and learning can occur independent of time and place. The paper also reviewed the possible impact of these challenges on e-Learning Best Practices, Strategy, Policies, Initiatives and analysed the future of ICT and Education in higher education in Nigeria. The study also explored the conceptual and physical components of ATutor LCMS and how it complies with the AICC and SCORM specifications as well as the role of standards in enabling successful e-learning implementations. The research revealed that teacher professional development and change can only be understood by tracing innovations, changes and disruptions within the institution - both in terms of infrastructure and contemporary content development

KEYWORDS: eLearning, Educational Technology, Digital Bridge, Digital Divide, Leaning Content Management System, Education Portal, Open Source, ICT and Education

International Journal of Research in Education and Sustainable Development | ISSN: **2782-7666**
Vol. 1, Issue 6 (June, 2021) | www.ijaar.org
Journal DOI: **10.46654/IJRESD**
Article DOI: **10.46654/IJRESD.1619**

SECTION ONE:

INTRODUCTION

There is a growing concern over the integration of technology in education without consideration for the infrastructural provisioning which in earnest has resulted in all kinds and manners of orchestrated aspersions on the quality of teaching, learning and research activities in private universities in Nigeria. From what is evident today, the scenario appears a lot more different from what it was when this study was conducted. Underpinning this paper is the view that Nigeria must embrace eLearning, project its own developmental efforts in education and research through Open-Source Technology, but that Nigerians world-wide need to support this process if quality teaching and learning is to be achieved through the integration of ICT into Education.

The first section of this paper is introduction that portrays global challenge for eLearning that sets out the followings:

- The relevance of Information and Communication Technologies (ICT) in helping to address the problem of content development, pedagogic approach to teaching and learning and systemic design of instructional processes in schools.

- An overview of the Digital Education and Development (DEaD) Project at the Igbinedion University Okada, an applied and exploratory research project, which is directed at assisting the University with technology enabled environment anchored on Open-Source Applications to develop Learning Content Management System (LCMS) in the promotion of effective teaching, learning and research as well as Global eLearning Best Practices.

A model of Distributed Network System Analysis is used as framework to conceptualise eLearning in this study and three categories of conceptual paradigms are used to interpret and explore the findings of the Research Project.

The second section examines technical specifications for learning-technology standards on developing effective eLearning Practices that explores the findings from the exploratory DEaD Research Project at the Igbinedion University Okada where developing content modules, apply suitable pedagogic approach and deploying appropriate technology and system integration were used to boost teaching, learning and research.

In the third section, change management and consensus building were considered in harnessing the changing practices that were evident in the implementation of the Project at the Igbinedion University Okada.

The paper concludes that integration of Information and Communication Technology into education through development of Open Source-Learning Content Management System applications can no longer be regarded as a mere instructional tool used to aid teaching, learning and research in Universities, but to be viewed as a sort of pedagogic strategy, delivery engine and pathways available in ever increasing sophistication, as well as quantity to Universities whether it is located in the developed or developing nations of the world thereby, affording new and transformative models of educational developments that extend the nature and reach of teaching, learning and research. Such developments must be standardised, openly shared and evaluated by eLearning Practitioners world-wide if the

International Journal of Research in Education and Sustainable Development | ISSN: **2782-7666**
Vol. 1, Issue 6 (June, 2021) | www.ijaar.org
Journal DOI: **10.46654/IJRESD**
Article DOI: **10.46654/IJRESD.1619**

global commitment to achievement of the Education for All (EFA) targets is to become a reality in Nigeria.

THE DIGITAL EDUCATION AND DEVELOPMENT PROJECT (DEaD)

Project overview

The Digital Education and Development Project is an applied exploratory research project, focusing upon two research questions:

i. How does ICT transform content, pedagogy and system practice of instructional processes at the Igbinedion University Okada?

ii. What is the impact of ICT- driven instructional strategies on Students' achievement and Lecturers' ICT skill development and adoption for teaching, learning and research?

The project's aim was to contribute to the growing, but as yet relatively small number, of in-depth research studies that can be used to inform education managers, educational researchers and others interested in ways in which new forms of Open-Source Technology can be developed to promote and enhance eLearning in Private Universities in Nigeria using Igbinedion University Okada as a case study.

RESEARCH DESIGN

The study was aimed at capturing trends across the DEaD project as it evolved over time. The task was to document the processes through which participating Lecturers and Students were provided with an opportunity to familiarise themselves with the ATutor LCMS environment for teaching and learning and then to try and capture the essence of qualities of ICT use in promoting educational development as more and more of access to the Internet as well as infrastructural provisioning are made manifest at the Igbinedion University Okada. Distributed Network Theory provided a strong underpinning to the conceptual framework of the research design and to the nature of the ICT integration into Education. Two key principles were elaborated in the project in order to help understand and document the experiences of teachers, students and eLearning Best Practices in the use of unfamiliar technologies for the first time (see Leach, 2005, p. 27):

TEACHING AND LEARNING WITHIN THE PROJECT

Research outcomes have shown in the past that the ways in which teachers use ICT within educational Communities, have a far greater effect on learning than physical access. In conceptualising the ICT that would be integral to the Project, the researcher was guided by a new form of activity and knowledge management - '*content', 'pedagogy'* and '*system*'. The project took a broad view of eLearning, encompassing more traditional teaching methods such as formal classroom *talk and chalk* form of teaching and learning in line with the definition used by the ICT4D 2003 platform at the Geneva Summit (Weigel and Waldburger, 2004)[v]. No primacy is assigned to any particular technology; use of ATutor LCMS within the project is considered first and foremost with respect to its capacity to support two inter-related pedagogic purposes:

1. The development of content and
2. The improvement of teaching-learning outcomes.

Whilst Management of Igbinedion University was primarily concerned with the provision of

Journal DOI: **10.46654/IJRESD**
Article DOI: **10.46654/IJRESD.1619**

the enabling environment in terms of, 'What infrastructures are needed? The project took off with a broad view of translating teacher knowledge and student learning within the framework of an automated web-based Virtual Learning Environment, aimed at helping to promote eLearning Best Practices in the University

SECTION TWO
TECHNICAL SPECIFICATIONSFOR LEARNING-TECHNOLOGY STANDARDS

BACKGROUND.

Online learning process promotes competences, skills and knowledge associated with a selected study object without involving space and time limitations as befits in-class training. Content Management System refers to the platforms for on-line learning that provide a framework for educational development being, a software application which makes possible contents administration by participants.

Documentation and knowledge on the web have improved and there has been exponential growth from the nineties, when static sites showed an equivalent information on every user request to dynamic pages which give interactive experience by responding to different conditions. The complexity of systems and services for information management supporting has produced within the 2000 decades an evolution in methods and techniques for administration. During this respect there has been a unification among several platforms. So currently global solutions which give the entire information management process are easily found.

Web Content Management System (WCMS) is consistent with Miller & David (2002) centered in web environment and its main goal is directed to supply digital information, especially to portals and corporative webs. Under the term CMS, different applications and platforms appear with several provisions and objectives focused on various sorts of users bearing in mind e-learning platforms and specifically Virtual Learning Environment. Technologically, American authors establish a distinction between Content Management System and Learning Management System, being the last one centered on software to manage corporate training programmes. Otherwise VLE term in Europe is taken into account as a subcomponent of the broader systems which support the larger infrastructure of data systems in a corporation. Additionally, the term Learning Content Management System (LCMS) appears as a software which employs web-based, self-contained and re-usable resources to support learning. Aside from this, LMS is usually wont to ask both an LMS and an LCMS

VLE CONTEXT, SCORM, IMS AND HACP STANDARDS.

E-learning platforms structure solutions to supply on-line contents and interactive tools like chats, forums, tasks, question papers and tests for evaluation, by means of which students can develop some actions as is that the role of an in-class learning process. consistent with Pierre DILLENBOURG from University of Geneva, there are some aspects to be achieved so as to talk about Virtual Learning Environment, such as: Information for educational interactions, produced by several authors, with an information maintaining, an area for the scholar to socialize where they're not only receivers but also information transmitters. A kind of heterogeneous technologies and multiple pedagogical approaches which integrates various applications. Roxanne HILTZ, a Distinguished Professor within the New Jersey Institute of

Journal DOI: **10.46654/IJRESD**
Article DOI: **10.46654/IJRESD.1619**

Technology of Newark, defines "The Virtual Classroom software as a teaching and learning environment located within a computer-mediated communication system that have new features virtual learning spaces during a single or integrated platform.

Actually, most E-learning platforms follow a classic scheme class transferred to web environment, rather than virtual proactive learning, being contents adapted to digital resources. This way, teaching material is convenient to be packed in SCORM, IMS format or HACP (HTTP-based AICC/CMI Protocol), a group of standards designed for web-based e-learning. Since e-learning beginnings, an excellent sort of platforms was developed and an enormous quantity of contents were produced using software designed for that aim. Thanks to this wide selection of platforms, problematic situations appeared when organisations:

i. Tried to vary their platforms, so it had been necessary to rebuild or unless to adapt contents.
ii. Needed to interchange information with other organization which had a special platform.
iii. or simply the compatibility aspect for the answer to be sold.

Accordingly, the Advanced Distributed Learning (ADL) initiative from the US Secretary of Defense developed SCORM (Sharable Content Object Reference Model) as a world Standard with open and free specifications. Thus, SCORM defines how content could also be packaged into a zipper file, so contents fulfill SCORM conditions if they are:

- Designed for an internet browser.
- Given a meta data description
- Structurally arranged as a group of smaller objects.
- Imported and packed from every compatible SCORM platform.
- Portable and may be hosted in Web Server in available Operating Systems.

Moreover, SCORM establishes how client-side content communicates with a number system and run-time environment which defines a uniform information interchange and compatible with Internet technologies. With this aim a JavaScript API (Application Program Interface) has been specified for providing a general manner to speak a user with a Learning Management System when it:

- A SCORM platform wholly fulfills a SCORM specification model.
- Accepts any SCORM content and is out there for being showed the platform users.
- Is provided by a run time environment where contents are showed by an internet browser.
- Run time environment keeps accessibility, adaptability, durability, interoperability and reusability as certain technical requirements.

SCORM Standard also uses XML (Extensible Markup Language) standard to permit defining grammar in specific languages. Additionally, it's convenient for Virtual Language Environments to watch IMS regulations. IMS may be a specification designed to support the utilization of pedagogies in online learning. It tries to do this by providing a generic language. This language is meant to enable many various pedagogies to be expressed. Besides the Aviation Industry CBT (Computer-Based Training) Committee (AICC), HACP standard is usually employed by Learning Management Systems and other systems to use content or evaluations. It's said to be robust although a pre-XML standard and thought of safer than SCORM.

International Journal of Research in Education and Sustainable Development | ISSN: **2782-7666**
Vol. 1, Issue 6 (June, 2021) | www.ijaar.org
Journal DOI: **10.46654/IJRESD**
Article DOI: **10.46654/IJRESD.1619**

CONCEPTUAL E-LEARNING COMPONENTS

Learning Objects—The Conceptual Building Blocks of E-Learning

A learning object (LO) is that the smallest chunk of content which will stand by itself as a meaningful unit of learning. The precise size of an LO can vary, but it's considered best practice for one LO to map onto one learning objective or concept. Each LO should be self-contained but independent of context; that's, it shouldn't depend on the other piece of learning content to be complete. This suggests that every LO are often shared by and reused in multiple lessons or courses. Although this sounds as if LOs must be quite small and focused, their actual size and scope is left to their authors and sometimes reflects practical instead of ideal considerations. It important to notice, however, that whatever its size, an LO is that the smallest unit of learning which will be automatically managed and tracked.

LOs are often considered the building blocks of e-learning content. They will be wont to construct any desired sort of learning experience. LOs are often com- pared with LEGO® blocks. As long as all of them conform to an equivalent or compatible standards, you'll use them in any combination, and that they will fit together seamlessly. Therefore, LOs are often assembled to make larger chunks of learning content like topics, lessons, or complete courses. Without standardization, however, there's no guarantee of a usable combination (See Figure 1.1.)

Content Structures

As we've seen, LOs are often considered the building blocks of e-learning content. Building blocks, however, aren't particularly useful unless they're utilized in larger structures. During this section we'll see how content structures supported LOs are represented within the main standards. Most learning content, no matter how it's delivered, uses some kind of hierarchical data structure. A course could also be divided into lessons, for instance, and a lesson into topics. There are many possible ways to construct courses. A serious requirement for e-learning specifications is to supply an easy but flexible method for representing a good sort of content structures.

Curricular Taxonomies

A curricular taxonomy may be a fancy term for an outlined set of named hierarchical learning levels. A curricular taxonomy may have just one or two levels, like Course > Lesson, or it's going to contain many levels, like those shown in Table 1.1.

Formally defined curricular taxonomy models like these are probably the exception instead of the rule. During a more typical scenario, the taxonomy would evolve during development to suit the wants of every course.

International Journal of Research in Education and Sustainable Development | ISSN: **2782-7666**
Vol. 1, Issue 6 (June, 2021) | www.ijaar.org
Journal DOI: **10.46654/IJRESD**
Article DOI: **10.46654/IJRESD.1619**

Table1.1

Examples of Curricular Taxonomy Models

Army	**Air Force**	**Marine Corps**	**Canadian**
Course	Course	Course	Course
Module	Block	Phase	Performance
Lesson	Module	Sub Course(annex)	Enabling objective
Learning objective	Lesson	Lesson	Teaching point
Learning step	Learning	Task Learning Learning step	

Adapted from: Advanced Distributed Learning Initiative, Sharable Content Object Reference Model (SCORM) version 1.2, *The SCORM Content Aggregation Model*, October 2001, Table 2.3.2.2a.

The higher levels of the taxonomy could be named, whereas lower levels are only implied within the structure of the content. The standards groups have developed simple, expandable content hierarchy models. These models are neutral in terms of content complexity, number of taxonomic levels, and instructional approach. Standards exist for 2 different models that describe the way during which courses are constructed from LOs. One model forms a part of the Sharable Content Object Reference Model (SCORM) developed by the Advanced Distributed Learning Initiative (ADL). The opposite model was developed by the Aviation Industry CBT Committee (AICC). We'll have far more to mention about these organizations and their specification within the course of this book. However, for now we'll simply introduce the 2 content structure models.

The SCORM Content Hierarchy

The SCORM content hierarchy includes three sorts of components:

- Content aggregation — a gaggle of learning resources which will stand by itself. Course-level content always constitutes a content aggregation. Lower-level blocks of content could also be treated as content aggregations if they're sufficiently independent to be used outside the context during which they were developed.

- Sharable Content Object (SCO): The SCORM's LO. This is often the extent at which the learner interacts directly with the training content and at which the LMS tracks the results.
- Asset: A little, single-purpose learning resource that would be utilized in multiple contexts. Assets aren't tracked by the LMS. They're normally "called" by SCOs, although it's allowable for them to be launched directly by an LMS. Assets typically contain media like graphics, sounds, and films, although there's no restriction on what they will contain.

You may have noticed that these three components don't cover all the territory necessary to completely represent most content structures. There's no provision for blocks of content that

International Journal of Research in Education and Sustainable Development | ISSN: **2782-7666**
Vol. 1, Issue 6 (June, 2021) | www.ijaar.org
Journal DOI: **10.46654/IJRESD**
Article DOI: **10.46654/IJRESD.1619**

aren't designed to face alone. This obvious gap is handled within the manifest document that has got to be packaged with all content aggregations. This document describes the aggregation's components, structure, and special behaviors. It's going to also reference the meta-data related to the individual components of the aggregation.

The AICC Content Hierarchy

The AICC content hierarchy also has three components, as described below:

- **Course:** The highest level of the hierarchy. This is often the extent at which content is assigned to learners.
- **Instructional Block:** An optional intermediate grouping of smaller learning units. Instructional blocks are often nested inside each other to supply any number of levels. These levels are often mapped to a given curricular taxonomy.

- Assignable Unit (AU) vs the AICC's LO: The LO concept reached today's level of refinement after the AICC content hierarchy was developed. The specification often refers to AUs as lessons, which means a comparatively large chunk of content. However, by nesting AUs inside variety of instructional-block levels, the granularity of a typical LO are often reproduced.

LEARNING CONTENT MANAGEMENT SYSTEMS (LCMS)

The recent appearance of another genre of administrative systems referred to as learning content management systems (LCMS) on the e-learning scene has added an extra layer of confusion for purchasers of e-learning components. These systems are produced in anticipation of the wide-scale avail- ability of standards-conformant LOs. A natural result of the adoption of LO technology is that there'll be a way larger number of content pieces to affect. Table 1.2 contrasts a standard course structure against that of a course built from multiple LOs. LCMSs were born of the belief that more advanced content management, organization, and search capabilities would be required to handle LOs than exist during a typical LMS. LCMSs are designed to satisfy the subsequent requirements:

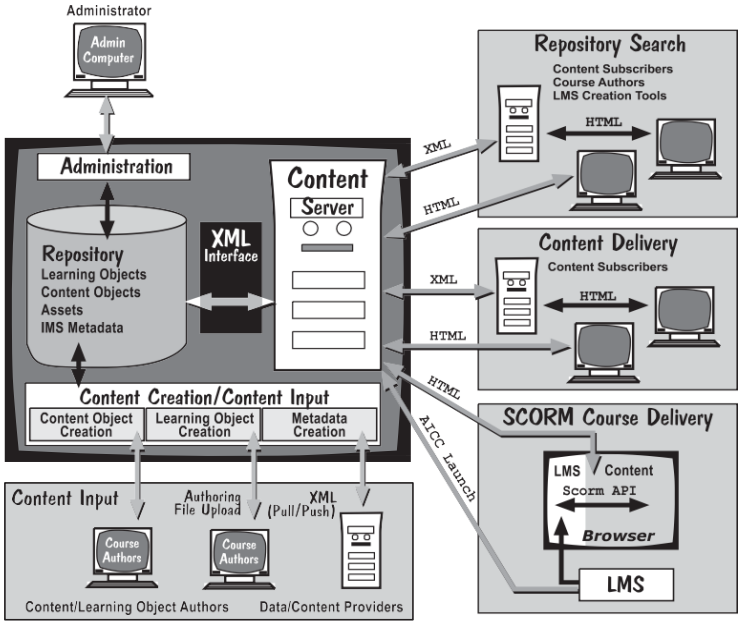
- Generate unique descriptions for every LO
- Discover (search for and locate) the specified LO
- Provide multiple hierarchies for storing and organizing LOs
- Facilitate the assembly of complex course structures

A typical LCMS includes the components outlined below:

- Authoring tools for producing content objects.
- Content tagging and assembly functions for creating LOs from lower-level content objects and for grouping LOs to make larger learning content structures like topics, lessons and courses.
- A content storing repository, LOs, content aggregations and structures.
- A delivery interface including functions for searching and organising LOs to supply individualized learning experiences.

Figure1.1 showing the architecture of a typical LCMS.

International Journal of Research in Education and Sustainable Development | ISSN: **2782-7666**
Vol. 1, Issue 6 (June, 2021) | www.ijaar.org
Journal DOI: **10.46654/IJRESD**
Article DOI: **10.46654/IJRESD.1619**



Sample LCMS architecture. (Adapted from Davies, D., Constructing Custom Courseware Factories, The Online Courseware Factory, unpublished marketing presentation, March 2002, slide 11.)

IMPORTANCE OF LCMS

Your requirement for an LCMS depends on how you plan to purchase and develop your e-learning content and how much content you will have to deal with. If you are taking an object-oriented approach by purchasing or developing many small LOs, then you will likely need an LCMS. However, at the time of writing, the availability of off-the-shelf Los is limited, and the design and production of context-independent reusable LOs offers a daunting challenge for an e-learning department. Overtime the availability of premade LOs and the expertise in producing them will increase. Also, more design and development tools to aid the novice developer will appear on the market. Perhaps the question is better phrased, "how soon will we need an LCMS?" In the short term, if you are planning to implement more traditional e-learning courses, use relatively few LOs, or be mainly concerned with learner administration and tracking,

Assessment Systems

Assessment systems are dedicated software systems wont to present assessments to learners and to grade the learner's responses. Generically, such software is named an assessment engine. An assessment engine has two main components, one for displaying the assessment items (questions) and therefore the other for processing the learner's responses (answers) to them. Testing of all kinds is often easily included in conventional LOs, of course. In fact, it's commonplace for a course to incorporate one or more test-only AUs or SCOs. So why might you would like a separate system? Assessment systems provide comprehensive sets of easy-to-use templates for question generation. They will even be wont to store and transport entire libraries of individual test questions, structured groups of questions, and complete tests. Generally speaking, assessment systems are useful for organizations that require to get large banks of assessment questions on a daily basis.

International Journal of Research in Education and Sustainable Development | ISSN: **2782-7666**
Vol. 1, Issue 6 (June, 2021) | www.ijaar.org
Journal DOI: **10.46654/IJRESD**
Article DOI: **10.46654/IJRESD.1619**

Development and Authoring Tools

Those getting to produce their own courseware in house got to consider purchasing one or more of the specialized development tools for authoring e-learning content. Generally, the sophistication and price of such tools will increase in direct proportion to the complexity of the e- learning content that they're capable of manufacturing. Incidentally, so will the training curve for achieving proficient in using the tools. Very simple content with low interactivity are often produced employing a internet site development tool like Microsoft FrontPage®. More specialized tools like Macromedia Authorware or Click2Learn Toolbook Instructor make it easier to supply content with a high level of interactivity once the developer is proficient with the tool. Chapter 9 offers an inventory of a number of the simplest standards-friendly authoring tools.

Collaboration Tools

Collaboration tools may be a term used to describe a gaggle of components that enable contact among groups of learners, between learners and school, or both. A number of these tools are wont to create the synchronous e-learning environments described earlier. Collaboration tools use Internet technologies for communication in environments like chat rooms and video conferences. A standard paradigm is that the Webcast, or online presentation during which a speaker presents to a distributed audience who view a series of slides or an electronic white- board displayed on their own computers, with a voice-over via an online connection. Learners are ready to ask questions by typing a text message to the presenter or to talk among themselves during a separate window. Some LMSs offer built-in collaboration tools. Although at the time of writing there's work being done on standards for collaboration tools, there's not sufficient public information available to incorporate them during this book.

SECTION THREE

DEVELOPING EFFECTIVE ELEARNING BEST PRACTICES

This session provides further examples of how explanatory constructs found in the research literature relating to the learning of these topics can be reconceptualised to provide additional insights and testable hypotheses as well as explore commonalities between learning mechanisms in different disciplines;

Participants quickly learnt to use the ATutor LCMS Platform for a range of teaching-learning activities as well as pedagogic purposes and during the lifetime of the project teachers grew significantly in their confidence to use *my space* within the ATutor Platform to organise and deliver course contents across the Internet and through cross-platform in addition to creating links to open repositories of knowledge related to their subject matter and collaborative synchronous and asynchronous Computer-Mediated-Communication activities. The development of basic computer skills was unproblematic, largely because most lecturers and students were already computer literate and having gotten a mastery of new pedagogies and curriculum related benefits from initial orientation and use of computers for desktop activities as well as for surfing the Internet. Participants were observed using the eLearning Environment to mediate teaching and learning over two semester's timeframes. By the end of one semester, all the participating lecturers indicated through questionnaires and interviews, that they had begun to feel *very confident'* in the use of the ATutor Platform

Journal DOI: **10.46654/IJRESD**
Article DOI: **10.46654/IJRESD.1619**

for teaching. Same applied to the students that were involved in the project for learning. By the end of the second semester project all participants reported '*high'* confidence level. The participant's awareness that they were involved in a research project seemed to encourage experimentation and support reflectivity. The University Management was quick to request a full-blown deployment for all programmes amidst persistent travails of poor Internet Bandwidth and incessant power failure and heavy reliance on Generator as source of power supply for the four Digital Centres of the University.

DEVELOPING CONTENT MODULES

Research generally suggests that teachers' subject knowledge (content) is an essential component of effective teaching, yet it is an element of continuing professional development often overlooked, or taught in isolation from other aspects of professional knowledge. The approach taken in the research project to integrate content development with new pedagogic approach supported by an ATutor LCMS Portal, through the planning, teaching and evaluation of classroom-based activities was welcomed by the whole University Community except for very few who are absolutely *computer illiterate*. The digitisation process of content materials in hard copies to soft copies was quite tedious and discouraging especially when most of the information has become outdated and obsolete. The main issues associated with so many of the Lecturers reluctance in making their lecture notes available to students online via the portal was traced to the fact that some of these materials were actually plagiarised works and therefore there exist fear of being detected and whereby some of which have been used for their assessment and promotion to higher academic status. The acquisition of Digitisation Machine by the University Management and the involvement of staff of ICT Unit in the Digitisation process lessen the burden on the Project Initiator. Hand-written lecture notes and content materials were sent to commercial business centres where professional high-speed typists are available to make digital copies out of it. Getting the lecturers to do proof-reading and corrections was another challenge that almost frustrated the project and because of low bandwidth availability, downloading the uploaded course contents and uploading completed assignment as course files were reported by lecturers and students as *very frustrating.* However, through new opportunities to practice the planning process, email and chat tools as well as bulletin board and forum, collaborative learning and content sharing became a routine in developing accessibility, flexibility, usability and creating fresh resources for instructional processes, lecturers in the project, felt motivated and confident enough to try out new teaching strategies and on-screen course assignment script assessment. Such findings further challenge the current orthodoxy that ICT relegates the teachers' role to that of *facilitator* thereby collaborating confirmed research that shows teachers' expertise and creativity in planning for pedagogy to be a central element of effective practice as clearly expressed in the DEEP Project by some researchers from the Open University UK. More broadly it highlighted the importance of content development for effective teaching and the key role ICT can play in enabling teachers to plan and develop resources and teaching strategies highly effectively and creatively.

GLOBAL CHALLENGE FOR ELEARNING

Research cannot hope to offer a productive contribution to learning if it does not evaluate the content design of the curriculum, the topic-specific aims of the teachers or lecturers, the mode or medium of instruction and the distinctive outcomes for individual learners. Careful evaluation of the learning mechanisms that underpin successful educational technologies is key to understanding what works, what will not work and why it will or will not work.

Journal DOI: **10.46654/IJRESD**
Article DOI: **10.46654/IJRESD.1619**

However, without a common theoretical framework for synthesising the vast quantity of research that has been carried out to promote eLearning by integrating Information and Communication Technology into Education, valuable findings will remain disconnected from each other. Aside from the problems of reconciling findings between technology and educational development and how policies and reforms are addressing different pedagogies as well as course contents, different learning platforms and network systems need to be compared. There is a need to apply these systemic transformations to teaching, learning and research through complex inter-subjective processes that are clearly in resonance with Vygotsky's Zone of Proximal Development.

SECTION FOUR

SUMMARY

The study explored the conceptual and physical components of ATutor LCMS and how it complies with the AICC and SCORM specifications as well as the role of standards in enabling successful e-learning implementations. The study evaluated what is included in these specifications and how they are actually used. The use of tools and contents by Lecturers in Igbinedion University Okada, as the DEaD Project revealed, depends and builds on the exposure, use and adaptation of the ATutor LCMS Platform. The uses made of tools and contents by individual Lecturer are in turn inextricably linked through their personal ICT skills to broader social/ school-based practices and perspectives. Linear theories of teacher development tend to suggest that there is one, correct course or sequence of development, leading to a fixed end point of mature fulfillment, measurable in terms of specific competences. Perhaps this is one reason why skeptics try to suggest that Lecturers in resource challenged work environments are 'not yet ready' for state-of-the-art technologies.

CONCLUSION

Teacher professional development and change can only be understood by tracing innovations, changes and disruptions within the institution - both in terms of infrastructure and contemporary content development – in relation to collective as well as individual learning histories. Such complex developments can only be expanded by taking account of teachers' past, as well as their current access to - and use of -technologies, tools and contents.

Journal DOI: **10.46654/IJRESD**
Article DOI: **10.46654/IJRESD.1619**

REFERENCES

AICC CMI Subcommittee (Hyde, J., chair), CMI Guidelines for Interoperability, revision 3.5, Appendix A. AICC, 2001, section A.2. Available at: http:// www.aicc.org. Accessed May 15, 2021

AICC CMI Subcommittee (Hyde, J., chair), CMI Guidelines for Interoperability, revision 3.5. AICC, 2001, sections 5.1–5.2. Available at: http://www.aicc.org. Accessed May 15, 2021

AICC CMI Subcommittee (Hyde, J., chair), AICC/CMI Certification Testing Procedures, revision 1.5. AICC, 2000, section 2.0. Available at: http://www.aicc.org. Accessed May 28, 2021

Banks, F., Leach, J. and Moon, B. (1999) 'New understandings of teachers' pedagogic knowledge' in Leach, J. and Moon, B. (Eds) *Learners and Pedagogy*, Paul Chapman, London.

Bruner, J. (1996). *The Culture of Education*, Cambridge, Harvard University Press.

Cawthera, A. (2001). *Computers in secondary schools in developing countries: costs and other issues*, Department for International Development, UK.

Chaiklin, S. and Lave, J. (1993) *Understanding Practice: Perspectives on Activity and context*, Cambridge. Cambridge University Press.

Commission For Africa (2005) *Our Common Interest*, www.commissionforafrica.org

Cox, M., Webb, W., Abbott, C., Blakeley, B., Beauchamp T., Rhodes, V. (2004) ICT and pedagogy: A review of the research literature London, Department for Education and Skills

Dembélé, M. and Miaro-ll, B. (2003) *Pedagogical Renewal and Teacher Development in Sub-Saharan Africa: A Thematic Synthesis*. Paper presented at the Association for the Development of Education in Africa Biennial Meeting, Grand Baie, Mauritius, December 3rd-6th.

Dodds, P., Ed., Sharable Content Object Reference Model (SCORM): The SCORM Run-Time Environment, version 1.2. Advanced Distributed Learning, 2001, section 3.2. Available at: http://www.adlnet.org

Dodds, P., Ed., Sharable Content Object Reference Model (SCORM): The SCORM Run-Time Environment, version 1.2. Advanced Distributed Learning, 2001, section 3.4.2. Available at: http://www.adlnet.org.

Dodds, P., Ed., Sharable Content Object Reference Model (SCORM): The SCORM Run-Time Environment, version 1.2. Advanced Distributed Learning, 2001, sec- tion 3.4. Available at: http://www.adlnet.org.

Durban, South Africa. www.open.ac.uk/deep/why/PanCommonwealth.doc (url last accessed

Journal DOI: **10.46654/IJRESD**
Article DOI: **10.46654/IJRESD.1619**

1.6.08).

Gupta, V.K., Govindarajan, S., Johnson, T. (2001), Overview of content management approaches and strategies. In: Electronic Markets, vol. 11, n. 4, p. 281-287.

International Organization for Standardization (ISO). *About ISO, Introduction*. Available at: http://www.iso.org/iso/en/aboutiso/introduction/index.html. Accessed May 252021

Lave, J. and Wenger, E. (1991) *Situated Learning*, Cambridge, Cambridge UniversityPress.

Leach J. and Banks, F. (1996) *Investigating the developing "Teacher ProfessionalKnowledge" of Student Teachers.*' BERA Conference, Lancaster, September 1996

Mandela, N (1994) *Long Walk to Freedom*, Boston, MA, Little Brown & Co.Marker, P., McNamara K. and Wallace, L. (2002) *The significance of ICT for reducing poverty*. London, DFID Strategy Paper.

Miller, B., David, D. (2002), Directions in Web Content Management. Burnts and, Inc.

Moon, B. (2000) 'The Open Learning Environment: a new paradigm for internationaldevelopments in teacher education' in Moon, B., Brown, S. and Ben–Peretz, M. *The Routledge International Companion to Education*, London, Routledge.

Norman, D. A. (1998) *Things That Make Us Smart: Defending Human Attributes in the Age of the Machine.* Cambridge, MA: Perseus Publishing

Perraton, H (2000) Open and Distance Learning in the Developing World, London, Routledge

Putnam, R.T. and Borko, H. (2000) 'What Do New Views of Knowledge andThinking Have to Say About Research on Teacher Learning?' *Educational Researcher*, Vol. 29, No. 1, pp. 4–15

Vygotsky, L. (1962) *Thought and Language*, Cambridge Mass. Harvard University Press.