An integrated system for an effective e-teaching-learning process

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Abstract—The problems revolving around the educational system up till now has not or cannot be completely solved, however these can still be minimized/reduced to enhance successful teaching-learning process. There are numerous problems militating against a successful teaching-learning process, however this is limited to the ones observed in AjayiCrowther University. One of the problems identified is students' inability to ask questions in class and which is identified as being caused by students' bad diction or lack of boldness or courage. In this paper, we propose a system that will help to eradicate this problem by integrating a chat module into the schools website to allow students engage in remote communication with either their lecturers or other students. The system will have an integrated website that will provide students with self-study objects (such as the e-books, tutorial videos and audios) and object modules such as the chat facility.

Keywords-chat; learning; learning style; web-dependent;

1. Introduction

Non-effective teaching-learning process is caused by quite a number of factors which can be the student, the lecturer or the teaching method used by the lecturer. Saturated class session is a controversial problem and attempt has been made to verify the reason behind it. The question now is why do students get saturated in class? Teachers do not interact with the students in the class. This is the most classic reason out of all the other possible reasons. Some teachers unknowingly show more attention to the blackboard instead of their target audience, the students who are actually in the class. Students find the subject too boring to actually stay awake. Some of the most boring subjects are often taught by the most boring teacher possible. Subjects like history should not be read to students. This act is comparable to reading a bed-time story to students waiting in line into dreamland. Teachers should try to turn these bed time stories into interesting stories to get the students attention *(this is mostly achieved through o play-way method of teaching).*Some teachers possess the most beautiful singing voices which could even turn bed time stories to lullabies. These teachers speak in monotonous voice and the words coming out of their mouths are more like chants for sleep spell. When action is not taken against a sleeping student, other students would surely tag along the ride to dreamland. Since the teacher is ignorant of this problem, it then becomes a mutual understanding between the teacher and students that sleeping is permitted in class, often seen as win-win situation between both parties. The problem created by the teaching method (erasable marker and white board method) is the major concern, irrespective of its causes; the proposed system will provide the technique as a measure for solving the problems.

2. Literature Review

There are problems with the traditional "***Chalk and Talk***" teaching-learning process used in AjayiCrowther University. The sources of these problems are either from the teacher, the students or the process itself. Studies have been carried out in the area of e-learning. Some of the related works are e-learning, learning styles, Virtual Learning Environment etc.

A. Students' Perception of E-Learning

E-learning is divided into different types ranging from web-supplemented courses, through web dependent to mixed mode courses and finally to fully online courses [8]. Perception of students shows that students would accept mixed and web supplemented courses in the immediate future than web dependent and fully online courses. These findings support other findings which have established that mixed mode, web-supplemented and web-dependent hold more promise than fully online[1][8][6][2]. Students were unanimous over the statement that there should be some combination of online and face-to-face teaching at University of Ghana. They however, disagreed that fully online courses should replace all face-to-face teaching at undergraduate level. This finding supports the evidence of [8] that fully online provision at campus-based institutions will remain very much in the minority for the short to medium term.In spite of the benefits that will accrue to students when e-learning is incorporated into teaching and learning at University of Ghana, there are three challenges which need the immediate attention of university authorities. These are:

(a) access to hardware (computers);
(b) improvement in bandwidth infrastructure, and
(c) skills training.

B. Learning Styles and Academic Performance

Individuals appear to learn differently or have different learning preferences or styles. [3]reported the work of (Dunn and Dunn, 1987) in describing three styles of learning which are: auditory, visual, and tactile/kinesthetic. Based on the descriptions of each of the learning style preferences, [3] offered that auditory learners prefer to discuss what they are learning. This act helps them process the information. The auditory learner tends to be analytical, logical, and a sequential thinker. Visual learners assimilate information most effectively by reading or seeing something. They tend to be more holistic thinkers and need to see the "big picture" before they are given the bits and pieces that contribute to the big picture. The tactile learner depends on drawings, games, experiments, models and writing to provide the connection between the brain and the hand [11]. The kinesthetic learner needs to be actively (bodily) engaged in the learning process with real world activities and with activities that have meaning to the learner. This learning process is considered one of the most important learning styles since the learned information is stored in one of the strongest memory (procedural) systems of the brain [3]. This procedural memory storage is what allows people to remember how to drive cars, ride bicycles, and swim once they have learned or mastered the skill. As noted in The Praeger Handbook of Learning and the Brain, the Chinese proverb, **"Tell me and I'll forget; show me and I may remember; involve me and I'll understand"** seems appropriate.If the primary goal of instructors is to help students learn and if we assume each of the dominant learning styles are consistently exhibited by the students enrolled in our classrooms, making efforts to address each of the learning styles should help the students succeed academically. [4] stated, "If educators are to successfully address the needs of the individual learner, they must understand what the word individual means. They must relate teaching style to individual learning preference"

C. E-Learning and Meeting the Challenge

There is no definitive agreement on what e-learning is and on terminology used to describe the use of technology in learning [10]. Romiszowski found more than 50 different definitions of the term. From this research Romiszowski developed what he terms "structured definition of e-learning".

The framework developed is as illustrated in table 1.0.below:

TABLE 1.0   STRUCTURED DEFINITION OF E-LEARNING

	INDIVIDUAL SELF STUDY Computer Based Instruction/Learning/ Teaching (CBI/L/T)	GROUP COLLABORATIVE Computer Mediated Communication (CMC)
ONLINE STUDY Synchronous Communication ("REAL-TIME")	Surfing the Internet, accessing websites to obtain information or to learn (knowledge or skill)	Chat rooms with(out) video Audio/Video conferencing
OFFLINE STUDY Asynchronous Communication ("FLEXI-TIME")	Using stand-alone courseware/ Downloading material from the Internet for later local study	Asynchronous communication by email, discussion lists or a Learning Management System

This framework emphasises that e-learning may be either a solitary individual activity or a collaborative group activity where both synchronous and asynchronous communication can take place or a combination of all of these [10]. There are a variety of technology levels, tools, frameworks and architecture systems available to the developer of an educational programme[7]. [5]developed the Guerra Scale (see figure 1.0), which outlines the range of e-learning content that a learner can use.
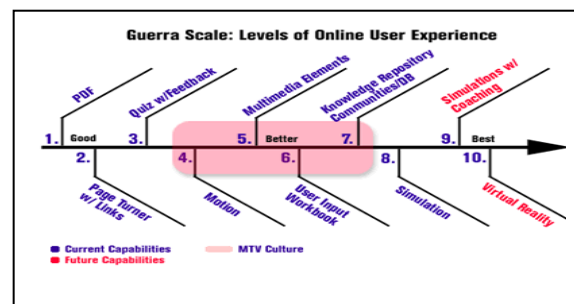

Figure 1.0   Levels of Online User Experience

Having identified that there are different technologies and different learning styles for different learners the challenge is to configure technology to deliver learning in an effective manner. Two case studies with which the author has first-hand experience with are outlined to illustrate the use of e-learning to deliver learning. In addition, some potential pitfalls are reviewed.

D. Issues on the Design of E-Learning Programme

This review has identified the following points that must be considered prior to designing any E-Learning programme.

- There is plenty of evidence to suggest that pure E-Learning programmes do not work whereas there is significant evidence to suggest that blended learning programmes are much more likely to be successful.
- Information is not instruction.
- Instruction must be based on sound pedagogical principles.
- Individuals have different learning style preferences, different cognitive processes and different past experiences.
- Different learning situations require different learning strategies.
- Learners require direction and focus.
- A one-size fits all approach to E-Learning has been shown to be ineffective.

E. The Traditional Lecture Method (chalk and talk method)

Chalk and talk method of teaching is a formal method of teaching, in which the focal points are the blackboard and the teacher's voice, as contrasted with more informal child-centred activities. The main feature of the traditional lecture method revolves round the merit and demerit. These are summarized as follows:

1. Advantages

- Gives the instructor the chance to expose students to unpublished or not readily available material.

- Allows the instructor to precisely determine the aims, content, organization, pace and direction of a presentation. In contrast, more student-centered methods, e.g., discussions or laboratories, require the instructor to deal with unanticipated student ideas, questions and comments.

- Can be used to arouse interest in a subject.

- Can complement and clarify text material.

- Complements certain individual learning preferences. Some students depend upon the structure provided by highly teacher-centered methods.

- Facilitates large-class communication.

2. **Disadvantages**

- Places students in a passive rather than an active role, which hinders learning.

- Encourages one-way communication; therefore, the lecturer must make a conscious effort to become aware of student problems and student understanding of content without verbal feedback.

- Requires a considerable amount of unguided student time outside of the classroom to enable understanding and long-term retention of content. In contrast, interactive methods (discussion, problem-solving sessions) allow the instructor to influence students when they are actively working with the material.

- Requires the instructor to have or to learn effective writing and speaking skills.

F. African Voices on the Digital Revolution

Rebecca [9] stated (African voices on digital revolution) that laptops and mobile phones are now far and away the most popular new learning devices in Africa – while, despite the hype, tablets are still lagging, only being used regularly by 20% of eLearning practitioners. Providing a unique snapshot of ICT developments across the Continent, the *eLearning Africa Report* goes beyond statistics and gives a voice to hundreds of Africans involved in eLearning practice at grassroots level. Its aim is to reflect "the stories, views and experiences of African practitioners and their contribution to the broader African eLearning narrative."These experiences offer surprising insights. Whilst, for example, 40% of respondents said they create local content, only 16% create it in indigenous African languages. And while social media and mobility are becoming more popular, accessing online resources and supporting classroom learning are the most common uses of technology."The Report confirms that mobility in learning and teaching is indeed on the rise in education and skills development in Africa but it has not yet eclipsed traditional ways of education delivery," says *Report* editor Shafika Isaacs.

3. Proposed System Architecture

An architectural description is a formal description and representation of a system, organized in a way that supports reasoning about the structures of the system, which comprise system components, the externally visible properties of those components, the relationships (e.g. the behaviour) between them, and provides a plan from which products can be procured, and systems developed, that will work together to implement the overall system. It defines the structure and behaviour of the system. In figure 2.0 below the interaction process revolves around three (3) main personnel who are the

domain expert (A specialist who possesses knowledge and/or expertise about a particular domain, that is, a source of expertise for developing a knowledge base for use by an expert system), training manager (who will plan, direct and coordinate all the informatics training activities of an organization. In some instances, you may be involved in the delivery of training programs to assist users) and learners. (The end-user of the system). The learner/user is the main subject in designing this system and irrespective of the position a person is holding, as far as he can benefit from the leaning material/object, he/she is bound to be a student/learner/user. The domain expert has little to do in building the system, whereas majority of the job lies with the training manager. The level at which the system is made viable highly depends on the level of the training managers' expertise in using the VLE.

4. PROPOSED SYSTEM DESIGN AND IMPLEMENTATION

There is the need to understand the functionalities of the existing system in order to identify the problems and therefore have a clear picture of the services available on the proposed system. This could be broken down into the following phases:
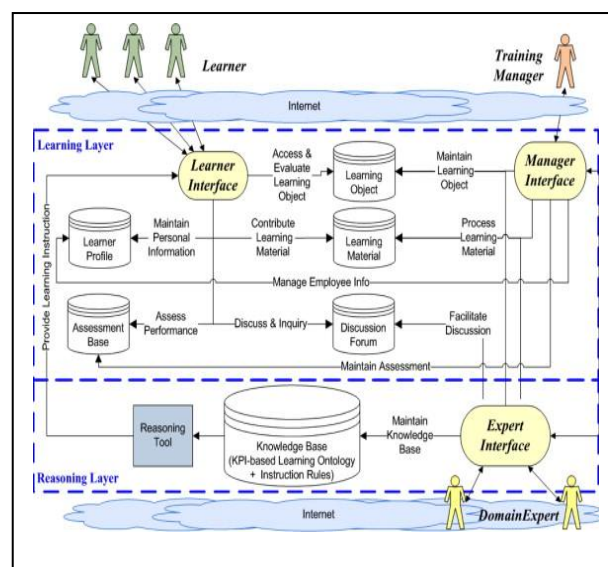

Figure 2.0Diagrammatic representation of the System

A. System Research Phase

This is the information gathering phase about the existing system or software.The teaching-learning process used in Nigerian institutions and in AjayiCrowther University to be precise is the traditional chalk and talk method of teaching. (Erasable markers and white board).Generally the chalk and talk method of teaching in AjayiCrowther University is not a flop i.e. some student still survive with the method. But the success of chalk and talk method cannot be precisely evaluated since most student that graduate with higher degree class also engage themselves in e-learning through self-study.

B. System Analysis Phase

In this phase the present system will be examined and the problems associated with it identified. In AjayiCrowther University and the physical sciences department to be precise, the methodology of the traditional teaching method is stated as follows:

- Every lecture starts 8:00 a.m.

- A single period lecture can only last for one hour and for double period its two hours and can be otherwise depending on the lecturer/ instructor.

- The total period of time spent on each lecture whether a single or double period is not equal to one or two hours respectively.

- The total amount of student present for each lecture is always less than 60% of the class except for cases where quizzes are taken.

B. Analysis of the 'Chalk and Talk'

In the context of the pre-technology education, the teacher is the sender or the source.

- The educational material is the information or message.

- The student is the receiver of the information.

- The delivery medium is chalk-and- talk" method

- In such a lecture, students play a purely passive role and their concentration fades off after the first 25 minutes. *(the class session begins to get saturated).* At the stage of a saturated class, teaching is going on but majority of the student no longer concentrate in learning hence, the objective of teaching which is to transfer knowledge is not achieved.

C. Limitations of the 'Chalk and Talk' Method

Some of the identified limitations of this method could be summarized as follows:

- Teaching in classroom using chalk and talk is "one way flow" of information that cannot satisfy every students with their various learning styles

- Teachers often continuously talk for an hour without knowing students response and feedback.

- The material presented is only based on lecturer notes and textbooks.

- There is insufficient interaction with students in classroom.

- More emphasis has been given on theory without any practical and real life time situations.

- Learning from memorization but not understanding.

In summary , teaching is done because certain number of entity wants to learn, but from the analysis and limitation stated above certain problem are highlighted such as a saturated class session, fewer number of student present in class etc. and with all the problems involved in the traditional teaching method, the objective of teaching-learning process can never be achieved.

D. System design

Systems design is the process of defining the architecture, components, modules, interfaces, and data for a system to satisfy specified requirements. Systems design could see it as the application of systems theory to product development.

Having stated the existing system and its shortcomings, the main objective which is solving the observed problems can be achieved through the following enumerated approach:

- What is to be developed are the learning objects, learning materials and an effective remote interaction medium (as seen in the system architecture) to facilitate interaction among users which include the students/learners and the lecturers/instructors.

- The leaning object and materials can be achieved through the designing of PDFs, PowerPoint, charts, graphs, educative audio files and video tutorials (using Camtasia screen recording software or the PowerPoint video conversion facility). Meanwhile for the sake of comprehensiveness, these learning materials should be designed by the training manager using the information extracted from the domain expert. A training manager can also be the domain expert.

- An effective remote communication medium, this is achieved by integrating facilities like chats, forum, messaging and blogs. And these facilities are provided or found in the VLE (moodle-modular object oriented dynamic learning environment) used.

The services of the Moodle can be summarized as follows:

- It allows the manager to create a list of all courses offered in an institution.

- It allows the manager to create a list of students in that particular institution

- It provides enrolment facility, allowing students to be enrolled into the course/courses which they offer.

- The training manager begins to add resources/material/content to the created courses. This is depicted in figure 3.0
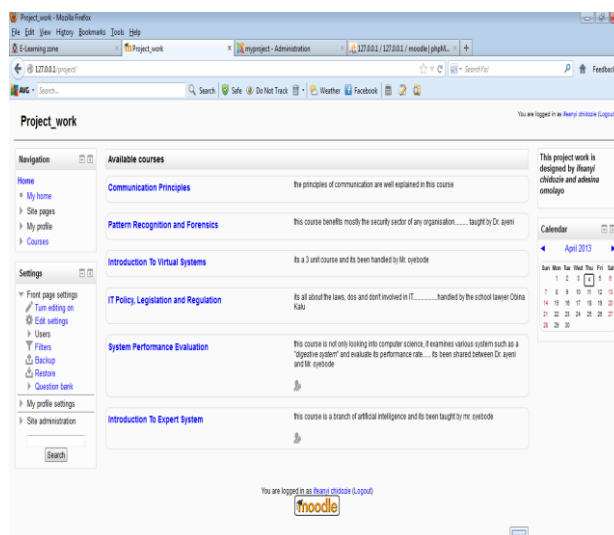

Figure 3.0   Showing List of successfully added Courses Screen

For a user to be able to access the contents of a course, a students must have enrolled for a particular course otherwise could only view list of available courses.

E. The Chat Session

This chat session has being set up for a course (i.e. CSC 4201), and any two or more enrolled students can have a real

time discussion (in this case 4 enrolled students are online having a real time discussion among themselves) every students see the discussion exactly the same way another student will view it. (See figure 4.0 below)
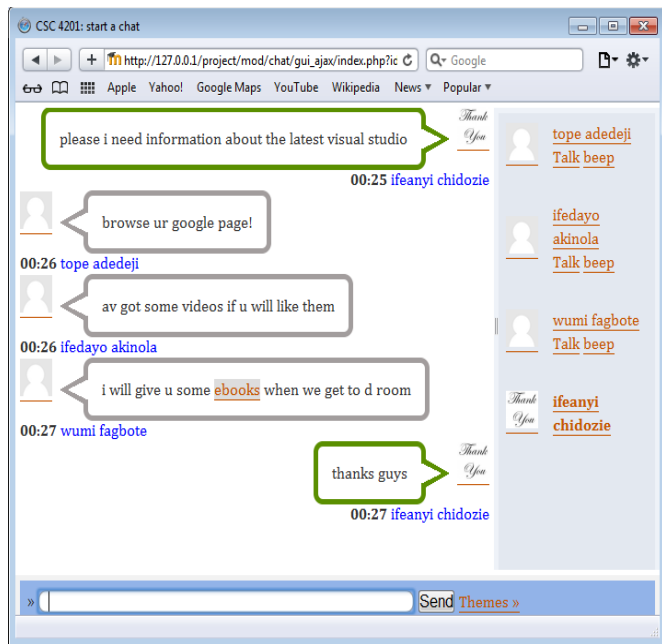

Figure 4.0   A Typical Chat Session Window

5.   Discussion of results

The discussion of result is emphasized on the problems, the causes and most importantly the techniques that solved the project in the proposed system.

1. Problem 1: *Saturated class session*

Having a saturated class session can result to students sleeping in class, disturbing the peace of the class and particularly among ACU students, getting bored up after 45 minutes of lecture. The causes behind this is seen when the teaching method (chalk and talk method) fails to fit the available students' learning style and also when teaching is not interactive and prolonged. The problem is solved by making the learning materials that satisfies all students learning style which are visual, auditory and kinesthetic learners using the ***camtasia*** screen capture and recording software available to the students.

2. Problem 2: *Students with questions not being able to ask questions in class.*

An aspect of these is seen when students produces the answer "Nooooooo question" to every "Any question" asked by the lecturer and also students not bold enough to ask the questions. This could be that the student have bad diction or is suffering from language disability.Since most students fails to communicate boldly among course mates, then providing a remote interaction medium such as a chat, messages and forum facilities will helped solve the problem. In this type of facility, language disability cannot be noticed and diction can be verified before hitting the "enter key".

3. Problem 3: *Fewer number of students present in class*

A proof to this is during test or quiz. On a normal lecture time, hardly do we have up to 39 students present for the class of 50, but when it comes to test, the number proliferates from 50. This could, either be the students already know that a particular course taught by a particular lecturer is going to be boring and saturated therefore they try to avoid it or that

students prefer other learning means such as self-study to classroom method.
Allowing students to engage in self-study with the provisions of appropriate materials and also making classroom setting interactive and interesting can solve this problem.

4. Problem 4: *Some lecturers can sometime feel reluctant coming to class*

This is noticed when a lecturer arrives to the class one hour after which the class is meant to start and leaves the class 15 minutes to the end of the class.

Normal lecture time ⟶ *8:00 a.m -10:00 a.m*

Lecturers' fixed time ⟶ *9:00 a.m – 9:45 a.m*

Bad breaking news which can destabilize the lecturer can be a cause to this problem and can be solved if the lecturer can prepare the video tutorial of all his courses and their topic, so that even if he/she turns weak, there will be a recorded and comprehensive tutorial video that the students can view.

5. Problem 5: *Students don't know what they or others think they know*

A better explanation to this can be seen among the first class candidates of ACU. Most of our first class students rely on the "cram and pour" method of learning, as most of them cannot remember what they did in the just concluded semester.What the institution/lecturer is demanding from a student during examination is a major cause to this problem. If I can cheat from my friend during examination and pass, there is no proof to ascertain if I really know it or not, therefore to solve this, lecturers should emulate the system of conducting oral quiz and exam, this will prompt the student to study hard as criteria for scoring high in oral exams is the ability to give extensive and correct explanation to the questions being asked.With all these problem highlighted, the objectives of teaching and learning can never be achieved.The discussed solutions are now integrated to the VLE by the training manager.

6.   Conclusion

In conclusion,the project has identified problems, observed causes as well as the solutions which were integrated into the website. As part of the identified problems, a saturated class session, fewer number of students being present in class, lecturers sometimes feeling reluctant coming to class and, students finding it very difficult to ask question in class are the major problems and have been observed to be caused by the teaching method used in the class; students' choice for a self-study means of learning, lecturers' self-related matters having no bearing with the subject matter of the course being taught and also bad diction and language disability from students.Preparing course contents that fit into all learning styles for the visual, auditory and kinesthetic learner, allowing students to engage in self-study as well as creating remote interaction medium such as chats and forum facility, have been a solution to the observed problems.

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