ONLINE ELECTRONIC-LEARNING PLATFORM

[1]DLAMINI MBANGO W.E, [2]DEHINBO JOHNSON O, [3]ODUNAIKE SOLOMON A

[1,2,3] Software Engineering Department TSHWANE UNIVERSITY OF TECHNOLOGY South Africa
Email: [1]dlamininwillies@gmail.com, [2]Dehinbooj@tut.ac.za, [3]Odunaikesa@tut.ac.za

Abstract - The rapid growth and development in internet technology has translated into heavy investment by educational institution in e-Learning systems to support their traditional teaching and learning to improve their learners' learning experience and performance. The fact of the matter is that the success of an E-Learning system depends exclusively on the understanding of certain antecedent factors that influence the learners' acceptance and usage of such E-Learning systems. This paper aims to provide a discussion of the current E-Learning environments including their characteristics, limitations, advantages and the major factors that affect the acceptance of such technologies. It is concluded that a successful E-Learning system should consider the personal, social, cultural, technological, organizational and environmental factors.

Keywords - E-Learning systems, web-based learning systems, learning management systems.

I. INTRODUCTION

The influence of Information technology (IT) in human endeavour and corporate sectors cannot be over emphasis. It has fundamentally challenge status quo and are considered as one of the catalyst for effecting change in the all sectors of our lives especially in our institution of learning [1];[2];[3];[4]. There are increasingly motivations among learners and undergraduate to undertake e-learning course but this hope and aspiration has been dashed by the problem associated with rural setting where most of these learners lived. The bad communication system, lack of suitable technology infrastructures, bad roads network, and insufficient human capacity are some of the significant challenges in rural area disturbing the learners from fulfilling their e-learning dream [5];[6]. Consequently, many researchers encourage learners to enrol for e-learning course because it offers flexibility of course and learning time and transcend beyond geographical barriers which is a unique opportunity for learners/students staying at any far off distant regions from the universities or schools they have enrolled [7]; [8]. Indeed, E-Learning adoption is increasing in most universities, schools and institutions of higher/secondary learning around the world. E-learning, also known as web-based learning, on-line education, e-education is defined as flexibility delivery of education through the use of internet to support individual learning or organizational performance and goals [9];[10]. There are different kinds of E-Learning system such as Blackboard Learning System (www.balckboard.com), myTUTor, Eletronic Campus EC, second life, WebCT (www.webct.com), Topclass (www.wbtsystems.com), Lotus Learning Spacewww.lotus.com/home.nsf/welcome/learnspace), Virtual-U, Aulanet, ProjectoVirtus and Teleduc – a free distributed virtual distance education environment that has been developed since 1996. Some of these software tools are commercially available making Web-based education designing, running and managing an easier task.

Smith (2009) stated that E-Learning is among the most recent types of education systems that has been attracted the attention of the educators worldwide. According to [12];[13];[14]. E-Learning is the method, which allows people especially learners/students to take courses from home or anywhere as he/she can access the internet, among other platforms such as peer-to-peer, client-server, and web services. Moravec et al. [15] mentioned that there are several studies, which are looking into how e-Learning tools affect the result of students and learning outcomes such as the research conducted into the influence of using e-tools in the education process at the high school and concluded the positive influence of this tool on learners. In addition, the E-Learning platforms allowed users to access information on the personal computers while most have also been adapted for mobile phone allowing users to access through their mobile devices. However, the success of an e-learning in teaching and offering depends on the understanding of certain antecedent factors that influence the learners' acceptance and usage of such e-Learning systems. This study aims to provide a discussion of the current e-Learning environments including their characteristics, limitations, advantages and the major factors that affect the acceptance of such technologies. E-Learning system should consider the personal, social, cultural, technological, organizational and environmental factors which play important roles in its critical success.

II. RESEARCH PROBLEMS AND QUESTIONS

On the backdrop of post-apartheid South Africa, there has been significant progress and over-hauling in South Africa educational systems. There has been more access, there have been a slight increase in building more schools. In fact, there have been steady focus and attentions by the government to deliver high quality education and improvement success rate. The education budgetary allocation is not bad at +/- 16% of the total budget which is informed by two

central documents that guide the development and implementation of basic education policy as stated by the National Development Plan (NDP) 2030, which sets quantitative goals for the schooling sector and the Department of Basic Education (DBE) own strategic plan, namely Action Plan to 2019: Towards the Realization of Schooling 2030 [16];[17]. Despite these efforts and spending, unfortunately many learners and areas still have poor quality education. The dropout rate is high, at the same time, the success rate is low and there are still secondary schools that achieved a 0% pass rate in their leaving examination. The reason for high dropout rate can be attributed to the fact that most of the scholars are often destitute and have long wish list as inherited by the segregation of the past apartheid government. The desperation to survive and earn living wage so as to cater for the immediate and extended members of family makes them vulnerable to dropping out of school at the slightest beckoning opportunity of job offers. To make matter worst, there are no opportunities to buffer or remedy their decision to drop out of school.

Equally, during protests, lockdown and disruptions, teachers and students are unable to continue with their teaching and learning resulting in loss of academic activities. Some learners and students do not have adequate material and resources. The disparity in distribution of technology and infrastructure to the rural areas created a huge gap in the quality of education and raise the on-going discussion on the effects of Public vs Private Education vs Private Institutions. Thus, the problem statement for this research work directly leads to the following main research question and sub questions:

How can we plan, develop and implement an effective E-Learning online platform?

The sub questions are as follow:

2.1 What other online platforms have been done for electronic learning?

2.2 What are the issues caused by electronic learning on online platforms?

2.3 How can the online E-Learning platform be developed and implemented successfully?

2.4 How to evaluate the performance and sability of the online e-learning platform?

2.5. The adoption of E-Learning

Many higher education institutions are adopting e-learning to meet the rapid and growing demands on higher education. They are starting to recognise e-learning as an additional means to access learning [18]. A strong relationship exist between Khan [18] in 2001 and Salmon [19] in 2011 which suggested that in the recent years, they have seen a melodramatic increase in both the uptake of e-learning within higher education and research into its influence for institutions, the practitioners or teachers, the learners or students [19]. Since 2000, most of the HEIs in the UK managed at minimum one form of virtual learning environment (VLE) systems [19]. There has been a review and report which examined the introduction of e-learning in 24 universities across Europe. They found that most of these universities accept e-learning primarily to support their students, and further found that the courses which have been taken on campus must accordingly improve the quality of the e-learning service delivered to the students[21]. The process of e-learning adoption in the HEIs includes numerous points and different influences which includes the social / cultural, interpersonal and the organizational factors [22]. There are other similar opinions, for instance, there is a conclusion that attitudes have a significant and are essential direct influence on meaning and the goals to adopt e-learning. Other influences to adoption of e-learning are listed as perceived helpfulness, benefits outcomes, ease of usage and the security of the system [19]. No doubt, the progression of e-learning adoption is not simple operation. There are many positive critical success factors that must be considered such as:

- The positive attitudes of the institution.
- The perceived helpfulness in adopting this system.
- The perceived effortlessness and the comfort of using the system.
- The readiness of the institutional team, users and staffs in terms of technology usage.
- Access and cultural evaluation.

III. RESEARCH METHODOLOGY AND DESIGN

The action research will be applied to the design, development and implementation of the e-learning package presented in this study. This is a technique offer us to create knowledge about higher education teaching and learning and deduces influential factors toward adopting e-learning teaching offering. The action research process allows user to design their activities based on their knowledge and previous feedback. It is viewed as a spiralling or iterative process, with each cycle serving into the next cycle. The action research can be defined as an interactivemethod of collecting information that's used to explore topics of teaching, curriculum development andstudent behaviour in the classroom. For example, lecturers could analyse the conditions and contexts of their classroom practice, which would help them to revise and change their teaching practice in a way that would suit their unique circumstances [24]; [25]; [18]. Other research methodologies used in this study are summarized in the table below:

Table 1: linking the research questions with the appropriate methodologies.

No	Research Sub Questions	Technical Objectives	Methodologies	Tools
1	What other online platforms have been done for electronic learning?	To determine existing online platforms that have been done for electronic learning.	Literature review and survey	Questionnaires
2	What are the issues caused by electronic learning on online platforms?	To determine issues caused by electronic learning online platforms.	Literature Review	Journals articles
3	How can the online E-Learning platform be developed and implemented successfully?	To implement and develop a online E-Learning platform successfully.	Prototyping	PHP, Bootstrap ,HTML,CSS,Ajax , AngularJS, MySql Database and JQuery.
4	How to evaluate the performance and usability of the online E-Learning platform?	To evaluate the performance and usability of the online E-Learning platform.	Survey	Questionnaires

3.1. Prototyping

Prototyping is used to explore the essential features of a proposed system through practical experimentation before its actual implementation to make the correct design choice early in the process of software development. We will apply the concept and design principle of prototyping in implementing the system development.

3.2. System tools

The development of the proposed e-learning platform will be implemented using a combination of different programming languages and will be a web based application. We will use HTML for the interfaces and bootrap combined with css to make the application more bright and user friendly. PHP scripting will be used for the back end to communicate with the MySQL database. Apache web server and Ajax, AngularJS and Jquery will be used to test and validate the front end data.

3.3. System architecture

The system achitecture for the proposed sytem will have three privileges admin, facilitator and student which each playing their role as designated. For instance, the admin will be responsible for registering facilitators into the sytem who will be responsible for each and every course in terms of uploading the relevant information and material that the students need for course .

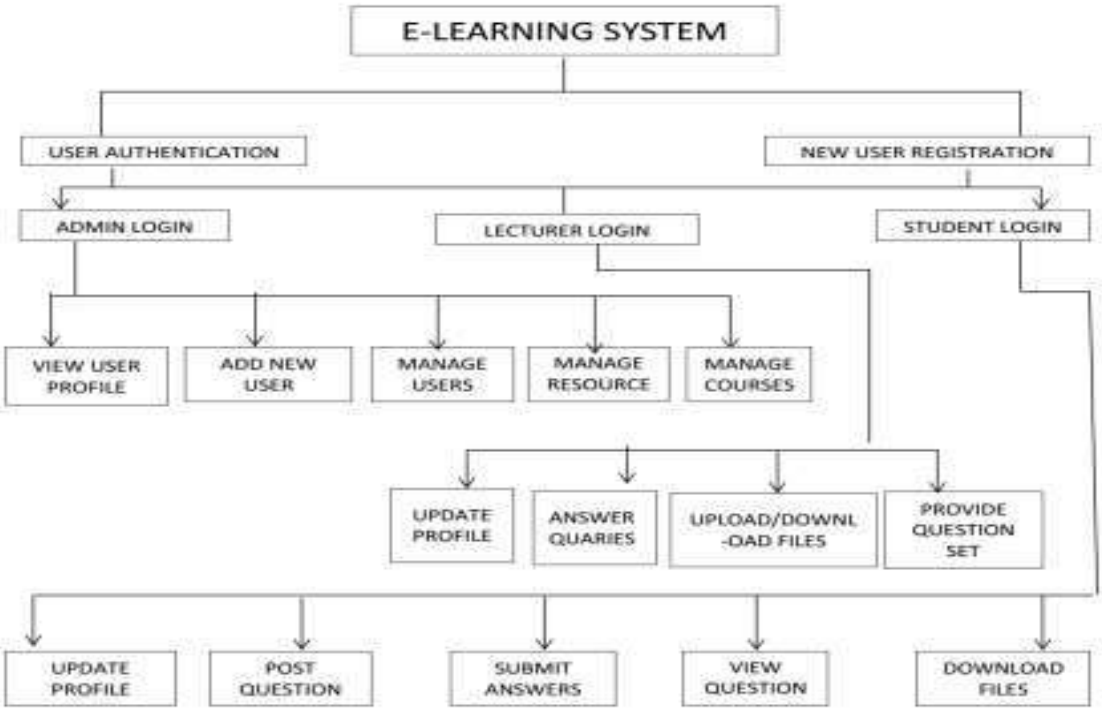


Fig 1: E-Learning System Achitecture

3.4. System flowchart or algorithms

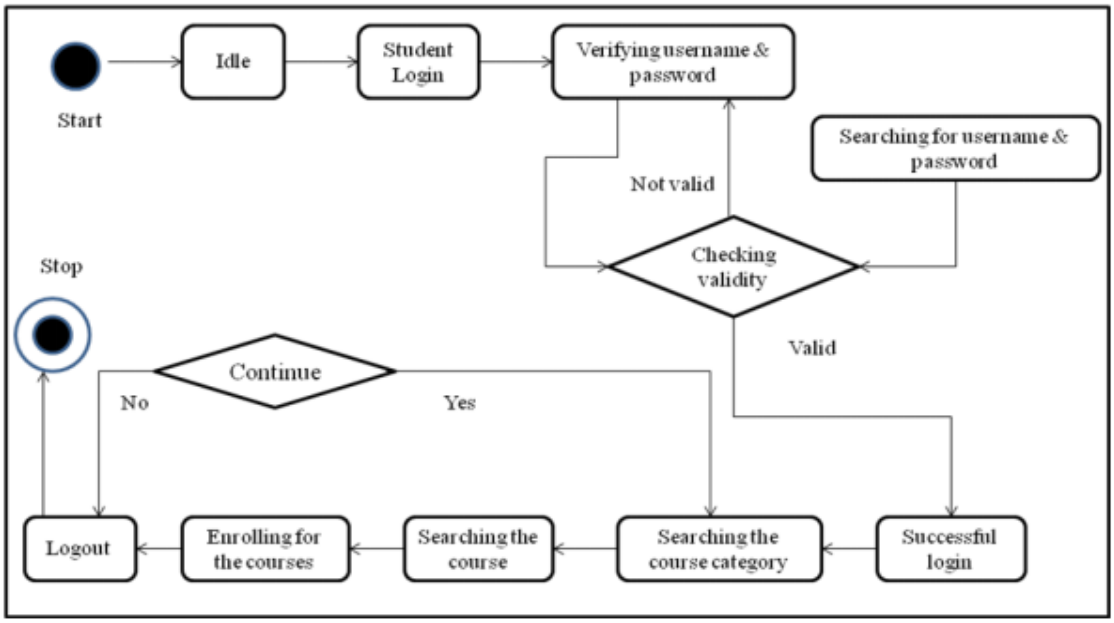


Fig 2:System FlowChart Diagram

3.5. System Coding and System Implementation

The following outline the skeleton codes. The bulk of the codes and function are left out in order to reduce the size and increase the clarity.

```
from urllib import urlopen
from smw.io import XMIStreamer
fromsmw.metamodel import UML14
class TestSuite:
returnedPage = None
defvalidateLink(self, link):
operation = self.getOperation(link)
if operation.name == "navigate":
url = self.getOperationParameters(operation)
fd = urlopen(serverbase + url)
self.returnedPage = fd.read()
fd.close()
elif operation.name == "display":
params = self.getOperationParameters(operation)
pageTemplate = generatePageTemplate(params)
parser = dotHTMLParser(pageTemplate)
parser.feed(returnedPage)
def execute(self, source):
xmi = XMIStreamer(UML14)
fd = open(source, "r")
model = xmi.loadFromStream(fd)
fd.close()
sequenceDiagram = self.getSequenceDiagram(model)
for link in self.getLinks(sequenceDiagram):
self.validateLink(link)
```

3.6. System testing

System testing enables us to verify and validate the business requirements and specifications as well as the application architecture. The modules were tested unit by unit. Once the module / components is integrated, the application as a whole is tested rigorously to see that it meets the required quality and standards.

3.7. System Modules

3.7.1. MY STUDY PAGE module

This is the homepage of the system that appears to all users (admins included) once they are login into the e-Learning platform Training-Online.eu. User navigates by Calendar and Overview of contents assigned to him and its due dates. To access the content is therefore direct and visible on a first sight.

3.7.2. USERS module

All users are managed through this module. User may create, edit and delete entries**.** Additionally, users can perform multiple operations to import or export users to and fro csv file. It enables user to manage its operation as easy as possible. User module also provides core operational system function such as enrol to courses, grouping and ungrouping.

3.7.3. GROUPS module

This module enables user to setup the group that represent teams or classes. Usually those groups are assigned the team leader or teacher with rights to manage all operations and have the access to the results and see the detailed statistics. Team leader can see assigned group and users in all groups. In addition, more team leaders may be assigned to one or more groups, which give the opportunity where each teacher is responsible for specific subject. Grouping provides the much needed management simplicity.

3.7.4. ROLES module

It assigns and configures rights system. The system administrator may create new roles with rights that enable the distribution of user management group to

their team leader and manager or specific department (Training or HR). The configurable roles system significantly contributes to the high level of monitoring and easy management as team leaders has the responsibility to perform all required actions within the education cycle. All the information stored in YOUR LMS is then visible, accessible or editable based on selected module rights.

3.7.5. COURSES module

All courses contents, its lessons, content orders, dependencies and scores are created and managed in this module. You may also see all current and future course enrolments. You may also decide to make a course visible to all other system or entitled users to reuse it, which means they don't need to create their own and it saves their time.

3.7.6. LESSONS module

This module stores and set basic lesson fulfilment parameters such as score, attempts, time. The **u**pload of internal test editor, skill gaps, internal announcements, pdf, video and SCORM files are supported. User may also decide to make a lesson visible to all other system entitled users to reuse it, which means they don't need to create their own and saves their time.

3.8. Data collection

A survey will be used be used to sample, collect and investigate the data, characteristics, behaviours, or opinions of a group of people through the use of carefully designed questionnaire. This research data collection tool can be used to ask questions about demographic information about characteristics such as sex, religion, ethnicity, and income. They can also collect information on experiences, opinions, and even hypothetical scenarios. Data will also be collected through interviews, literature reviews and observation.

3.9. Sample population

A group of Economics first year, second semester English medium class in the University was selected as the sample. The class consist of an almost equal number of males and females. The majority of the students were Sesotho speaking students. In this study, online population observations took place on two different group levels. Group 1 contributed in the academic discussion forums which were recorded and analysed. This was the more formal discussion forum. The social discussion forum (chill café) where students discussed general, non-academic issues was also analysed. Altogether, there were 504 messages for Group 2, spread over a period of 10 active weeks. All these messages were read and where applicable, included in the analysis.

IV. DATA ANALYSIS

The fact that the questionnaires were open ended or unstructured, allowed the students to share as much or as little as they wished about their experiences in the LMS, the effect of it on their learning process and the effect of sharing learning and experience with others in groups. A large amount of data was collected and had to be analysed and interpreted.

4.1. Gender Distribution of the Respondents

Table I shows the gender disparity of the respondents. From the results, it is evident that 70.0% were male while 30% were female respondents. This shows that there are few female participants using the e-learning system. Among the lecturers, 73.3% were male while 26.7% were female. As for the students, 68.0% were male while 32% were female.

4.1. Gender Distribution of the Respondents

Table I shows the gender disparity of the respondents. From the results, it is evident that 70.0% were male while 30% were female respondents. This shows that there are few female participants using the e-learning system. Among the lecturers, 73.3% were male while 26.7% were female. As for the students, 68.0% were male while 32% were female.

TABLE I. GENDER DISTRIBUTION

Category			Gender		Total
			Male	Female	
1	Lecturers	Frequency	11	4	15
		%	73.3%	26.7%	100.0%
2	Students	Frequency	17	8	25
		%	68.0%	32.0%	100.0%
Total		Frequency	28	12	40
		%	70.0%	30.0%	100.0%

4.2. Level of Education and Category of Lecturers

Table II shows staff category and level of education among the lecturer respondents. The most common educational qualification of the respondents was the Masters with a total of 10 representing 66.67% of the respondent followed by degree holders representing 13.3% and the Doctorate degree represents 13.33%. On the staff category most of the respondents were lecturers (7) representing 46.67% followed by Senior Lecturers and Assistant Lecturers each 3 representing 20%, the least was Graduate Assistant / Tutorial Fellow representing 13.33%.

TABLE II. LEVEL OF EDUCATION AND STAFF CATEGORY

		Staff Category				
		Graduate Assistant / Tutorial Fellow	Assistant Lecturer	Lecturer	Senior Lecturer	Total
Degree	Count	2	1	0	0	3
	%	13.33	6.67	0	0	20
Masters	Count	0	2	6	2	10
	%	0.00	13.33	40.00	13.33	66.7
PHD	Count	0	0	1	1	2
	%	0	0.00	6.67	6.67	13.3
	Count	2	3	7	3	15
	%	13.33	20	46.67	20	100

4.3. Experience of the Respondents with E-learning System

All the respondents answered on affirmative as shown in table III on the use of e-learning systems. This means that all the respondents have an experience with e-learning systems. From the results, uploading, assignments, quiz and forum are the most frequently used modules recording 97.5%, 100%, 65% and 95% respectively. The least used modules are journal, chats, workshop and choice at 32.5%, 15%, 32.5% and 42.5% of the respondents respectively.

TABLE III. E-LEARNING SYSTEMS USED

E-learning System	Yes	No
Wiki	57%	43%
Moodle	100%	0%
WebCT	5%	95%
Blackboard	5%	95%
Sakai	0%	100%

CONCLUSION

Technological influences in recent years have been characterised by an increase in the accessibility and usability of information, educational and communication technology tools. This study's aim was to evaluate students' perceptions of the E-learning tools with respect to the perceived effectiveness of the usability of the tool, the quality of the user experience and the perceptions of the quality of self-learning capability of the tool in enhancing novices' learning experience. Moreover, students were evaluated based on whether the tool assisted in overcoming difficulties. The main objective of this report was not only the evaluation of the usability of user interface of an e-learning application but also to analyse the system's support to learner's learning activities. Usability evaluation is done empirically and different methods were selected for this purpose. One usability evaluation methods could not identify all usability problems so multi-method approach should be adopted by involving those users who have regular interaction with the system. Different usability evaluation methods may give different results because each method touches different mind approaches.

Learning style effects on learning, so good user interface means achieving higher user satisfaction level. Two major methods were used in this report for the usability evaluation of Its Learning user interface: For any e-learning application, judging criteria for success is that it should incorporate with the three basic characteristics of usability i.e. efficiency, effectiveness and user satisfaction.

REFERENCES

[1] AL-Syaidh, N.H.J., & Al-Zu'bi, Z.Transformational Leadership and its Impact on the Effectiveness of Employees' Behavior in the Public and Private Jordanian Hospitals. Jordan Journal of Business Administration, 11 (1), 23-57, 2015.

[2] Hajir, J.A., Obeidat, B.Y., & Al-dalahmeh, M.A., The Role of Knowledge Management Infrastructure in Enhancing Innovation at Mobile Telecommunication Companies in Jordan. European Journal of Social Sciences, 50 (3), 313-330, 2015.

[3] Alshurideh, M andAlkurdi, B. The Effect of Customer Satisfaction upon Customer Retention in the Jordanian Mobile Market: An Empirical Investigation. European Journal of Economics, Finance and Administrative Sciences, 47, 69-78, 2012.

[4] Shannak, R. Intermediary Effects of Knowledge Management Strategy and Learning Orientation on Strategic Alignment and Firm Performance. Research Journal of International Studies, 24, 112-128, 2012.

[5] Darawsheh, S., ALshaar, A. and AL-Lozi, M.The Degree of Heads of Departments at the University of Dammam to Practice Transformational Leadership Style from the Point of View of the Faculty Members.Journal of SocialSciences (COES&RJ-JSS), 5 (1), 56-79, 2016.

[6] Alenezi, A., and Shahi, K. Interactive E-Learning through Second Life with Blackboard Technology. Procedia Social and Behavioural Sciences, 176, 891-897, 2015.

[7] Hubackova, S. and Golkova, D.Podcasting in Foreign Language Teaching. Procedia Social and Behavioural Sciences, 143, 143-146, 2014.

[8] Maqableh, M., Masa'deh, R. and Mohammed, A.B The Acceptance and Use of Computer Based Assessment in Higher Education. Journal of Software Engineering and Applications, 8 (10), 557, 2015.

[9] Clark, R. and Mayer, R. "E-learning and the science of instruction: proven guidelines for consumers and designers of multimedia learning". John Wiley & Sons. San Francisco, USA, 2003.

[10] Arasteh, B., Pirahesh, S., Zakeri, A., andArasteh, B. (2014). Highly Available and Dependable E-Learning Services Using Grid System. Procedia Social and Behavioural Sciences, 143, 471-476, 2014.

[11] Draghici, A., Popescu, A., Fistis, G., andBorca, C.Behaviour Attributes That Nurture The Sense of E-Learning Community Perception. Procedia Technology, 16, 745-754, 2014.

[12] Mustea, A., Muresan, M., and Herman, C. Integrating E-Learning into the Trans disciplinary Methodology as a Solution to the Challenges of 21st Century Society. Procedia Social and Behavioural Sciences, 128, 366-372, 2013.

[13] Moravec, T., Stepanek, P., &Valenta, P.The Influence of Using E-Learning Tools on the Results of Students at the Tests.Procedia Social and Behavioural Sciences, 176, 81-86, 2015.

[14] The Presidency, The National Development Plan 2030: Our future – make it work. Pretoria, Government Printers, 2011.

[15] Department of Basic Education, Action Plan to 2019: Towards the Realisation of Schooling 2030. Pretoria, Government Printers, 2016.

[16] Khan, B. Web Based Learning, Educational Technology Publications, NJ, USA: Englewood Cliffs, 2001.

[17] Salmon, G. E-moderating: the key to teaching and learning online. In: www.e-moderating.com (Ed.). London: Taylor and Francis, 2001.

[18] Schwartzman, R. Service-learning responds to technological enchantment and intellectual isolation. College Student Journal.Retrieved June 25, 2013. From: htta://www.wlv.ac.uk/lib/svstems/atharvard. htm, 2001

[19] Lepori, B.,Cantoni, L. andSucci, C.The introduction of e-leaming in European universities: Models and strategies.",Newmine (New Media in Education Lab), Switzerland, 2003.

[20] Stephenson, J. Teaching and Learning Online: Pedagogies for

New Technologies, UK: Routledge, 2001.

[21] Price, J. Action research, pedagogy and change: The transformative potential of action research in pre-service teacher education. Journal of Curriculum Studies, 33:43-74, 2011.

[22] Eickmann, P., Kolb, A. and Kolb, D.A. "Designing learning". In R. J. Boland & F. Collopy (Eds.), Managing as designing (pp. 241-247). Stanford: Stanford University Press. PDF, Page 10, 2004.

★★★