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## OPEN EDUCATIONAL RESOURCES AS AN ELIXIR OF EFFECTIVE TEACHING AND LEARNING IN INSTITUTIONS OF HIGHER LEARNING: A CONCEPTUAL OVERVIEW

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### Abstract

The development of the information society and the widespread diffusion of information technology compound by the emergence of artificial intelligence (AI) and its' offshoots, have given rise to new opportunities for teaching and learning especially in institutions of higher learning. This paper is a conceptualization of digital open educational resources as an elixir of effective teaching and learning in institutions of higher learning. It adopted a qualitative research method, using the explanatory research approach through which relevant literature on open educational resources (OERs) were reviewed and analyzed in line with the four objectives that guided the review. Apart from conceptualizing OERs, the paper identified and explained the theories of OERs as well as OERs as being employed for teaching and learning in institutions of higher learning among others. The paper noted that OERs is presently revolutionizing teaching and learning more so in higher education especially in massive open online courses (MOOCs) distant learning and has increased accessibility to learning in that with it, broader people are reached and learning easily made accessible even to those with limited resources. The paper deduced that since the lecturers' role as supplier of reading lists and teaching materials is diminishing, OER is likely to accelerate transformation in the traditional lecturing role and the solution of more independent students. Above all, with OERs, an increase in non-formal and formal learning can be expected to enhance the demand for assessment and recognition of competences gained outside formal learning setting. The suggestions inter-alia are that the government of a country like Nigeria, should equip all institutions of higher learning with state-of-the-art information and communication technology gadgets in tandem with what is obtained in higher institutions of developed nations and students and lecturers, should utilize OERs at their best in realizing their educational goals and in contributing meaningfully in a digital global biosphere ruled by information and technology.

**Keywords:** Open Educational Resources, Institutions of Higher Learning, Teaching, Learning, Information Communication Technology, Artificial Intelligence

## Introduction

The development of the information society and the widespread diffusion of information technology as well as the emergence of artificial intelligence (AI) and its' offshoots like the machine learning (ML), chatbots, and avatar, have given rise to new opportunities for teaching and learning especially in institutions of higher learning. At the same time, they challenge established views and practices regarding how teaching and learning should be organised and carried out. Higher educational institutions have been using the internet and other digital technologies to develop and distribute education for several years. Yet, until recently, much of the learning materials were locked up behind passwords within proprietary systems, unreachable for outsiders. In this situation, learning and acquisition of knowledge were left so to say, to those who have the means financially or what may be called the privileged few. Information materials and course contents were not easily accessible as most were restricted within the faculty ambit and those digitalized were only accessed by bona-fide students.

This scenario not doubt is against the ambition plan of action of the international Community, the 2030 Agenda of leave no one behind, aimed at creating a peaceful and prosperous world, where dignity of an individual person and equality among all is applied as the fundamental principle, cutting across the three pillars of the work of the United Nations Development, Human Rights and Peace and Security (United Nations, 2016). In a dynamic world, nothing remains constant with the exception of change and today there are new ways of teaching and learning precipitated by the invention of information and communication technology (ICT) spurred to the high heavens by the internet also known as the information superhighway. It did not only made the world, a global village, it also brought about astronomical growth in information resulting to information overload and free accessible educational resources. The crown glory is that the dynamism gave rise to the availability and accessibility of educational resources online free of charge to all strata of learners as well as teaching resources for teachers/lecturers of all levels, and released under creative commons licenses which allows users to use, reuse, revise and remix and even distribute such educational resources (Wiley, 2014). This is what is known in the present

digital global biosphere as the open educational resources (OERs). The open educational resources (OERs) movement or initiative aims to break down earlier mentioned barriers, and to encourage and enable freely sharing content with a view to enhancing global teaching and learning to all and sundry. The implication is that the initiative has brought about education for all mantra at no cost. Evidence abound as apart from free millions of educational resources online, this age is also witnessing the highest number educational agencies and bodies offering free but certificated professional online courses under the Massive Open Online Courses (MOOCs). For instance, HP Life, Saylor Academy, Alison and Coursera among others.

The view being expressed is that since the UNESCO Paris Declaration on OERs adopted by the global community in June 2012, there have been a number of developments, and the key question is no longer about the "how" of OERs development. We are no longer talking about authoring tools or distribution systems. It is more about realising the value to be derived from OERs. This involves defining an OERs value chain that will help stakeholders identify the various sub-systems in the chain that link the individual teacher's or learner's contribution relating to OERs use, to bigger initiatives such as good-quality open textbooks or Massive Open Online Courses (MOOCs) which could lead to viable academic qualifications and credentials involving institutions. In recent time, the emergence of artificial intelligence (AI) and it offshoots like avatar and generative AI, Chatbots among others have enhanced the usefulness of OERs as they are prepared in various digital formats to suit almost every learner's need. The obvious is that in past two decades, one may say that the greatest technological invention powered by computer is artificial intelligence (AI). Artificial Intelligence which is the simulation of human intelligence processes by machines, especially computer systems (Laskowski and Tucci, 2024) has taken hold of almost every aspect of human activities even in some cases, doing better what the human cannot do. The belief is that AI has the potential to change how we live, work and play. In higher education, and particularly in Massive Open Online Courses (MOOCs), such technologies are especially attractive because they enable more cost-effective production of multilingual material,

greater flexibility in creating and updating educational videos, personalized learning through avatars or synthetic “lecturers,” and improved access for students who do not speak English as a first language, (Sannino, et al., 2022; Yin and Ma, 2025).

As explained by McCammon (2021), the rapid development of generative artificial intelligence models between 2020 and 2025, including large language models (LLMs), multimodal translation systems, and voice and video synthesis technologies, has created an entirely new synthetic media ecosystem. Presently, these media have extended far beyond basic image filters to include deepfake videos, neural translation systems, avatar tutors, and AI-generated educational videos that can be adapted to different languages, tones, speaking rates, and even cultural contexts. Above all, synthetic media from deepfake videos have emerged as a new interesting technology. These are referred to as cloned voices, multilingual translation models, to more recent applications of avatar tutors into higher education. As a matter of fact, these technologies are rapidly becoming part of the multilingual distance learning model and, more recently, MOOCs worldwide. In the same vein, synthetic media is seen as a complex term often used to describe risks, has been revealed in recent studies that when used transparently and with a focus on pedagogical and not entertainment objectives, can improve accessibility, personalization, and increase learners’ engagement.

This paper is therefore aimed at conceptualizing Open Educational Resources and its applications in Teaching and Learning in higher education with a view to highlighting areas OERs can be utilized in teaching and learning and to create the desired awareness among lecturers and students of institutions of higher learning in Nigeria in particular of the importance of these tools in this digital age in teaching and learning.

### Study Objectives

The main objectives of this study therefore include:

1. To conceptualize Open Educational Resources (OERs);
2. To identify OERs theories,
3. To Highlight the general purpose of the concept, and

4. To determine areas OERs can be applied in teaching and learning in institutions of higher learning in Nigeria

### Methodology

The study adopted a qualitative research method, using the explanatory research approach to ascertain where technology through open education resources is functional in teaching and learning in institutions of higher learning with Nigerian higher education system being the area of focus. A step-by-step review of related literature was carried out in the course of the study, with special consideration on the nature of topic under study, the researcher did utilize different search engines, databases such as Google search, Microsoft edge, Academia Edu, Research Gate and other useful websites with a view to obtaining both retrospective on current literature on the topic. The search strategy involved the use of key terms such as “open educational resources, open educational resources theories and utilization of OERs in teaching and learning.” This methodological approach lasted for a period of three weeks within which, relevant articles and literature were gathered. With the compilation of articles and other literature from the databases, search engines and websites, the researchers meticulously examined and assimilated the content as they relate to the OERs and every other thing therein.

### Conceptualization of Open Educational Resources (OERs)

Open Educational Resources (OERs) are important learning materials with the potential to facilitate the expansion of learning worldwide. The flexibility, both technological and legal, afforded by openly licensed content is an important pre-condition for supporting the educational use of content. Open standards support the deployment of learning objects as OERs on a wide variety of different devices, whether mobile, on the desktop or in print (McGreal, 2004). In fact the emergence of open educational resources is a concept for accessible learning that breaks the barriers of strata, geographical location, political and social interference, disabilities and finance.

As revealed by Wiley (2010), the term “learning object” was coined in 1994 by Wayne Hodgins and quickly entered the vocabulary of educators

and instructional designers. In terms of the history of OERs, learning objects popularized the idea that digital materials can be designed and produced so that they can be easily reused in a variety of pedagogical situations (Wiley,

2010). It is pertinent to state that the image of Lego bricks or atoms sometimes used is a way of explaining how learning objects can be used and reused in different contexts.



**Figure 1:** Image of Lego Bricks

On the other hand, it was Wiley in 1998 that came up with the expression “open content” which caught the attention of internet users and popularized the idea that the principles of the open source software movement could be productively applied to content. Wiley also created the Open Publication License, the ever first widely adopted open license for content (Wiley, 1998).

Indeed, the digitalization of teaching and learning is seen as a necessary transformation in education globally, both with respect to teaching practices and curricular goals for students. While the reasons for this shift are multifaceted, it is frequently argued that such developments are tied to the overall expansion of information and communication technology (ICT) throughout society and the emergence of the knowledge economy (MacDonald, 2005; Robertson, 2005). In the context of the digital ecosystem, the United Nations Education and Scientific Commission (UNESCO) in 2002 came up with the term ‘Open Educational Resources (OERs) with the aim of promoting open access to digital educational resources that are available online for everyone at a global level (Caswell et al. 2008). The body perceived the concept as a technology-enabled, open provision of educational resources for consultation, use and adaptation by a community of users for non-commercial purposes and went ahead to define it as; teaching, learning, and materials that are freely available, openly licensed and accessible online for everyone to utilize, share and adapt (UNESCO, 2019). Basically the characteristics as highlighted include that the resources will be available to all at no cost, they are openly

licensed which implies that they are released under Creative Common License or similar which allows users reuse, remix, revise and redistribute (Wiley, 2014). The William and Flora Hewlett Foundation (2010), one of the primary donors in the OERs movement, supported the use of OERs to equalize access to knowledge for teachers and students around the globe. In this regard they saw OER as teaching, learning and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use or repurposing by others (Huyen 2007). OERs therefore, can be full courses, course materials, modules, textbooks, streaming videos, tests, software, and other materials or techniques used to support access to knowledge (Hewlett Foundation, 2020).

Another widely used definition of OERs is the one provided by Atkins et al. (2007), who defined OERs as full courses, open courseware and content, educational modules, textbooks, streaming videos, tests and assessments, open source software tools, and any other tools and materials used to support teaching or learning. Suffice to say, that Open educational resources are embodiment of full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge.

To Downes (2011) OERs are materials used to support education that may be freely accessed, reused, modified and shared by anyone. Other definitions discussed in the July 2011 worldwide online conversation of members of the OERs

community were more specific. Whereas, Rossini (2011), posits that open educational resources are digitized materials offered freely and openly for educators, students and self-learners to use and reuse for teaching, learning and research. While Johnstone (2005), sees them as the open provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes. The underscore is that OERs are learning content that is made up of full courses, courseware, content modules, learning objects, collections and journals;

tools in the form of Software to support the development, use, reuse and delivery of learning content, including searching and organisation of content, content and learning management systems, content development tools, and online learning communities as well as implementation resources guaranteed by Intellectual property licenses to promote open publishing of materials, design principles of best practice and localize content.

Inasmuch as "Open" has become somewhat of a buzz word which currently has positive associations for most people. The entirety of OERs revolves around openness and free for all. It is against this backdrop Materu (2004) opines that the present decade can be called the o-decade (open source, open systems, open standards, open archives, open everything) just as the 1990s were called the e-decade. The two most important aspects of openness have to do with free availability over the internet and as few restrictions as possible on the use of the resource, whether technical, legal or price barriers. Several suggestions have been made as to how "open" should be interpreted in relation to OERs. To many, they are materials; that are convenient, effective, affordable, and sustainable as well as available to every learner and teacher worldwide. The deduction is that the concept pillar are the 4 A's maxim which stands for accessible, appropriate, accredited, affordable" (Daniel, 2006). Downes (2006) argues that "the concept of 'open' entails, it seems, at a minimum, no cost to the consumer or user of the resource.

Emphatically, Open educational resources (OERs) are any resources available at little or no cost that can be used for teaching, learning, or research. The term can include textbooks,

course readings, and other learning content; simulations, games, and other learning applications; syllabi, quizzes, and assessment tools; and virtually any other material that can be used for educational purposes. OERs also typically refer to electronic resources, including those in multimedia formats, and such materials are generally released under a Creative Commons or similar license that supports open or nearly open use of the content. OERs can originate from colleges and universities, libraries, archival organizations, government agencies, commercial organizations such as publishers, or faculty or other individuals who develop educational resources they are willing to share. (Educause, 2010)

### **Open Educational Resources Theories**

It is impossible to pin down any one theory that best fits the OER movement other than the principle of openness in education. This includes, at the forefront, the principle of accessibility opening educational resources so that anyone can access and learn from these resources at no cost. The Cape Town Declaration (2007) states that Educators worldwide are developing a vast pool of educational resources on the Internet, open and free for all to use. These educators are creating a world where each and every person on earth can access xvi and contribute to the sum of all human knowledge. They are also planting the seeds of a new pedagogy where educators and learners create, shape and evolve knowledge together, deepening their skills and understanding as they go.

The use of OER is not confined to eLearning contexts or distance education. Although they are for the most part born digital, many if not most OERs can also be printed out and used in analogue contexts. Most OERs are technologically neutral in that they can theoretically be reformatted or refitted for use in any platform or in any learning management system or application. OERs can be used online or in traditional classrooms, or in blended or flexible learning contexts. This includes a focus on the importance of interoperability for both learners and instructors, in their free re-use or repurposing of the resource, including mixing and mashing. Interoperability of the resources in different contexts is a pre-condition for useful OER.

There is no single paradigm associated with OERs, nor are there any preconceived approaches to learning that limit the generalizability of OERs. On the other hand, individual OERs can be specifically designed to support particular theories of learning, whether that is behaviourist, constructivist, connectivist or something else. The OERs concept can accommodate a wide range of theories. In addition to openness, eclecticism may be the theory most nearly associated with the OERs movement. Educators using OERs can draw on multiple theories, mixing and mashing them to fit what they feel is reasonable given their particular context. Pragmatism that links practice and theory in order to improve both can also be an important theory associated with OERs. Pragmatists consider the practical effects of using OERs and base their decisions on these.

Diffusion theory (Rogers 1995) has also been used to describe the rate of adaptation of OERs among educators and in informal learning contexts, but it is not all-encompassing. In fact, it is a *bricolage* of many theories bunched together by the researcher (*bricoleur*). Complexity theory also has its place as researchers investigate how OERs have been formed through self-organising and emergent methods and interactions.

So, OERs, as freely available learning objects encapsulating learning resources, are pedagogically neutral and, as a concept, can lend themselves to any learning theory. OERs proponent in different theoretical “camps” of learning, such as constructivist, connectivist or behaviourist, can design their OERs either to support their theories uniquely or to be more generalisable in a wider variety of learning contexts. Likewise, educators can make effective use of OERs according to their theoretical approach, which could be easier or more problematic depending on the theoretical perspective that is embedded in the OERs. There is no one theoretical camp that can claim ownership of OERs from a pedagogical perspective. Independent learning is often connected to OERs, but OERs are also used in classroom, blended learning and distance education environments. Panke and Seufert (2012) noted that there is no one-size-fits-all theory that allows us to understand all aspects of the learner’s use of OERs.

## Application and Utilization of OER in Teaching and Learning

Historically, resources such as books, journals, newspapers, and audio and video recordings have been fairly well curated in university libraries. However, the same cannot be said for teaching and learning materials, unless they have been included in a textbook or study guide. In the past, such materials have typically only been made available to registered students within the confines of the physical or virtual classroom. In the early 2000s, institutions such as MIT (Massachusetts Institute of Technology) and Rice University challenged this convention of locking down teaching and learning resources by opening up access to many of their teaching and learning resources to the rest of the world as OER. In April 2008, the University of Cape Town (UCT) joined the open movement by signing the Cape Town Open Education Declaration, thereby committing itself to making a selection of its teaching and learning materials available as OER. Other notable OERs initiatives include USA openStax that provides free peer review textbooks (OpenStax, 2020), African Virtual University (AVU) which offers OERs for African universities (AVU, 2020) and Commonwealth of Learning (COL) that supports OERs development and use in Commonwealth countries (COL, 2020). This is to say, OERs have become effective tool for teaching and learning. To this end, OERs are now be applied in so many areas of teaching and learning. They have not only helped in making education accessible to all, but they have also helped in the conducting of researches among scholars and lecturers in institutions of higher learning.

On a general note, the importance of OERs to education cannot be under played. The underscored importance include that the emergence of OERs has increased accessibility to learning in that with it, broader people are reached and learning easily made accessible even to those with limited resources (Geser, 2007). Furthermore with all sorts of educational materials openly available at no cost for all classes of learners, it reduces cost for students as well as their institutions (Hilton, 2016). Above all, OERs improve quality of teaching and learning as they pave way and encourage collaboration, peer review, and continuous improvements as those online materials are regularly updated by professionals in different areas of study. Be that as it may, OERs can be

specifically be applied in the following areas in our institutions of higher learning:

In the first instance, OERs are veritable tools for distance learning. If one considers in Nigeria that most Nigerian students, who after series of attempt to go into the regular universities through Joint Admission Matriculation and Board (JAMB) organised UTME failed have resorted to the National Open University of Nigeria (NOUN) as well as other universities operating distance learning as alternative choice of achieving their academic goals. The use of OERs stands out as readily available course materials for such students as a way of not only saving cost but also making relevant course materials accessible. Come to think of it, open universities from inception were defined by their goal to reduce entry requirements for higher education. In the distance education model, students received texts and reading resources via postal service and submitted assignments in return. Today with millions of students learning at a distance research, literature have developed to address teaching practices, learner skills and attributes, as well as governance and leadership of open universities (Simonson, et al. 2011). MOOCs are a continuation of this trend of innovation, experimentation and the use of technology to provide learning opportunities for large numbers of learners.

Open online courses, sometimes called “massive” (MOOCs) due to their high enrolment numbers (Maculey et al. 2010) and this is what the NOUN and other distance learning institutions are all about, offer a middle ground for teaching and learning between the highly organised and structured classroom environment and the chaotic open web of fragmented information. In a traditional classroom or online course, learning designers and educators structure the readings, learning resources, lectures and activities of learners. As a result, learning is directed toward clearly articulated goals and outcomes. The educator provides shape and direction to the learning experience by forming groups and providing assessments, assignment focuses or guidelines. The evolution of generative AI, avatar and deepfake as well as synthetic media have further changed the face OERs. The integration of these systems in MOOC systems provides a new opportunity for one instructor to teach in multiple languages while at the same time maintaining their unique characteristics and,

more evidently, their voice, facial expression, and overall presence. Also, alternative videos can be offered in the original language via caption, i.e., adapted subtitles or generic simplified language. Additionally, recent studies on AI-generated videos in the domain of education [Pellas (2025) and Zhang, et al, (2024), suggest that the overall learning outcomes are comparable to real-life human-produced material, while at the same time decisive factors remain notions such as social presence and authenticity. For this reason, multilingual MOOCs enhanced with synthetic media have the potential to support greater linguistic equity, provided their use is guided by clear pedagogical, ethical, and political principles( Jiang and Gu, 2025: Yuan and Hu, 2025).

Furthermore, OER have gained increased attention for their potential to support open access, sharing and re-use of digital educational resources in various education settings. For instance, in the field of technology-enhanced science education, where the development of new digital science education resources is a costly process, the sharing and re-use of resources is very attractive. Thus, over the past several years, a large amount of digital science education resources has become available worldwide through Web-based open access repositories. These resources have the potential to support technology-enhanced science education by facilitating the work of science teachers in their day-to-day science teaching. It has also been noted that science teachers could benefit from participation in communities of best science teaching practices by sharing not only OER, but also their educational practices. As a result, there is an increased interest for the development of Web-based repositories that facilitate open access to both educational resources and educational practices. MOOCs were originally intended to democratize access to knowledge, (Rizvi, et al, 2024) yet the predominance of English has produced linguistic and cultural inequalities (Mac Lochlainn, Nic Giolla, Mhichil and Beirne, 2023; Barrault, et al, 2023). A lot of non-English speaking individuals from diverse backgrounds find it hard to attend or follow in general advanced courses, even though the model's declared openness. In contrast, newer technology innovations such as SEAMLESSM4T, a framework that allows simultaneous speech and text translation in up to 100 languages, (Barrault, et al, 2023; Jasuja and Fund, 2024), prove that it is technically

feasible to provide live translations with captions (subtitles) to educational videos automatically, and if needed on a large scale. As such, the integration of these systems in MOOC systems provides a new opportunity for one instructor to teach in multiple languages while at the same time maintaining their unique characteristics and, more evidently, their voice, facial expression, and overall presence.

To be emphatic, for one to fully understand what synthetic media in education especially as they concern what OERs are all about, it requires engaging with pedagogical and ethical frameworks rather than purely technical descriptions. In this case reveal Shea, Richardson and Swan (2025), the Community of Inquiry (CoI) model is relevant here, as synthetic avatars and AI-generated videos influence the balance of cognitive, social, and teaching presence. This is imperative assert Aslan and Turgut (2021) and Wertz (2022) as social presence may be altered when the instructor is an avatar with teaching presence shifting as instructors increasingly take on roles of designers or curators; and cognitive presence changes as the representation, pacing, or linguistic form of information is modified. Heutagogical perspectives also offer insight, emphasizing autonomous and self-directed learning in which students can select the language, avatar, or difficulty level of learning resources, participate in the co-creation of instructional material, and develop critical awareness of AI and deepfake technologies (Agonács and Matos, 2021 ; Mynbayeva, Yessenova and Karabutova, 2025; Kavashev, 2025).

While the gains of AI is being stressed in OERs, it is also necessary understand the need for ethical considerations while using AI generated resources. As argued Holmes, et al (2022) on the ethics of educational AI, they wonder on whether it should be treated as a transparent process involving all interested parties participating in evaluating its use and adaptation. Similarly, Yan, et al (2024), stressed on the need for technological maturity, transparency, reproducibility, and privacy of LLMs as it may become increasingly complex when fused with multimodal synthetic media (Rahman, et al, 2024). As such, one can state that MOOCs and synthetic media should be studied as standalone pedagogical and ethical

terms rather than mere tools, methods, or technical solutions.

Furthermore, as noted, AI is a major advancement in the field of information and communication technology especially in terms of its capacity to produce fresh, original information and depends on pre-established rules as well as uses sophisticated algorithms to produce information materials on its own (Davenport and Mittal, 2022). This involves explains Lawton, (2023) creating realistic text and graphics that can imitate the creative processes of humans. Prominently in the areas of linguistic models such as GPT-3 (Generative Pre-trained Transformer 3) and picture generators like DALL-E, which have the ability to generate extraordinarily creative and cohesive outputs.

In addition, educational resources developed in an open environment can be vetted and improved by a broad community of educators, resulting in materials that represent what the educational community sees as most valuable. By providing educators with new access to educational material, open resources have the potential to spur pedagogical innovation, introducing new alternatives for effective teaching. OER have the potential to expose students and instructors to the long tail of content, most of which never finds its way into widespread educational use. Moreover, learning resources that can be modified and reused promote collaboration and participation two key elements of a Web 2.0 approach to teaching and learning.

The resources required to develop high-quality learning materials and activities for a full complement of courses can be prohibitive for many institutions and instructors. By distributing the costs over a larger number of users, OER brings a greater range of tools within reach of more users. OERs can also lower the costs for students to obtain educational content. OERs and online or hybrid learning are natural partners in efforts that take advantage of and prompt developments in educational technology that facilitate new media, new formats, and new means of distribution (Hilton, 2016).

OERs have also been found useful in the construction of course of study. Few will disagree that the infusion of OERs into higher education is likely to have far-reaching effects on the character of teaching and learning, all the

same, the nature of that transformation is the subject of some debate. One of the more radical viewpoints is that the OERs movement will lead to a future in which all of the components of an education will be available online for free and that learners will have the opportunity to construct a course of study though it might not be called a “degree” from the wide and growing pool of open content. Others envision a less disruptive future for OERs, suggesting that the model for higher education will persist in a form not wholly different from what it is today, but enhanced with high-quality, open, digital content. Regardless, OERs will expand access to educational resources to more learners, more of the time. In particular, adult learners, students who work full time, and other nontraditional students stand to benefit from open resources because they are available for independent, self-directed study (Geser, 2007).

Generally, open resources are one way to address the rising costs of education, and they also have the potential to facilitate new styles of teaching and learning. Giving faculty the ability to pick and choose the individual resources they want to use, and to modify those resources and “assemble” them in unique ways promises greater diversity of learning environments open license that permits their free use and re-purposing by others. The use of open file formats, improves access and re-use potential of OERs, which are developed and published digitally. They can include full courses, course materials, modules, textbooks, research articles, videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge.

Wiley (2010) did present strengthened and characteristics of OERs in these three elements: the concept of “free”; the four Rs permissions which stand for re-use, redistribute, revise, remix, and non-interfering technology and media choices. Wiley affirms that free-of-charge access is a necessary feature of OERs, but is not sufficient, noting that many resources online are freely accessible whether they be texts, videos, pictures, games and so on. He likens this linkable/viewable but free accessibility as “window shopping,” arguing that if the resources are not openly licensed with permissions for the four Rs, they cannot be OERs. The bottom line is that OERs are needed to ensure that the instructors and/or students have effective control of the content.

The free and open sharing of educational resources is essential for promoting the building of ubiquitous learning networks as well as reducing the knowledge divide that separates and partitions societies. Educators worldwide continue to face significant challenges related to providing increased access to high-quality learning while containing or reducing costs. New developments in information technology highlight the shortcomings and challenges for the traditional education community, as well as those of more flexible providers such as open universities. Such developments, including accessible repositories, Internet access, wireless networks and mobile devices, have the potential to increase access and flexibility in education by rendering it ubiquitous. Basic education for all continues to be a goal that challenge and will continue to challenge many countries. OERs can be used to overcome many of the obstacles faced by both learners and educators.

The development and exchange of OERs continue to be a technologically intensive process. Technological considerations in OERs are not limited to authoring or remixing tools. Collaborative production of OERs requires well-designed and robust online spaces and infrastructure and repositories. The latter can also be used to combine OERs to create lesson plans online (Open Science Education Resources in Europe). Unless OERs are consistently and adequately described, they cannot easily be located in online searches. Open Educational Resources (OERs) are important learning materials with the potential to facilitate the expansion of learning worldwide. The flexibility, both technological and legal, afforded by openly licensed content is an important pre-condition for supporting the educational use of content. Open standards support the deployment of learning objects as OER on a wide variety of different devices, whether mobile, on the desktop or in print. The open license frees instructors and learners from concerns about permissions, as well as about how, when, where and how long the content, video, audio or application can be used.

## Conclusion

Independently of whether institutions are engaged in OERs project or not, OERs can be expected to affect curriculum, pedagogy and assessment. With thousands of (openware)

courses from internationally reputed higher education institutions available for free, lecturers will need to consider the students compare their curriculum with others. Since the lecturers' role as supplier of reading lists and lecturing materials are diminishing, OERs are likely to accelerate transformations in the traditional lecturing role in institutions of higher learning and the solution of more independent students/learners. An increase in non-formal and formal learning can be expected to enhance the demand for assessment and recognition of competences gained outside formal learning setting. Finally, one has to agree that OERs are not panacea; neither is proprietary content, nor is it a technology, nor constructivism, connectivism nor anything else, but they all could have a place in any of the multiple approaches that we can develop to promote accessible learning. It there is therefore so-to-speak, an elixir of effective teaching and learning in institutions of higher learning when deployed in the right perspective. To this end, the suggestions are:

In line with global trend, the government of a country like Nigeria, should equip all institutions of higher learning with state-of-the-art information and communication technology gadgets in tandem with what is obtainable in higher institutions of developed nations as to leverage the gains of OERs.

To the students and lecturers, information is at your bake and coin, it is left for you, to utilize it at their best in realizing your educational goals and in contributing meaningfully in a digital global world that is ruled by information.

Furthermore, there is the need for both teachers and students to acquire modern digital skills in line with trending technologies like the AI and its offshoots as to be better placed to access and retrieve educational resources using these tools.

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