A COMMUNITY-BASED ELECTRONIC LEARNING MANAGEMENT ECOSYSTEM FOR SUSTAINABLE LEARNING

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Abstract: The primary goal of this paper is to explain the need for an Online Community-based Ecosystem (OnCE). This paper also identifies problems with the systems at two universities, University A and University B. This paper reports a learning community culture amongst five prominent role members that are the standard in a higher learning institution. The qualitative research methodology was used to collect data for this research. Data was collected via document analysis, participant observation, and in-depth interviews to refine and construct a technological ecosystem befitting for outstanding curriculum and instruction. The instruments used are a rubric for document analysis, a checklist for participant observation of three classes, and interview questions for in-depth interviews for three admin staffs, three teachers, and three students. The authors conclude that an ecosystem is essential to aid student's learning and make them better graduates, well learned with experience for the job market even when many lessons are taught remotely. The objectives, purpose and aim for the online community-based ecosystem will be fully actualized using educational technology.

Keywords: *Education ecosystem, Educational technology, Learning Management, Sustainable Learning*

INTRODUCTION

A learning community of educators and their knowledge, students eager to learn, potential clients who need the innovations of students' research and development should have a domain related to an ecosystem. Thereby creating a culture, a way of life structured and well managed for effective learning and not just confined to the walls of a classroom, lecture notes, assessments, assignments, and examinations (Sigurðardóttir, 2010; Barrett-Tatum, 2018). This ecosystem is for the perpetual demand in education to be accessible at one stop point. This system is referred to as an Online Community-based Ecosystem (OnCE).

OnCE is an automated ecosystem that consists of a complete life cycle for a proper and complete education from idea inception to the final consumers' hands. With the use of all possible forms of knowledge acquisition such as online video tutoring (TV), social networking (Facebook), vast access to professionals in every educational field (lecturers, admin staff), and the final consumers/customers (companies/organizations). Interacting with one another for the sole purpose of sharing knowledge is sometimes referred to as a community of practice (Flores, Rodríguez, & García, 2015).

Literature Review

The lack of a learning culture and community has created redundancy which is the repetition of the same data (Rob & Coronel, 2006) on different platforms, there is no shared database for the information the University A needs of all students' information, lecturer's project, and potential client's interest hence there is a constant requirement to repeat the same information (Yury, Stepchenkov, Khilko, & Shikunov, 2017) on the various current systems being used, therefore the need for a bridge such as a learning community, an ecosystem.

Thus, the OnCE will bridge this gap by having every information needed by the key roles in one ecosystem, without the need to leave the ecosystem. If there is any need to leave the ecosystem for any more information, the system itself will be a link to the outside world.
The below diagram denotes Maslow's theory of hierarchy of needs applied in the Education Sector.

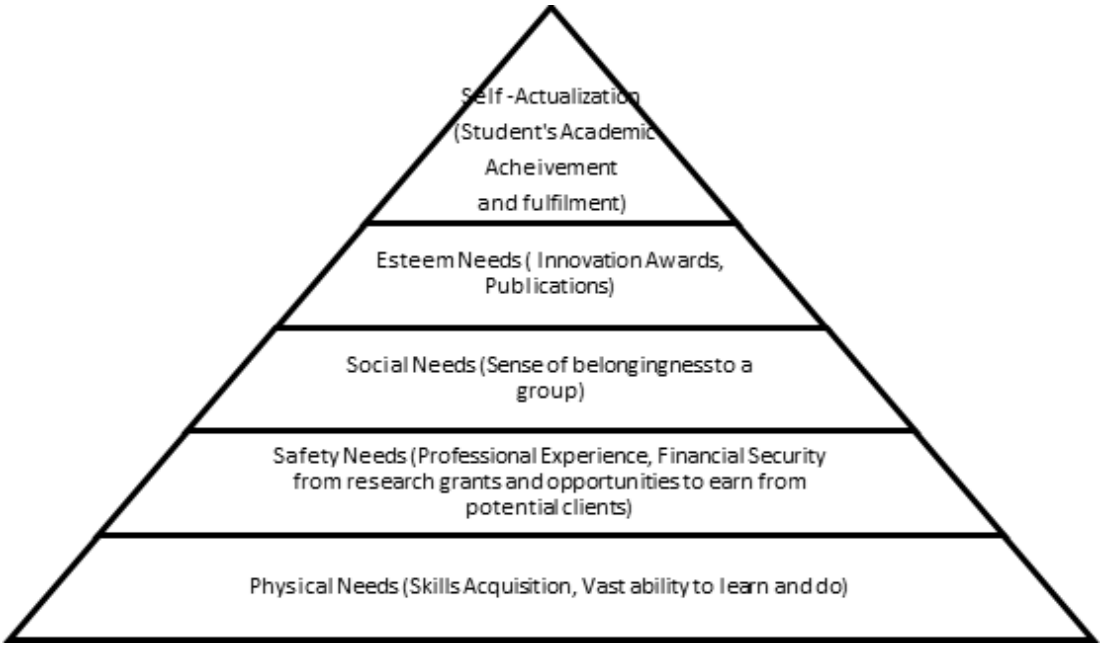

Figure 1. Adapted Maslow's Hierarchy of Needs Theory applied to the Education Sector using OnCE

In many ways, there is a paradigm shift from what could be a deficit view, that is; for example, the student lacking self-esteem and cannot learn, to the culture of the ecosystem impacting the student's ability to develop vigorously, that is; for example, the values of the University's department and the University at large.

Using interviews to find out from Experts, Administrators and Educators on how the needs of students are being met currently and to gather information to know other ways the process of the Online Community-based Ecosystem (OnCE) can be of utmost benefit to the Ecosystem.

The aim of the study

The development of an electronic ecosystem for higher learning students to enhance the knowledge depth of their field of study, the interconnectedness of their methods of sustainable learning, and give them an expanded exposure.

The strategies introduced over the years have become so cumbersome that there are no proper management methods and adequate structuring that bridge the gap between lecturers, students, and potential clientele. In private and public higher education, to attain the utmost need, there is a requirement to ensure every student's learning satisfaction is met. The OnCE is a concerted effort that ensures the students who graduate from higher learning institutions are better equipped with knowledge and experience before graduating and becoming a part of the working class. Therefore, the online community-based ecosystem is a necessary mechanism to enhance student's knowledge of their field of study and their experience in it.

Tertiary education is often acquired because of the competition in the job market to have more desirable qualifications than other job seekers (Kwok, 2015). This idea is very pragmatic given that degree holders are likely to own better-paying jobs than skilled professionals who are not graduates (Association of Public and Land-Grant Universities, 2017). Hence, getting the most out of university education is paramount. It not only entails attending classes and studying for exams. However, it also includes having an ecosystem that enables learning to be successfully carried out, therefore, getting the most from a college education.

The OnCE has been broken down into three (3) main sectors: Management, TechnoSphere, and Networking.

Management: The Administrator handles this sector of the OnCE. The management consists of the Admin Portal, Student's information System, and Station. The Administrator and external auditors have access to this sector for auditing purposes.
TechnoSphere: The Technosphere comprises of the; InTechPro, Inventor's hub, and InTech.

Networking: This sector houses the online broadcast of both audio and visual transmission. Online talk shows done by the Online Community-Based Ecosystem (OnCE) can all be found here. Also, a social network such as Facebook for communication amongst users can be found here. All users of the system can access this sector of the OnCE.

For this research, qualitative research methods extensively used for data collection are in-depth interviews, participant observation, and document analysis research.

Lectures, students, and administrators were questioned on this to know what is on the interviewees' minds essentially and know what they think and feel about their current system if there are any. Lecturers and Students of any faculty and department were interviewed based on the research question and the conceptual framework. Based on the responses given, some back-and-forth questions were not scheduled in the initial interview questions to clearly understand the interviewee's perspective (Ayres, 2008; St-Amand, 2018).

Also, the current issues being faced by potential users (lecturers and students) of the system were identified. The current needs are identified based on the Lectures, potential clients, and user's perspectives to understand more. The interview will provide clear findings of the current methods and the factors that may encourage them to embrace the Online Community-based Ecosystem (OnCE). The interview was structured based on the current system being used and the needs of an Ecosystem important to the interviewee. The In-depth Interview instrument were interview questions that started easy. This tactic was introduced to get the interviewee talking and then gravitate to abstract and then sensitive problems.

Participant observation is used to learn about the people being studied in their natural setting doing their activities as usual. It will include actively looking, writing detailed notes, informal interviews, and patience (DeWalt & DeWalt, 2002; St-Amand, 2018). Asides from observing by actively looking patiently, natural conversations can be engaged in, as well as checklists, unobtrusive methods, and even questionnaires. The instrument for the Participant's Observation is the Checklist. The Checklist is used to structure the observation and evaluate the participant. This list of items was marked as either yes or no, and comments were when needed. This instrument is used for consistency (Rosenblatt, 2013; Sheroz, 2015).

Based on O'Leary (2014) book, there are three types of documents, they are public records, personal documents, and physical evidence.

The best advantage of data collection is that the analysis verifies findings and supports evidence from other data collection techniques.

For this research, five (5) documents were analyzed. The documents were management systems used in higher learning institutions. At the end of the analysis, there was a grade for each document based on the rubric. The documents were rated based on how correct the information was, how clear they are, and how detailed they are (Soe, n.d).

METHODOLOGY

Evidently, like any other ecosystem, every factor must be feeding off each other just like a shared mental framework to gain recognition of their work and reach full potential based on Maslow's theory (Jones, 2017).

According to Held, Knaff, and Vosgerau (2006), the phrase "mental model" is theorized knowledge structures people use to reason about the world to make suggestions based on the available information and make predictions. Generally, the concept of mental models based on groups and group members having functions in their group in common with other groups creates a shared mental model (SMM). The shared mental model help make decisions and adjust individual behaviours based on the expectations of other group member's state currently. It also influences activities and actions that may occur in the future. Ultimately, a shared mental model is required to make sense of the group's actions and understand the vigorous changes in their needs and goals, functions, and roles (National Research Council, 2000; Zhou, 2017).

The Ecosystem consists of five (5) active members. They include students, lecturers/professors, admin/auditors/external assessors, industrial participants/potential employers, and the public. They all interact with each other one way or the other to create a shared mental model (National Research Council, 2000; Jones, 2017).

The Lecturers and Professors upload research information that students and the public can access. Information like assignments, exam questions, and attendance can also be uploaded for future reference. Another function of this category of users includes upload publications they are willing to share for free or sale (Bishop, 2016).

The next category of users is the Students, the Students can upload their profile information, and they can access research data and information uploaded by lecturers and professors. There is also leeway for students to indicate their work for potential employers to view and perhaps purchase. Therefore, students reach their utmost potential.

For everyone visiting the OnCE without full access to the system, there is some restricted access. If the people visiting the system are not registered, they are referred to as the 'public'.

The public has access to community service provided by both lecturers and students and all projects that may and may not be for sale, granting them respect and recognition for their work (Milheim, 2012; Sterrett *et al.*, 2018) and frankly that of the lecturers/professors also.

The industrial participants, like potential employers, can see practical work done by Students under supervision by Lecturers, thereby enabling recognition.

Moreover, the admin oversees all these by allowing external assessors and examiners to check that this learning method is up to the standards placed by government agencies. This development provides a warm school culture and security stability (Milheim, 2012; Sterrett *et al.*, 2018).

This research matrix summarizes the research objectives, research question, participants, instruments, and conclusions/outcome are investigated.

Table 1
Research Matrix for the Online Community-Based Ecosystem

Research Questions	Research Objectives	Participants	Instruments	Research Outcome
<u>Needs Analysis:</u> What are the criteria of the existing platform for managing instruction at a higher learning institution and what are the needs for developing a management system?	To find and study the existing methods used in universities for managing instructions and identify factors that will lead to the success of the OnCE system.	Lecturers, Students, Admin	Document Analysis, Participants Observation, In-depth Interviews	To know the existing systems currently being used in the University and other universities.
What are the difficulties and problems faced by managers, admin, and students?	To know the current problems users of the current system(s) face now and identify the factors that influence the Management, TechnoSphere and Networking in the OnCE system.	Lecturers, students, Admin	In-depth Interviews	To know the problems being faced by role members in the University.
<u>Design:</u> How will the design of the OnCE system fulfil the current needs of the users of the system?	To know the needs of universities now when it comes to designing the OnCE system and suggest practical ways the OnCE system will be	Lecturers, admin, potential Clients,	Participant Observation, In-depth Interviews	To know the current trends needed to incorporate in a proposed Ecosystem

	accomplished from the execution stage to the delivery stage.			
Development: How will the prototype of the OnCE system fulfil the current needs of the users of the system?	To ensure the OnCE system fulfils the needs of the admin, lecturers, and students.	Lectures, student, Admin	In-depth Interviews	To know if the proposed design is implemented in the prototype
What are the difficulties and problems faced by managers, admin, and students?	To know the current problems users of the current system(s) face now and identify the factors that influence the Management, TechnoSphere and Networking in the OnCE system.	Lecturers, students, Admin	In-depth Interviews	To know the problems being faced by role members in the University.

FINDINGS AND DISCUSSION

In this section, findings are presented. The interview questions were posed for three of the five categories of users including, lecturers/professors, students, and admin. The questions were designed to align with the research questions which are:

1. what are the criteria of the existing platform for managing instruction at a higher learning institution?
2. what are the needs for developing a management system?
3. what are the difficulties and problems faced by managers, admin, and students?
4. how will the design of the OnCE system fulfil the current needs of the users of the system, how will the prototype of the OnCE system fulfil the current needs of the users of the system?

The interview questions were divided into themes for easier processing of the collected data, based on Clarke and Braun (2013) thematic analysis of qualitative data is a flexible way to identify themes and patterns that are important and then use these patterns to address the research, “a good thematic analysis makes sense and interprets the data. These themes are as follows; engagement, second theme communication, and the third usefulness.

Just as Marek and Skrabut (2017) did in their article Privacy in Educational use of social media in the U.S, the document analysis was based on website contents which are like that which will be carried out here in this section as web content analysis.

The web contents to be analyzed are the systems mentioned in the interviews conducted to supplement the data gathered. These websites and web applications include University A’s Learning Management System, Student management portal, Online library, and University B’s student portal. Just like the in-depth interview, the document analysis will be reviewed using the thematic process. These themes are as follows, the interface of the management system, the aesthetic value, and the interaction.

For this data collection, three classes were observed. An undergrad class, a master’s degree class and a PHD class. The observer was placed as a member of the setting to collect data accurately, understand and capture the scene within which participants interact (Bryant, 2015). A checklist was used for participant observation.

Three data collection methods were used including in-depth interviews, document analysis and participant observation. All data collection methods were helpful in their way, each complementing the other’s result to give a more refined outcome. They were all different in their unique ways, in-depth interviews gave specific answers to questions, these answers were then accessed in the document analysis and observed in the Observation data collection to see the behaviour of the intended users.

Table 2
Comparison of data collection methods

Variables	In-depth Interviews	Document Analysis	Participant Observation
Cost	Moderate	Low	Moderate
Speed	Slow	Moderate	Slow
Response rate	High	Low to Moderate	Moderate
Sensitive questions	Best	Not Applicable	Low
Possibility of bias	Low	None	None

Data obtained from the qualitative methods which include in-depth interviews, participant observation and review of the school's document analysis will be shown here. At the same time, the in-depth interview report in this paper is based on three lecturers, three members of the admin and three students, while the observation report is on three different higher learning institutions classrooms and lastly, the document analysis concentrates on the current systems mentioned by the samples during the interviews which include University A's Learning Management System, Student management portal system, Online library, and University B's student's portal. The Lecturer's portal system which was also mentioned by the samples was not available to be analyzed by the researcher as it was only opened to members of the teaching staff. No faculty member was open to sharing their grading system layout for the sake of this research.

Providing a holistic view of how learning is carried out in and out of the classroom by all categories of the participants to therefore answer all research questions, the questions for the interview were open-ended. Once data was collected from the interview, it was then contrasted with the current systems mentioned by the participants for document analysis and then for the conclusion of the data collection, all details and data mentioned were then observed to confirm that the data collection was reported correctly and nullify untrue information.

In creating the OnCE system, the interview questions are analysed in themes. The first theme examines the use of the existing systems by students, lecturers, and admins based on the collection of qualitative data, the second theme shows the perceptions of the subjects of the implementation of the programme, the third further discusses the benefits that can be derived from the implementation of the existing system. The research has made a concerted effort to present the data with as few comments as possible to create a clear picture and for clarity.

Table 3
Needs vs. Analysis

Needs	Analysis
Physiological needs: Access to basic amenities like water, food, library, computers, a sound and healthy environment	It is paramount that for successful learning, students need access to basic physiological amenities. During the interviews, Student B talked about the washroom does not clean enough and this could make students uncomfortable staying on campus for a longer period. The observer noticed that most classrooms had a restroom very close to the classrooms used for lectures. Water fountains were observed to be also accessible from classrooms. Although it was observed that not all classes had computers, Pomerantz and Brooks (2017) reported that 95 per cent of undergraduates own a smartphone or a laptop. It was also observed that some lecturers did not mind the students using their laptops or smartphones to research during the class. As most of the systems such as University A's Learning Management System are not mobile-friendly as seen during document analysis, using a smartphone on it may be a challenge.

Safety needs: Warm school Culture, security, stability, and Shelter	It was observed that there was security at the entrance of the school. The classrooms are cool enough and comfortable for learning, they are also well shielded for any weather condition. The document analysis results showed that all online systems used were secure with HTTPS protocols.
Social Needs: This includes needs of Belonging, availability of friends and relationships.	It was observed that the lecturers tried to create relationships with students by allowing access to them via WhatsApp groups, emails and even an open-door policy, which means students may visit the lecturer if they needed extra lessons or help to understand what was taught in class. Sharing ideas while learning makes students more comfortable with one another and enables them to show confidence in themselves, thereby showing the chances they take and the amount of effort they give (Delaware Department of Education, 2015). This was reinforced by Student B, Student C, Lecturer B and Lecturer C during the in-depth interviews. The WhatsApp and Facebook groups allow group communications.
Esteem Needs: Work Recognition and Respect	It was observed that Lecturers commended students with an occasional, "good", "correct" remark and sometimes told the class to give a round of applause to a student with correct answers to questions. This creates a sense of joy in the students as often, they smile. Konen (2017) explains that via cheerful specific praises more learning conversations will occur hereby encouraging others to contribute to class activities. On the other hand, students with wrong answers are not entirely ignored by the lecturer as in a particular class the observer reported, the lecturer saying there are no wrong answers. Konen (2017) also commented on this as a way of being respectful by jumping in and restructuring the question asked just in case the students do not understand the said question asked, this also allows students to still communicate freely in the classroom and not use rejection as an excuse to dissociate from interacting in the classroom.
Self-Actualization: Reach full potential and creativity fulfilment	Besides the usual test and examinations scores that every school, university or learning institutions have for the end of every academic session to prove who deserves to move to the next step or grade, it was observed that class activity was as important for the sake of adding to the sessions/semester cumulative grade scores. It was noticed that at the end of some classes a take-home assignment was given to see how creative the students will be outside of the classroom. Similarly, class activities were given during the class and those who were able to solve the questions given correctly were noted for what was assumed to be extra credits. Bates and Bailey (2018) explain that there is only so many leaders can do to take people to reach their full potential, by providing a solid foundation filled with challenges and encouraging creativity. It is then left to the individual, in this scenario, the student's desire to get to the peak whether the learning environment promotes or hinders the students.

The above table explains the needs of students and analyses them based on the data collected.

CONCLUSION AND RECOMMENDATIONS

This research has obtained and emphasized the great importance of having a common system for learning. Many learning institutes lack an ecosystem for efficient and successful evolution for complete learning.

In this part of the paper, pedagogical implications will be suggested to lead institutions to help learners comprehend in a constantly evolving world.

As technology advances, learning ecosystems have evolved. Ecosystems for learning allows all types of learning and gathers standardized information. Ecosystems for learning should serve a vital purpose to genuinely enrich the capability of everyone involved, including students, lecturers/professors, admin/auditors/external assessors, industrial participants/potential employers, and the public (Benedicks, 2018).

The recommendations below are based on the data collected and analysis are as follows:

a. University A should establish a system that is centralized to the key group of people (students, lecturers, public, external auditors, and admin) the university accommodates thereby creating an ecosystem.
b. University A should encourage online classes to complement online course notes delivered to students for future reference and students who were unfortunate to make it to physical classes. It should also allow the upload and download of all file types of teaching materials because different courses have unique file types of students may need for reference, for example, a mobile application class notes may include, pdf/word files of class outline and notes, additionally, an example of a mobile application is an apk file.
c. University A should migrate from hardcopy to soft copy document submissions for external auditors.
d. University A's systems should be mobile friendly and user friendly.
e. University A's system should have a platform where students and lecturers can share their work within the ecosystem, for example, a lecturer who visits a summit or conference could share what he/she learned on the forum, the same applies to students.

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