Information Technology Solutions for Online Teaching Learning and Evaluation

IT Solutions for Distant Learning

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Abstract—**This paper presents pertinent information for design,development and management of online teaching and learning which is the bedrock of establishment of online schools.Whilst online 'classrooms' are rapidly springing up in developed countries,this has not been duly embraced in developing nations.For over two centuries education providers have fostered learning in physical classroom environment(1,,2),However, recent socio-economic factors like technological advancement and population growth are proving these physical spaces inflexible in catering for the ever changing nature of communication that ensues in the process of teaching and learning. The central aim of the paper is to present the potential of an information technology (IT) solutions such as online university architecture(OUP) to aid access to education and skill acquisition for the 21st Century education industry around the globe.**

Keywords—Distant Learning, E-Learning, Online Learning,Participation,Interaction,Level of Presence and Virtual College/University.

INTRODUCTION

The educational industry has recorded tremendous achievements in technological breakthroughs over the last three decades attributed to years of research and technological innovation to further make the education industry better, improved and also more conducive for learning. According to a survey carried out in 2016, there are about 23,729 universities worldwide with each one offering a number of courses to its students in a way that makes learning different other universities, though similar.

The norm is usually to locate a suitable environment, build its infrastructure to contain both learning research facilities as well as accommodation depending on the form of architecture each university tried to implement. The physical location of any university usually also has an impact on its immediate environment and the people. This might include boost in sales in supermarkets among other as a result of in flocks of students into the community.

The demand for higher education, most especially an international degree that is always seen as a gateway to building a lasting career has risen over the last 2 decades. A trend that is seen by most universities

to further establish themselves as a one of the leading universities by offering more courses and also increase packages that attract both foreign and local students. A critical evaluation also shows that the funding that goes into establishment of these universities is usually not amount expected to be possessed by individuals.

This practically means that a lot is usually invested in infrastructure, material resources as well as human resources not to mention a few. These and other consideration has been the driving force for further research to find a way of making education flexible, affordable to the students and cost effective to the investing bodies

The concept of Online Learning is not new as it was used by some universities in their early days. The result and statistics obtained from the implementation showed drastic outburst of students switching from normal university schedule to Online Learning as it further helps them to be able to do a couple of other major things while studying.

Sheehy (3) discovered a remarkable trend saying " *More than 6.7 million students 32 percent of total higher education enrolment took at least one online course through a university during the fall of 2011, up from roughly 6.1 million students the year prior* ". This means there is a need to critically examine the

Online learning solutions available.

REVIEW OF KEY TERMS

There is a critical need to distinguish between concepts that have been misused and misrepresented. A clearer explanation of these terms and concept would clearly help in identifying the emerging concept and how it can be implemented as a solution for online teaching, learning and evaluation.

Distance Learning

The best definition that explains distance learning is "*an institution based formal type of education where the learning group is separated and they use communications system that are interactive to connect to their respective correspondence which can be other learners, instructors and available resources*". In

order to be considered as distance learning tool, it needs to satisfy four main reasons: it has to be institutionally based which differentiates it from

self-study; there has to be separation between the learner and the instructor which is usually geographic in nature; there has to be a form of interaction which can be same time or different times and finally the connecting platform that connects both learner and instructor which in real time allows learning to really occur

E-Learning

Electronic Learning (E-Learning) is usually used as a compound name used to imply learning through the use of digital devices for both teaching and learning. It can be explained from technology driven, delivery system oriented, communication oriented and educational paradigm oriented perspectives. As described by (4) "***E-learning is the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services, as well as remote exchange and collaboration***". This clearly explains the basis of processes that makes it e-learning.

Online Learning

Online Learning is also a form e-learning only that in some instances, the involvement of network is mandatory. As described by (5) "***Online Learning is e-Learning with a mandatory involvement of a digital network which a learner needs in order to access at least part of the learning materials and services. Online learning refers to network enabled teaching and learning that allows the learner to have increased interaction with content, teacher and other learners.***" In this case, it has to function as a

network enabled teaching and learning platform.

Virtual College/University

A virtual College or University is best described as a "***higher education institutions or network of higher***

education institutions responsible for design, development and offer of courses and programmes in

flexible and online environment." Understanding this simply clearly means one has a clear overview of a virtual college (6,7).

With these concepts clearly defined and outlined, a lot of question would pop up, questions such as: which of these highlighted does an institution adopt? What are the technical considerations for the adoption of these concepts? What type of environment are they best suitable for? These questions relatively give an outline of an examination of these solutions which is needed to critically know which one to adopt based on the location of the institution, target population as well as developed framework.

CONSIDERATIONS FOR INFORMATION TECHNOLOGY SOLUTIONS FOR ONLINE

TEACHING

Online teaching comes with a lot of attributes coupled with the technicalities involved in the integration as well as implementation (8,9) in order to achieve the desired goal for which it has been created, developed and effected. In order to be able to understand which IT solution is most suitable for Online teaching to be implemented, there are consideration to be examined and they individually define the type of Online Teaching that would be adopted. These include:

Participation and Interaction

The level of participation (11) of both instructor and learner has a substantial effect on the quality of education gained by the student and how much is learnt. This means irrespective of the type of solution to be adopted, the level of participation has to be declared as a benchmark (10). The author described this in his article: Principles of Effective Online Pedagogy, saying "***let the students do most of the work***". He further explained saying "***the more quality time students spend engaged in content, the more of that content they learn***". This further reflects that engaging students in more academic related exercises exposes them to

know more. Interaction comes in different ways and perspective depending on what is involved and the purpose for which the interaction must take place as Pelz stresses it more saying "***interaction must stretch beyond simple student discussion***" He further went ahead to say "***Students can be required to interact with one another, with the professor, with the text, with the Internet, with the entire class, in small groups or teams, one-on-one with a partner, etc. In addition to discussing the course content, students can interact regarding assignments, problems to solve, case studies and laboratory activities. Any course can be designed with required interactivities***".

This also shows the importance of the different types of interaction within a learning environment as it relates to both teacher and student in order to facilitate effective learning which is the ultimate goal.

Categories of Presence

The level of presence for online learning environment are described in three different forms which are

Social Presence:

The social presence occurs when the correspondence of an online course help in establishing a community of learning by projecting real characters in various discussions. This is also described in three forms which are; *affective:* which involves expressing feelings, mood and emotions, *interactive:* which involves confirmation of evidence of reading, attending, understanding as well as thinking about other responses and *cohesive:* which involves responses that subsequently develops and further

sustains group commitment and common goals and objectives among other things.

Cognitive Presence

This represent the extent to which both teacher and student are able to construct and also confirm meaning by means of extensive discussion. This can be achieved by: demonstrating in form of introduction of factual concept and knowledge based on theory in discussions, validating the source, clarity, accuracy as well as comprehensiveness of the knowledge.

Teaching Presence

This is achieved by the combination of facilitation and direction of both social and cognitive presence in order to realise personal, meaningful and educational goals as outcomes. This is also achieved in two ways:

Facilitation	Direction	
Agreement and disagreement identification	Questions and presentation	content
Reaching consensus understanding	Discussion focus	
Students contribution acknowledgement and encouragement	Discussion summary	
Setting learning environment	Understanding confirmation	
Discussion prompting participation	Misperceptions diagnosis	
Efficacy of the process assessment	Technical concern response	

The considerations for online teaching have been critically examined with three main elements been identified: Participation, Interaction and Level of Presence. At this point in time, the questions that would come to one's mind are question like: What level of participation is required from both student and teacher? How much interaction is required from the student and teacher? What is the least level of presence required for teach and for the students to achieve their respective ultimate goal? All these question can only be answered by critically examining the architecture behind online learning.

A GENERAL SYSTEM ARCHITECTURE OF AN ONLINE LEARNING SYSTEM

In order to understand how the online learning platforms works, there is a critical need to examine the system architecture from the perspective of pros and cons of online learning. This will further model an outline that can be used to visualise the system architecture.

Pertinent Issues Associated with Online Learning

Online learning is a process of learning within a created online platform created for the students to access academic materials to be used for respective study. Since the aim is to make learning as flexible as possible, it has certain issues (12) and there is a need to critically examine how they affects the goal for which it was developed.

Pros

- **Convenience**

Students can decide to work out a schedule that is more convenient for them. It allows more convenience in the way students do their coursework based on their own personal pace which a lot of students find awesome.

- **Flexibility**

The fact that learning cam be done and the student's convenience brings a flexibility that a lot of student prefer learning online to other forms of learning. One advantage it gives student is that it allows them balance both school, work and other commitments they might have. On the part of the tutors, it can also allow them balance teaching and other personal commitments that are engage in.

- **Material Review**

For online learning, students usually have access to learning materials like lecture notes, PowerPoint slides, and also peer discussions. These can be reviewed, re-watched and class exercises can be repeated which could be an advantage especially for students that have problems with specific courses

- **Motivation**

Motivation can come in the sense that student who see asynchronous online learning more engaging. It enables them to be able to interact with study material when they are freshest and can assimilate best.

- **Analytics and Assessment**

Online learning involves online exercise as well as assessment which helps tutor to be able to get statistical data on the students that can also eb used to track student's individual progress. This can also be used to better improve course design, content and ultimate goal

- **Access and Support**

Online learning provides classes with vital access to place-bound population and other groups that that the resources are meant to serve.

Cons

- **Student Struggle**

Online learning may be the best solution for students who are matured, in terms of organisation and

time management. Students who are not matured and disciplined may struggle a lot with online learning.

- **Community**

In terms of community building, a lot of students may lose out on the networking that comes with physical based learning and so this may have setback on the student's social integration

- **Student Support**

Students with disabilities may struggle or have difficulties using online tools and may likely need technological support that a lot most online learning platform don't provide.

- **Technical issues and problems**

Platforms that are used to create online learning may have technical issues that cannot be prevented. Servers can crash and in the case that happens, it means both tutors and students will not be able to have access to the platform to perform their respective duties. To further make matter worse, staffs providing administrative support would not be able to do so.

The pros and cons have been discussed critically and the effects seen. There is a need to take a closer look at the types of users and their respective role in order to be able to clearly identify the issues and subsequently propose a solution

Online Platforms Users

A critical examination of most online learning platform shows that at every point in time, there are 5 main active users which are: System Admin, Back End Staffs, Corporate Staff, lecturers and Students. Each individual active user has limited access to a particular set and amount of resources. The table below gives an overview of what each user does upon gaining access to an online learning platform.

Functionalities	TOTAL EXCLUSIVE R	PARTIAL EXCLUSIVE			
Login			■	■	■
Registration			□	□	■
Add other users					
Upload Academic Materials			□	■	□
Upload Assessment			□	■	□
Monitor Student's Progress			■	■	□
Upload Test Score			□	■	□
Send email			■	■	■
Download academic materials	RIGHTS	IGHTS	□	□	■
Download Course work			□	□	■
Upload Assignments			□	□	■
View Course Progress			■	■	■
Viewfees Update			■	□	■
View Registered Courses			■	□	■
View Course Schedule			■	□	■
View Student Academic Report			■	■	■

The above table is a general representation of what each user can do when they gain access to the system. The level of access given to each user actually can be used as reverse engineering in terms of design in order to understand the type of learning platform that is used, different level of access. This leads to the questions that always comes up especially when proposing the best online learning solution which is

"*what are the issues associated with online learning and how they are best addressed?*"

Issues of Online Learning

Since there are several issues associated with online learning, two standouts and are most critical. These are the dropout rate of students enrolled in online learning and the inability to accommodate struggling students

Student's Dropout Level

Statistics shows that student's attrition in online courses is nothing to write home about. This is further corroborated by the researched conducted by Columbia University Community College Research Centre which shows that the students who enrol in online course are more likely to either fail or totally withdraw the those course they are enrolled as compared to students who attend colleges in face-to-face teaching and learning. This also has been attributed to the fact that students do struggle with online courses and are more likely to withdraw.

Inability to Accommodate Struggling Students

The inability to accommodate students who needs a different kind of help that students in classrooms are offered may eventually catch up with time. Critical evaluation points to the fact that most online learning environments don't provided that support or do not offer anything close to support provided in a traditional classroom based teaching and learning. This has left a lot of students to struggle and after a consideration duration, they drop out simply because they can't meet up. This has becoming alarming in recent years.

A critical consideration of the pros and cons of online learning coupled with the associated issues as well as the consideration for solution with regards to online teaching and evaluation has to led to the point where the type of IT solution for online learning is required to be proposed in order to address the issues identified and to further provide more support for students especially the ones with one form of disability or the other.

PROPOSED INFORMATION TECHNOLOGY SOLUTION FOR ONLINE TEACHING AND

LEARNING.

To understand IT solutions for online teaching and learning (13), there are some factors that we need to take into consideration. These factors discussed would form the bedrock for which proposed solutions would be designed, developed and integrated.

Security and Authentication

In the case of security, this explains how the materials including academic and institution materials are stored and secured. Since most of the academic materials would be stored on the server, there is a need to beef up the security involved to further avoid compromise. Universities offering online courses might want to have their own server where all materials are stored. This is more secure and a three tier security level should be implemented to further secure the materials from insiders. Authentication comes on the part of all staff, tutors and students for identification and confirmation of their respective identity especially in recent times where hacking and information theft has drastically increased.

Mode and Format of Teaching

The mode of teaching employed has a huge effect on the performance of the student. The more the mode and format of teaching, the easier it is for the tutors to carry all students along. The most common modes and formats are through text and videos. A more practical approach would be to include lectures notes using sign languages and also webinar once a while in order to make sure everyone is carried along and everyone is catered for in terms of support

Mode and Format of Assessment

Mode of assessment also matters in order to be able to actually grade a student in the best circumstance.

Integrating assessment formats such as quiz, test, assignments, exams and online presentations as all methods that should be used to assess student. This would be handier especially if a student is lacking behind or intends to lack behind. Seasonal quiz and test, occasional assignments and exams as well as constant coursework presentation would help students stay focused and consistent.

Study Pace and Flexibility

The flexibility in study pace is a way to accommodate all kinds of people with diverse situations. Typical examples including continuing education, work and school, nursing mothers and so on. Because of the demanding nature of these types of situations, a lot of students might not be able to meet up with the standard pace laid down and as such, the level of flexibility allowed becomes top priority. An online solution that allows self-paced study would be more applicable in order to accommodate the demanding situations different categories of students experience

CONCLUSION

In conclusion, there are a lot of online learning platforms that are already in existence. The need to critically examine if they have met the purpose for which they have been developed shows that they haven't in most cases and complications are involved. In order to tackle the issues, there is a need to examine the whole online learning platform from a different perspective in order to satisfying the aim for their integration. Teachers need to have the right skill and knowledge to effectively engage students, and their educational institutions have a greater responsibility to increase their preparedness by identifying their students demographic data to design appropriate teaching and learning environments(14)where both can thrive.Online learning platform should be seen as a better and more advantageous way of studying and building a career as compared to the reverse case in real time.

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