The Role of Virtual Learning Environment in Improving Information and Communcation Tecnology Adoption in Teaching Exploring How Virtual Learning Environments Improve University Teacher's Attitudes about the Use of Information and Comuncation Technology

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Abstract :

The adoption of ICT-enabled teaching in contemporary schools has largely ragged behind despite its obvious and many benefits, mainly because teachers still hold ignorant, misinformed and highly negative attitudes towards ICT-enabled teaching. This article aimed at investigating the effect of Virtual Learning Environments (VLE) on university teachers' attitudes towards using ICT in their teaching, and to further develop a best-practice model for use by stakeholders currently interested in promoting the use of ICT in education. VLE experience can positively shape teachers' attitudes towards using ICT, which would in turn increase the adoption of ICT-aided teaching in contemporary schools. The article argues that when university teachers participate regularly in VLEs, their attitudes towards the use of ICT improves. It is thus recommended that learning institutions and universities should invest in creating productive, regular and readily accessible VLEs for their teaching staff, as an important support incentive to any ICT program deployment.

Keywords - *Virtue Virtual Learning Environment(VLE); Information and Communication Technology(ICT); ICT in Teaching ;Teacher Attitudes; Contionues Professional Development(CPD)*

I. INTRODUCTION

It is widely held that ICT has the potential to improve the quality of learning and teaching in contemporary schools. Empirical studies have also shown that since technology has permeated every way of life, into homes and offices alike, one of the primary roles of modern education is to provide ICT and ICT usage skills. According to Gulbahar and Guven ICT increasingly pervades various aspects of our daily lives like work, business, teaching, learning, leisure and health (and as such), every individual in a society should become technology competent [1]. This realization has motivated governments and learning institutions to initiate programs that integrate ICT into the curriculum through the use of educational software and classroom interactive technologies.

Nonetheless, these programs have faced a major setback across the globe and some researchers have identified teacher attitudes as one of the major hindrances. To this school of thought, the adoption of ICT-enabled teaching in contemporary schools has largely ragged behind despite its obvious and many benefits, mainly because teachers still hold ignorant, misinformed and highly negative attitudes towards ICT-enabled

teaching [2]. In a recent study, Gulbahar and Guven that despite the Turkish government investing heavily in projects meant to integrate ICT in the nation's schools, these projects have not attained any significant success so far [1]. After conducting a survey of 326 teachers, the researcher found that "although teachers are willing to use ICT resources and are aware of the existing potential" the adoption of ICT in their teaching has largely been hindered by a "lack of in service training opportunities" [1].

Important in this respect are some studies that have linked positive teachers' attitude to successful adoption of ICT programs. Reference [3] conducted such a study whose findings confirmed that successful transformation of current educational practices where teachers always avoid using technology in teaching in as much as they can, can only be achieved through "the development of positive user attitudes towards new technologies" [3]. More importantly, Watson went a step further and established how such a positive ICT attitude can be developed in teachers [4]. According to Watson, the most significant factor to the successful and increased integration of computers into modern learning process is to develop positive attitudes among teachers, which can easily be done by creating opportunities for the teachers to learn, use and gain confidence about these technologies [4]. Such experiences according to Watson would help in "avoiding the teachers' resistance to adopt ICT in the classroom [4].

VLE represents such opportunities for teachers to 'learn, use and gain confidence about' ICT. It is hypothesized that VLE experience can positively shape teachers' attitudes towards using ICT, which would in turn increase the adoption of ICT-aided teaching in contemporary schools and other learning institutions. As such, this article is aimed at investigating the effect of Virtual Learning Environments (VLE) on university teachers' attitudes towards using ICT in their teaching, and to further develop a best-practice VLE implementation model for use by stakeholders currently interested in promoting the use of ICT in education.

II. ICT IN EDUCATION

A. Benefits of ICT Enabled Learning and Teaching

In the context of the present discussion, ICT shall refer to Information and Communication Technologies, essentially defined as the "diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information (such as) the internet, computers, telephony and broadcasting technologies (television and radio)" [5].

Numerous scholars, researchers and education professionals have argued the case for ICT adoption in education. Reference [1] for instance argue that ICT integration into the curriculum is a crucial obligation for contemporary schools. ICT is the vehicle through which most of the new and contemporary communication, learning and storage of knowledge occurs. It is hard to get anything done today without using technology, making it mandatory for "all schools to be equipped with the necessary ICT in order to provide the next generations with the needed tools and resources for access and use and to attain the expected skills" [1].

Proponents of the ICT-Aided learning argument cite numerous potential benefits attributable to ICT use in education [4] [3].

In an age when education standards have been on the decline globally, scholars have argued the integration of ICT can help in revitalizing both students and teachers [6]. Technologies such as interactive whiteboards, e-conferences, educative software and education portals among others, have   been proved as an essential boost to classroom activity, learning motivation and general inquisitiveness [1]. According to The World Bank Development Report, ICT-enabled teaching and learning "greatly facilitates the acquisition and absorption of knowledge … reducing the sense of isolation, and opening access to knowledge in ways unimaginable not long ago" [7]. Other researchers have proposed that technology aided teaching provides curricular support to students and teachers alike, in subject areas that would otherwise be viewed as difficult [1].

It has previously been concluded that "one of the most commonly cited reasons for using ICT in the classroom has been to better prepare the current generation of students for a workplace where ICT, particularly computers, the Internet and related technologies, are becoming more and more ubiquitous" [5]. This means that technological literacy amongst both students and teachers as well as the ability to employ ICT skills efficiently and effectively to solve life problems and needs is perceived as representing the competitive edge that the modern society in the increasingly globalizing atmosphere [5].

Another very significant advantage of ICT enabled education is how ICT makes education accessible from any place and at anytime. According to Tinio, "the prominent defining feature of ICT is its ability to transcend time and space" thus enabling what she refers to as "asynchronous learning" or real-time transfer of knowledge across different regions, without the necessity of having learners and instructors in a single location and which is accessible at any time of the day [5]. In teleconferencing for instance, ICT enables learning in a way that can be simultaneously received by multiple, unrestricted and geographically-dispersed participants.

Modern ICT capabilities enable teachers to engage in collaborative projects with their peers, to build partnerships within a particular discipline and to develop effective intervention change strategies for their student ts [1]. Researchers have also argued that ICT integration in education is a prerequisite to the academic preparation of contemporary students, in a world where technology has "created a new global economy "powered by technology, fueled by information and driven by knowledge" [1]. Without a background in ICT use, graduates from modern schools would not fit into the society since ICT applications have become common place in every field of ordinary life [6].

Significantly also, ICT enables cheap and synchronous access to the most advanced learning resources from remote locations. As Tinio argues, "teachers and learners no longer have to rely solely on printed books and other materials in physical media housed in libraries (and available in limited quantities) for their educational needs (since) with the Internet and the World Wide Web, a wealth of learning materials in almost

every subject and in a variety of media can now be accessed from anywhere at any time of the day and by an unlimited number of people" [5].

B. Challenges to the Adoption of ICT in Education

It is a fact that governments and learning institutions across the globe have strived to invest in ICT infrastructure for both teachers and students in the last decade. In a recent study in Malaysia for instance, Keong, Horani and Daniel established that although the Malaysian Ministry of Education has since 2003, invested heavily in ICT installations in public schools [8]. Unfortunately however, the researchers' survey found that "teachers are not fully utilizing these facilities in their teaching" (p. 43). Various studies such as Ageel and Keong, Horani and Daniel empirically determined that there are greatest barriers that are currently preventing both adoption and integration of ICT in teaching [9] [8]:

a) Lack of or inappropriate allocation of adequate time in school curriculums for ICT projects and engagements as part of the timetabled/scheduled activities

b) Insufficient skills and training opportunities among teachers to engage in the use of ICT

c) Inadequate and under-funded technical support for ICT installations and usage

d) Poor integration of ICT in the improvement of curriculum due to lack of adequate or appropriate knowledge

e) Difficulties in using various ICT tools as integrated components of teaching a single lesson

In another study, Watkins a project manager at the European Agency for Development in Special Needs Education conducted a study amongst teachers to determine barriers to better ICT adoption in the European education sector [10]. According to the contributors, the most significant and generalizable factors hindering the use of ICT amongst European teachers included [10]:

a) Lack of confidence amongst teachers in using ICT within normal curricula and programmes

b) Poor and even lack of information sharing and exchange between peers and between different schools

c) Unavailability of adequate specialist software and hardware resources or the funds to perform requisite

upgrades

d) ICT policy not having clearly incorporated ICT into school development programs besides the mere purchase of installations

e) Inexistent assessment modalities to enable teachers evaluate ICT requirements of their pupils

f) Inflexible and largely dogmatic school organization structures

g) Teachers' perceptions regarding the appropriateness and usability of ICT in teaching

h) Lack teachers' incentives to acknowledge, accept and commit to ICT deployment in schools

i) Lack of continues professional development (CPD) in ICT training for teachers

j) Lack of an environment encouraging the use of ICT in teaching

III. TEACHER ATTITUDE IN ICT USE

Current difficulties in deploying ICT in education are well captured by Rajesh in his argument that, "in spreading the use of Information and communication technology some major difficulties are felt by the policy makers as well as the implementers" extending both to the technological front and to the human factor [11]. For the present discussion, it is the human aspect that is of central concern. Teachers are supposed to be the vehicles, the foot soldiers, and the active implementers of ICT in teaching, after states pass policy guidelines on ICT use in education, after schools fund ICT projects and after scholars argue for the benefits of ICT-aided teaching. If teachers fail to embrace the growing momentum, no policy guideline or investment would help in boosting ICT in education. The major concern is "in the years to come, communication technologies will play a major role in deciding learning outcomes" [12].

But perhaps the study that captures these very sentiments in a better way is that of Gulbahar and Guven who conclude that, "providing schools with hardware, software and CPD training is not enough (since), there must be active involvement of the teachers concerned in the whole change process so that there is the element of "ownership" of the innovation" [1]. The scholars recommend that CPDfor ICT-using teachers should accompany peer coaching, peer dialogue and follow-up support to enable them accept and utilize new technologies applicable in teaching contexts [1]. What this scholars capture, albeit covertly, is the role of teachers' attitudes to the deployment of ICT in teaching, being a determinant factor of whether ICT is successfully accepted and deployed or not.

A. Relevance of Teacher Attitude in ICT Adoption

Numerous scholars have irrevocably and repetitively established that the attitudes of teachers are relevant to the learning outcomes of students, be it in the perceived complexity of mathematics and science subjects, in the introduction of new curricula, in the appreciation of art subjects or even in the use of technology. This is especially so when it concerns the use of technology in teaching, where scholars have attributed the failure of success of such programs to the attitudes of teachers. According to Gulbahar and Guven, "teachers' attitudes are major predictors of the use of new technologies in instructional settings" and further that, "teachers' attitudes toward ICT shape not only their own ICT experiences, but also the experiences of the students they teach" [1].

Teachers will use ICT in their teaching just as much as they have positive attitudes about such usage, both for their effectiveness as teachers and for the learning outcomes of their students. If teachers possess negative attitudes, ICT implementation will remain at sub-optimal levels. This brings into question how negative teachers' attitudes towards ICT can be improved to be more positive, as the most effective strategy in promoting ICT adoption in education.

B. How to Change Teacher Attitude towards ICT Use

Various scholars have contributed into the discussion of improving teacher's attitudes. In study surprisingly conducted by eight renowned scholars, Demetriadis et al. concluded that ICT "adoption efforts are generally welcomed by teachers but consistent support and extensive training is necessary in order for them to consider themselves able to integrate ICT in their teaching methodologies" [13].

On their part, Zhao and Cziko argued that there are three basic conditions that are necessary if teachers are ever going to introduce ICT-enabled teaching in modern classrooms [14]. The first of these conditions is positive teacher attitude, where teachers must necessarily positively believe in the need for and effectiveness of ICT. Secondly, teachers must positively believe that using ICT would not trigger any disturbances or inconveniences on their part. Finally, teachers must positively believe that even after adopting such technology, they will retain control over their teaching and over the technology thus adopted [14].

Perhaps the most precise findings on how negative teacher attitudes towards ICT use can be transformed into support were reached by Rogers [15]. To begin with, Rogers established that the most critical factor that determines teacher's attitudes toward new technologies is the nature and characteristic of the technology itself. Rogers identified five characteristic of technology that influences its acceptance, familiarization and subsequent adoption. These characteristic are relative advantage, compatibility, Observability, complexity, and trialibility

According to Rogers, ICT teachers can increasingly develop positive attitude towards its use in teaching if they perceive that ICT will result to advantage that previous teaching methods lacked, that ICT is aptly compatible with the existing teaching practices, that ICT in not overly complicated or difficult to learn and to use, that ICT has observable results when employed in teaching, and that ICT can easily be experimented with at an individual level before being adoption [15].

IV. VIRTUAL LEARNING ENVIRONMENTS

A. What is VLE?

A virtual learning environment (VLE) generally refers to an education system accessible on the World Wide Web that enables the integration of learning tools (such as tests, notes, academic resources, course guidelines, homework platforms, peer contributions etc.) that would otherwise have to be availed in the conventional classrooms, but which are equivalently accessible on the internet with the possibility of interactive exchange. According to JISC, "A virtual learning environment is a collection of integrated tools enabling the management of online learning, providing a delivery mechanism, student tracking, assessment and access to resources" [16]. VLE provides one of way of facilitating computerized learning and teaching, as a form of what is generally called E-Learning. The major benefits of implementing VLEs, especially for universities include [17] [18] [19]:

a) Reduces the demand for physical presence and man hours required to complete academic tasks such as submission of projects

b) Provides a networking platform for instructors across institutions, campuses countries and regions

c) Reduces costs of distributing learning materials for numerous students simultaneously and repetitively, especially in regards to reusable information

d) Reduces time and location limitations that could otherwise make learning inflexible for students and instructors

e) Introduces standardization of instruction and instruction materials

f) Provides unlimited and infinite storage and access repositories of academic knowledge

g) Enables integration of institutional information databases for individual students, courses and instructors, for use in statistical analysis, evaluations and reviews, as well as for record keeping purposes

h) Eliminates human errors of commission or omission in the delivery of official information

i) Provides an interactive forum for students and teachers

j) Economizes on time that an institution's teaching staff needs to communicate with students

k) Reduces the level of technical expertise required to employ the internet in learning by simplifying the user interface

l) Exposes and develops ICT skills in both students and teachers

B. VLE Components

In most implementations of VLE, several components are common. Such elements or components include downloadable course syllabus for one or multiple modules taught in a particular institution, as well as administrative information including instructors, contact details for course instructors, preambles of a course(s), course requirements, registration processes, fee payment, admission prerequisites, information about the school, credits, physical sessions, assignments and tests, reading materials, and links to academic resources [17] [18] [19].

A VLE platform may also feature a course or school specific notice board where all current and crucial information is posted regarding upcoming or ongoing courses. Some VLE versions support peer assessment applications or features, blogs, discussion boards, chats, RSS feeds, supplementary reading materials and virtual learning applications. Finally, VLE platforms can also feature such formal applications as test, essay and project submission applications, academic writing templates, academic writing guides and reverencing guides. Some of the most elaborate VLEs can involve an interface enabling exchange between different institutions [17] [18] [19].

C. Implementing VLE in Modern Schools

To begin with, it is important to note attitudes are the important factor that now remains before teachers can accept and adopt ICT in their teaching, since much of the required infrastructure is already available and accessible. The role of attitude in future ICT deployment is not in question. According to Gulbahar and Guven, "teachers' attitudes are major predictors of the use of new technologies in instructional settings" and further that, "teachers' attitudes toward ICT shape not only their own ICT experiences, but also the experiences of the students they teach" [1].

The question is how to transform current negative attitudes to pro-ICT attitudes. Reference [3] empirically investigated this phenomenon and concluded that successful transformation of current educational practices where teachers always avoid using technology in teaching in as much as they can, can only be achieved through "the development of positive user attitudes towards new technologies" [3], and further that, developing such positive attitudes among teachers can be done by creating opportunities for the teachers to learn, use and gain confidence about these technologies. Such experiences according to Watson would help in "avoiding the teachers' resistance to adopt ICT in the classroom [4].

VLE can thus provide a platform in which instructors can 'learn, use and gain confidence about ICT-aided teaching and in the process, they will develop positive attitudes' about ICT use in general. This study holds that VLE can provide the bridge between teachers and ICT usage, simply by providing an area of compromise for otherwise disinterested teachers and the future of ICT-based education. Important to this argument are the findings of Gulbahar and Guven who conclude that, "providing schools with hardware, software and CPD training is not enough (since), there must be active involvement of the teachers concerned in the whole change process so that there is the element of "ownership" of the innovation" [1].

An ideal VLE implementation model for the purposes of building teachers' attitudes towards ICT-aided teaching should primarily begin by CPD training for ICT-using teachers accompanied by peer coaching, peer dialogue and follow-up support to enable them accept and utilize new technologies applicable in teaching contexts [1].

Next, the VLE can only work in generating positive attitudes among teachers is it meets the criteria developed by Rogers [15]. Rogers identified five characteristic of technology that influences its acceptance, familiarization and subsequent adoption. These characteristic are relative advantage, compatibility, observability, complexity, and Trialibility it is herein argued that for VLEs to enable positive teachers' attitudes towards ICT usage, then it must be perceived as likely to result to advantages that previous teaching methods lacked. Secondly the VLE must be compatible with the existing teaching practices. Thirdly, the VLE must not be overly complicated or difficult to learn and to use. Fourthly, the VLE must have observable results when employed in teaching. Finally, the VLE must be easy to experiment with at an individual level before being adopted [15].

If the VLE is developed with all these requirements, it will expose the teachers to a beneficial, highly rewarding and captivating experience that has the potential to transform their general attitudes towards ICT and teaching. The factors discussed above have been illustrated in a novel model developed to guide the VLE implementation process towards developing positive ICT attitudes among teachers.

TABLE 1. RECCOMMENDED VLE IMPLEMENTATION MODEL
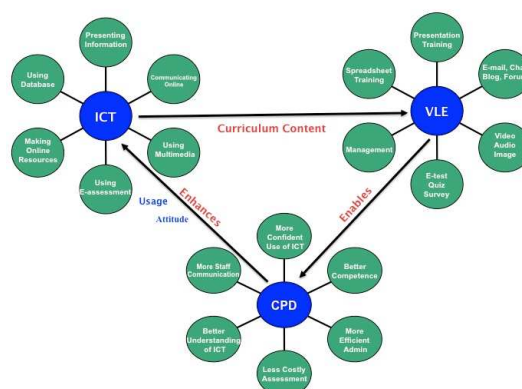
D. Conclusion

It is evident that something needs to be done to improve the adoption of ICT in contemporary teaching practices, owing in part to the potential benefits that both teachers and students can derive from ICT-aided learning. However, the major handle to successful ICT deployment in teaching remains that teachers still hold negative attitudes towards the value, relevance and usability of ICT in their teaching.

This article has established that to change these largely negative attitudes among teachers, it is important to create an opportunity for teachers to actually interact with technology, to gain ICT incremental skills of ICT and to experience the resultant benefits VLEs. This portend significant results because the exposure of teachers to VLE and the practical enablement that VLE gives teachers through CPD, has the potential to transform their negative attitudes to supporting greater levels of ICT deployment in teaching. Using the model advocated for by this article, institutions can indeed use VLEs to better the instructors' attitudes to ICT and by so doing boost ICT acceptance and deployment.

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