

Integrating e-Learning in Technical and Vocational Education: A Technical Review

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Abstract

Vocational and Technical Education (VTE) is one of the manpower development programmes of study that is attracting the attention of various countries around the world. This quality equally qualifies it to be seen as the only programme that tackles the menace of poverty and create employment skills. Therefore, deployment of Information and Communication Technologies (ICTs) in teaching and learning (e-learning) of VTE courses is paramount and should be given priority. Despite the availability of studies on the use of e-learning in technical and engineering education related areas, there are quite few studies on the integration of e-learning as a tool/environment for disseminating hands-on TVE courses, which this present paper attempted to highlight. Specifically, this paper reviewed technical literature on e-learning in the context of TVE, the benefits of integrating e-learning in TVE and some challenges that could serve as a barrier toward the successful integration of e-learning in TVE. Related studies on e-learning, journal articles, opinion papers, conceptual papers, etc, were analysed to contents related to integration of e-learning in TVE or related subjects were extracted to form this paper. It was concluded that e-learning is so significant that no any TVE programme can afford to neglect, thereby recommending its full implementation in all areas of TVE and practically oriented courses.

Keywords: e-learning, Technical and Vocational Education (TVE)

Introduction

Technical and Vocational Education (TVET) remains the popular means by which trained manpower is produced for economic and industrial growth of both developed and developing countries in the world. The Federal Republic of Nigeria, specifically stated in its National Policy on Education (2004) that, "Technical and Vocational Education is used as comprehensive term referring to those aspect of the educational process involving, in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in the sectors of economic and social life". This could be one of the reasons why TVE is integrated in almost all educational levels; primary, secondary and tertiary institutions. It is also an area that is attracting the attention of young and old researchers as well as educationists around the globe. Moreover, the impact of TVE in curtailing the menace of unemployment, reduction of poverty and the break through in industrial development makes it one of the field of study that requires full deployment of Information and Communication Technologies (ICTs), especially in the present era where world of work is rapidly changing its requirement for workers from skill based to an ICT capable

(Karahocaa, et-al, 2010). This is because recent developments in technology, globalization and changing demand for new skill sets in the job market have necessitated a need for a new teaching and learning paradigm

Today's world of work is continually challenging those entering labour market as fresh graduate or those returning from training or short term courses, especially those from VTE area of specialization. This happens due to the development in the world of work that requires application of ICTs in TVE (Saud et-al, 2011). Since, the inception of ICTs in general education and TVE in particular, several challenges has so far been emanated and challenge workers to be well equipped with ICT-based employable skills. This therefore, calls for general reorientation on the way courses are been taught in TVE, as such adequate arrangement needs to be put in place in order to deploy e-learning in web-based environment for the presentation of interactive e-content to students without limitation of time and space.

Studies and researches on the relevance of e-learning in the field of science and technology, engineering education and even TVE is not exhaustive to address all issues in the knowledge based society. In other words, the literature cannot be seen as abundance that no addition is required, hence the need for this technical literature review to specifically explore the relevance of e-learning environment in technical and vocational education (TVE). Specifically, the paper will analysed documents, articles, research findings, policy documents, etc, to bring out clearly the relevance of e-learning environment in teaching of vocational and technical courses.

E-Learning in the Context of TVE

Due to the flexibility, simplicity and affordability of ICT facility in all areas of human endeavour, its application in the field of education is gaining popularity among educational organisations and their stakeholders (Tondeur, van Keer, van Braak, & Valcke, 2008). TVE in this context is not an exception too; the use of ICTs to foster employability skills is highly recommended (Saud, et-al, 2011). However, the use of Information and Communication Technologies (ICTs) toward the preparation of TVE graduates; and in their mode of training should also incorporate the use of e-learning in teaching learning process. E-learning (ICT based learning environment), enables students, trainees and teachers/instructors interact virtually without physical contact. E-learning or web-based instruction as the name implies refers to

The use of electronic technology and media to deliver, support and enhance teaching, learning and assessment. It includes elements of communication within and between communities of learners and teachers, as well as provision of online content, which may be locally generated or developed elsewhere.

(O'Leary et., al., 2003)

The consensus among educational practitioners is that e-learning is 'the use of processes and technologies to create, distribute, manage, and enable learning via an electronic network.

By the implication of the above definition, one may wonder how e-learning environment that is similar to distant learning in designed and presentation can support the nature of courses offered in TVE, considering the fact that majority of the courses require hands-on activities (practical activities). But above definition offered some explanation to that

effect, as to e-learning environment and its flexibility to allow for the development of course content by lecturers/instructors, in order to give both teacher and student an opportunity to upload and download course material (interaction) and of course the material dealing with practical (hands-on) activities; such as machining, measurement and so on. E-learning in the delivery of hands-on activities have found application in engineering education (Gupta, 2002).

The use of interactive electronic media has proven advantageous in recent study on vocational and technical education students and even seen as a solution to shortage of staff and materials in the field (Karahocaa, et-al, 2010). The integration of e-learning to facilitate problem based learning in engineering and technical education will give students some sort of support to comfortably take part into learning activities, gives them an opportunity to work independently and developed new ideas on the problem at hand (Tasir, et-al, 2005). It was further identified that some strategies for the effective integration of e-learning in problem based learning (PBL) for engineering and technical education are as follows:-

- (1) The use of online assignment tool;
- (2) The use of both synchronous communication tools (such as chatting) and asynchronous communications tools (such as forum and journal);
- (3) lecturer-initiated communication for the PBL case on the e-learning platform,
- (4) Frequent availability of lecturers online for facilitation, and
- (5) The use of online journal for reflection and assessment.

(Tasir, et-al. 2005)

Benefits of Integrating e-learning in TVE

Generally, the preparation of course material for online, web-based or e-learning environment is time consuming at the initial stage. However, the flexibility of the tools enable teachers obtain high quality materials, update lecture note at any given time, facilitates self-learning, support student group work, and support laboratory learning tools such as virtual labs etc. (Michau, Gentil, and Barrault, 2001). The development and delivery of e-learning contents is feasible through the following ways: -

- Map Competencies to Courses:
- Schedule Classes/Register Students:
- Track Learning:
- Develop Learning Content:
- Deliver Learning Content: (Singh, 2005)

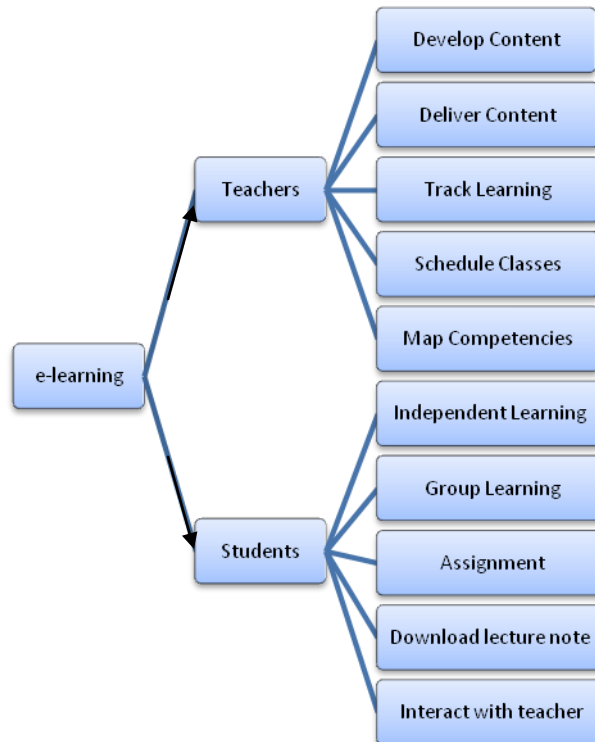


Fig. 1: Some benefits of e-learning to Teachers and Students developed from (Singh, 2005; (Michau, Gentil, and Barrault, 2001), concepts.

Challenges of Integrating e-learning in TVE

Though, e-learning is identified as interactive media environment that facilitate teaching and learning online via internet connectivity, certain challenges have been identified by scholars (Abdellah, 2007; Peterson, 2002). Their work were on engineering education, but can be applied in technical education as well due to the interchanging nature of the nomenclature of the two areas of study. According to them, the following issues have been identified to pose a challenge to the application of e-learning to engineering education (Abdellah, 2007; Peterson, 2002):-

- Identifying the skills required by admitted students.
- Evaluating the progress of students.
- Identifying the appropriate teaching strategy.
- Choosing to use electronic means in laboratory work and the resource required for sharing remote labs.
- Accrediting e-learning-based engineering programs.
- Targeting interactions with international engineering education bodies.
- Estimating the cost of resources serving online engineering education.
- Estimating human and technical infrastructure required.
- Assessing student and staff satisfaction.

- Facing changes in student advising protocols.
- Assessing class software requirements.

Pirani (2004) in his paper titled “supporting e-learning in higher education” states that while institutions adopt e-learning some new issues arises; redesigning courses to be taught using e-learning environment, provision of technical infrastructure and possession of technical skills to use e-learning by staff and students. The major challenges to the implementation of e-learning in TVE lie on technological development, human resources development, infrastructure development, economic issues, managerial and policy making issues. This is as shown in the figure 2 below.

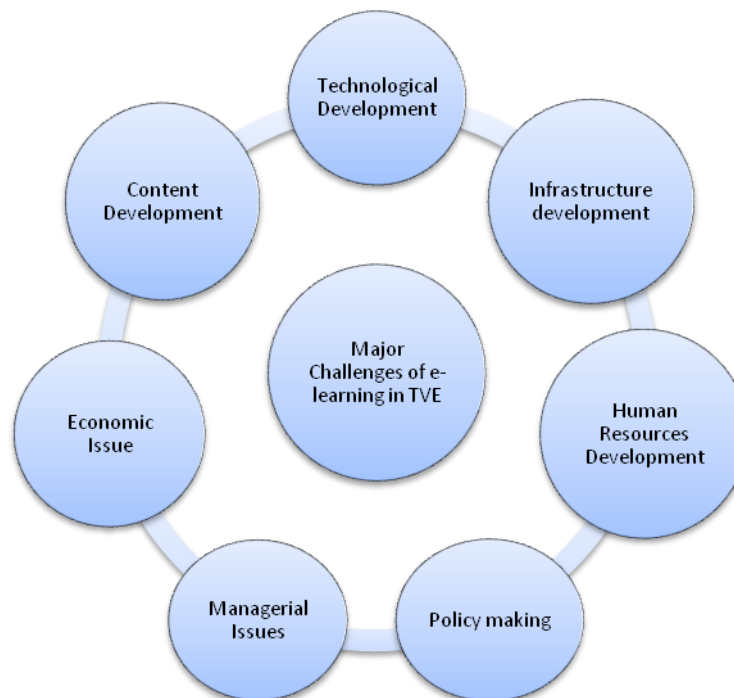


Fig. 2: Major Challenges of e-learning in Technical and Vocational Education

Conclusion

The application of technological innovation in education and the need for TVE graduates to compete in a technology biased labour market necessitated the need for integrating e-learning tool in teaching and learning of hands-on courses. Moreover, the development in internet connectivity, availability and affordability of network service providers enable TVE students to download virtual lecture materials and laboratory manuals and perform laboratory experiments virtually. Despite its benefits and challenges outlined above, full deployment of e-learning tools for enhancing the teaching and learning of engineering related disciplines is something the management of such institutions should dwell on.

However, some of the challenges identified may not be talked within short period of time, especially in developing countries like Nigeria, nevertheless all efforts should have to be

on deck to adopt e-learning teaching and learning system in order to forestall the challenges face by TVE graduate in the changing nature of the world of work.

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