Enhancing the Quality of E-learning through Mobile Technology: A Socio-Cultural and Innovation Viewpoint towards Quality E-learning Applications

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Abstract – This paper plans to present piece of the work of a progressing examination extend that is taking a gander at socio-cultural and mechanical advancements from a portable innovation meeting perspective; to demonstrate how socially mindful joining improvements in versatile innovation can be received and utilized for the advancement of society. The paper indicates how interface outline can absolutely improve the quality characterizing attributes of learning in an E-learning situation. Methods for accomplishing these attributes of learning through powerful E-learning are accounted for. This paper is finished by tending to necessities for quality-learning through successful interface-design contemplations, towards meeting the general quality prerequisites of discovering that ought to be natural for an all-encompassing E-learning environment.

Index Terms – E-learning, M-learning, web based learning, mobile technology, ICT

1. INTRODUCTION

In today's world, the part of innovation in conveying learning goals in the formal and casual learning environment keeps on growing. This can be ascribed to a vast degree of advancements in internet and web-related innovations, paralleled with improvements in the data and correspondence innovation area. Such advancements have made it workable for rich E-learning applications and substance assets to be created and conveyed to learners over the globe. As advancements in versatile innovation in base and gadget level gets progressed, more door gets open for a more adaptable portable innovation bolstered learning environment, and improvement of versatile innovation (m-learning) as an E-learning stage gets explored. These improvements in innovation driven learning have been acknowledged at diverse levels and scales, and these have been over the distinctive periods in the diverse economies of the globe; driven by financial quality, the degree of data and corresponding innovations' (ICT) progression in specific economies. For example Tanzania, with the co-operation of multinational technology based companies and non-profit associations has set out different ICT based E-learning tasks to determine learning instructions, undertaking over a million number of optional school (eLearning Africa, 2011). The potential commitment of ICT as a driver of learning exchange towards engaging populaces keeps on growing and governments in the creating scene. For example, Africa has set up empowering arrangements towards the spread of ICT foundation, with an emphasis on social needs. As innovation upheld, learning keeps on discovering its own way into both, the formal and casual learning segment. The accessibility of satisfactory and solid ICT framework will empower the augmentation of learning chances to a more extensive segment of the populace, giving further chances to an enhanced profit for the ICT foundation ventures. Such open doors exist in Africa, where surprising development in cellular telephony market has been observed in recent years (Kefela, 2011).

In taking activities to address social difficulties and in addition to improve the learning knowledge through innovation, the estimation of a proper E-learning framework toward upgrading a quality learning background can't be disregarded. A challenges' portion of adding to a fitting E-learning framework lie in distinguishing suitable and significant segments of the framework, their interrelationships and their part as a major aspect of an E-learning framework. Tending to these difficulties obliges thinking seriously about the innovation measurement: application and base variables, and in addition the non-technical measurement: the socio, monetary, pedagogical

and human (learner) components, towards the advancement of compelled e-learning systems.

In the following sections, we present a dimension-based view of these factors, and a description of each dimension and its relevant facets (components).

2. THE NON-TECHNOLOGY DIMENSION

The focus of this dimension is to identify the social, economic, and pedagogical context of E-learning and its implications on the design of effective learner centered E-learning systems.

2.1 The Socio-Cultural Facet

E-learning systems are usually produced in order to complete indication to the learning method in order to address societal challenges. Therefore, an E-learning systems must acknowledge the type of social goals which are generally used to address one's interpersonal environment, societal values, sociable norms and interpersonal influences of the created users (learner or learner's support group (maybe)). Regarding this, the attitude towards the learning for the intended users is expected to be inherent. The program code of incorporating a great socio-cultural dimension to the learning program is actually implied with the findings of the "School with Regard to Life" project, undertaken within Ghana (Hayford and Lynch, 2003). Socio-cultural aspects in this case can be expected coming from both, a good macro and micro perspectives. Once macro perspective takes into account, socio-cultural details on a good national level can be achieved. Micro perspective refines current socio-cultural perspective of persons or even small groups, hence adopting a good individualism along with collectivism approach, giving username to the learner- a press button aspect of any "cultural pedagogy theory" (Korat, 2001).

The non-technology dimension inputs for the development of social- profile model, to be referenced segmentation equally of E-learning method architecture. This can be holistic and adaptive, and is supportive by the current development regarding social-context responsive E-learning systems. For example, the non-technology dimension facet could contribute for a good knowledge base used for the evaluation of the potential requirement for "on ground" cultural help (especially on the minor urban areas of an developing world) pertaining to the E-learning project, pertaining to illustrate the requirement to its assistances which are relevant to the community extension officials.

2.2 The Learner Facet

A learner centered approach to E-learning is observed as fundamental to the success of an E-learning system. This view is supported in the work of Wang et al. (2004) in their presentation of "User interface with interactive 3D media" and also in their presentation of "Adaptive presentation", in which they make reference to "learner centered (interface) construction" and the use of "learner's traits and preferences" in selecting learning material most appropriate to the learner. In recognizing the value of a learner-centered E-learning approach we present this dimension facet with a focus on providing some contribution to the development of learner-centered E-learning systems; by addressing aspects of the learner that should be considered in the design of E-learning systems.

Within this facet, we identify three main domain areas (stated below) with appropriate to the learner facet. The degree of influence or relevance of each of these domains will depend on the nature of the specific E-learning system. That is, to what extent the user interacts with the E-learning system with the objective of completing learning tasks. For instance, E-learning systems with a high learner-interaction focus are likely to exhibit a higher degree of referencing the information contributed by these domains than E-learning system that are oriented towards learner-support.

- Learner Subject Knowledge Domain.
- Learner's Social Profile Domain.
- Learner's ICT Skill-Set Domain.

2.2.1 Learner Subject Knowledge Domain

E-learning systems may be designed to support both individual and group learners whose focus is to acquire knowledge on a chosen subject area. This domain sources and presents a knowledge profile of the learner, enabling the E-learning system to relate this knowledge profile to a subject learning-content and ascertain the knowledge gap between the relevant learner-knowledge and the learning content, and apply this deduction in making decisions on selecting a most appropriate learning pedagogy. Selecting the most appropriate learning pedagogy can be dynamically achieved in intelligent learning systems or manually configured by referencing predefined learning content mappings to pre-defined levels of required subject-prior- knowledge.

2.2.2 Learner's Social Profile Domain

This domain focuses on refining the higher–level relevant social-profile, presented in the socio- cultural facet, to a level that is unique to a particular user, individual or defined group, of an E-learning system. This learner specific socio- cultural profile is then applied to the design of an E-learning system that is "familiar" to the learner as much as possible. An approach which is also reflected in Duncan-Andrade (2005) on the use of popular culture in education and its role in realizing effective teaching and learning practices. This domain is a specialization of the socio-cultural facet. Social (auxiliary) learner support structures to the learning process; for example, parental support with student homework, parental interest in children's school work etc, is an important aspect of the learning process (Coulombe, 1995), particularly child learning (Public School

Review, 2008). In order to maintain the possible benefits of such support structures to the E-learning process, it is therefore important that the development of E-learning systems takes cognizance of the social support facet of the learning process and find ways of building this into the system.

2.2.3 Learner's ICT Skill-Set Domain

As the use of E-learning systems requires learners to interact with the E-learning system hardware and software interfaces, it is important that users of E-learning systems pre-acquire adequate competence in the use of the relevant E-learning device and its interface as well as acquiring competence in using the E-learning application interface. This domain will support the profiling of the level of competence of the learner in the use of ICT devices such as mobile phones and other hand-held devices against identified user competence requirements of the E-learning system, in support of learner centered interface design by applying context aware design and presentation techniques. According to Wang et al. (2004), taking learner "traits and preferences" into consideration aids in the selection of "the kind of learning material and presentations that would benefit particular learners most". The same no doubt applies to interface rendering based on the learner's current skill level in the use of a particular learning device. In addition, a learner profile derived from information in this domain will be useful in the profiling of learner training needs on the use of the E-learning system prior to commencement of the actual E-learning process.

In the last section, we focused on presenting a socio-cultural view of areas of design consideration that are relevant to the design of socio-culturally aware E-learning systems. We also focused on the socio-cultural environment that should be modeled as part of an approach towards developing quality E-learning systems.

In conclusion to this section, we further observed that fundamentals of a learning processes, e- based or traditional; is the role of learning support structures beyond the teacher or tutor, particularly from a socio- cultural dimension. In traditional learning systems, such support structures are provided at various levels ranging from the nucleus family support structure such as parents and siblings (formal and informal learning sector) to community support structures such as community extension workers (common in the informal learning sector). It is therefore important that E-learning systems should be extended to aid such support structures and reason from an informed reference source in order to assess the need, value and availability of such support with respect to a specific E-learning project. The socio-cultural model could play a great role in presenting relevant demographics on this aspect.
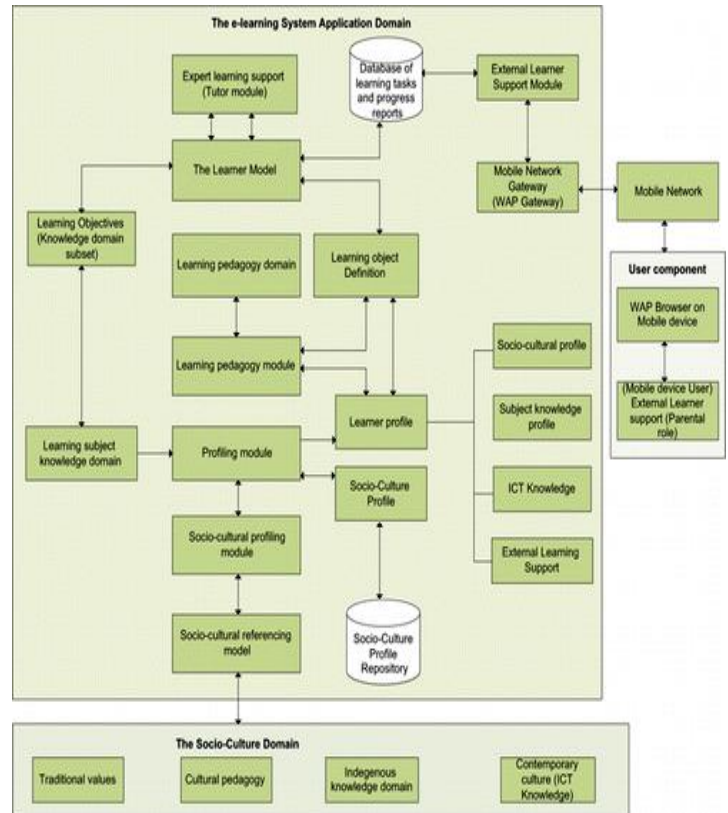

Figure1: The E-learning System Application Domain

3. THE TECHNOLOGY DIMENSION

The ultimate delivery of an E-learning solution relies on the availability of appropriate and adequate technology. The contribution of technology in enhancing a quality E-learning experience is to some extent a function of the availability of appropriate technology for content integration as well as technology. This requires communication for learning materials and contents at an expedite motion and acceptable response times especially in a remote E-learning setup.

Support for multimedia information representation and access in applications, and particularly on the internet, as well as the integration of high speed data, video and voice communication technology, over both wire and wireless networks continue to provide a growing and rich platform for the deployment of E-learning projects.

Within the technology dimension we identify two primary technology areas that have a bearing on the deployment of remotely accessed E-learning systems. These are the infrastructure and application facets. In the subsequent sections, we place emphasis on the application facet and its role in an E-learning system, but first we acknowledge the value of the Infrastructure facet.

3.1 The Infrastructure Facet

Though external to the actual design of an E-learning application, the value of this facet lies in the importance of recognizing the value of having adequate infrastructure, capable of supporting a successful deployment of E-learning based projects. The availability of the right infrastructure and technology for the sharing of learning content supports decision making relating to the technical characteristics of a proposed E-learning system, and how the system will be made accessible to the potential learner. That is, the infrastructure facet is concerned more with issues of E-learning system deployment and E-learning access devices.

3.2 The Application Facet

This facet is the most dynamic component of an E-learning system. The design of this facet draws on the profiles developed from the non-technology dimension in order to adopt a learner centric design approach. In addition, this facet also draws from the infrastructure facet of the same dimension particularly in developing an awareness of the capability of devices targeted for use with the E-learning system to be deployed. This facet also defines available application development technology options. The application facet is the component through which the learner develops a learning experience of the E-learning system, derived from the learner's constant interaction with the E-learning system application. This facet is fundamental in influencing the learner's opinion of E-learning through the way the various components of the e-learning application are projected to the user through the E-learning application interface.

To place this into context, the following section discusses socio-cultural considerations in the designing of the application interface, in line with the discussed socio-cultural view of an E-learning system. We identify socio-cultural views that can be adopted in support of E-learning system design. These views are presented in the context of interface design.

4. THE SOCIO-CULTURAL PERSPECTIVE TO INTERFACE DESIGN

4.1 The Culture-Aware-Pedagogy View

Development of learning pedagogy should take the cultural environment and its influence into consideration. This should be applicable to both formal and informal community based teaching and learning and should be observed in the development of E-learning systems. This approach will benefit from adopting an approach born of cultural practice. This view examines a society's ways of teaching and learning, how knowledge is transformed into practice, how responsibilities for teaching are defined, etc. This pedagogy view should also be adopted for interface design since the application interface will provide the learner with a view to the learning system in its

implementation of the chosen pedagogy. This view inputs to interface design concerns.

4.2 The Pedagogy-Aware View

Designing an interface that delivers E-learning based on a culture-aware learning pedagogy similarly requires the interface design approach to adopt a culture-aware view. That is, a design that takes into accounts a community's tradition and cultural values of teaching and learning as they are represented in the learning pedagogy. The importance of adopting such a cultural view is further expressed in Korat (2001) and Duncan-Andrade (2005). Designing the E-learning system Interface without considering relevant pedagogical issues will run the risk of delivering an interface that does not meet the requirements of the adopted learning style and therefore risk delivering an in- effective E-learning system.

4.3 The Indigenous Knowledge Domain View

An application interface component that is designed to be used in setting up the learning environment would benefit from having access to indigenous knowledge. This knowledge domain would be a reference source for a more accurate profiling of the learner or learner group with an understanding of the values, norms and traditions of a particular society and culture, at individual, community and society levels. This domain would be a source of knowledge inherent to a cultural group by virtue of the traditions of that culture. Information from this domain view will contribute to interface design by including cultural consideration beyond those that are only learning pedagogy related.

4.4 The Learner Profile View

This view profiles the learner, taking into consideration the learner's socio cultural environment. The view presents a unique extract from the non-technology facets presented above and contributes to the achievement of a learner centered E-learning system interface. The view also makes use of the indigenous knowledge domain view in building a profile of the learner or learner group.

In conclusion this section, we make reference to Duncan-Andrade (2005) in which Jeffrey et al. state that "The challenge confronting students of color attempting to acquire academic, professional, and critical literacy is exacerbated by the growing cultural disconnect between the teaching force and the student population". Therefore, adopting a socio-cultural inclusive approach in the design and development of E-learning systems would address this challenge of "cultural disconnect" and minimize the potential of E-learning systems exhibiting inadequacies caused by the "cultural disconnect". This is important, considering that E-learners are of diverse populations and culture and the result of "cultural disconnect" as stated in Duncan-Andrade (2005) is that "Teachers are at a loss to enact engaging multicultural

curriculum with increasingly diverse student populations". E-learning system must therefore seek to avoid this.

5. CONCLUSION

E-learning systems are designed with a primary objective of assisting learners towards achieving identified learning objectives. Objectives which are born with a desire to learn are resulting from the learner's need to achieve in a particular subject area and driven by a human need to achieve or attain a particular goal in society. It is therefore fundamental that E-learning systems are designed to assist learners or users achieve their societal aspirations. An E-learning design-focus should therefore be to present for the learner and other learning support entities an E-learning solution that enhances the chances of the leaner meeting the demands and expectations of and from their learning program. The system must be developed from a learner-centered approach, providing mechanisms for automatic or manual adaptation in order for the system to meet the needs of different learners as much as possible. This can be achieved to some extent by providing as much customizable features as possible.

In designing flexible systems, accessibility and usability features play an important role towards system acceptance, use and value. The internal learning environment of an E-learning system should be inclusive and learner-centered in its design, taking into consideration both the technical (hardware and software) and non-technical (social, cultural, human) system dimensions.

A learner centered E-learning system should be designed to meet the learner's requirements in the way the learner accesses and interacts with the system, as well as in the learning or teaching approaches presented to the learner by the learning system. The effectiveness of the adopted learning style will not only depend on how it is realized at interface level, but will also depend on its appropriateness to the learner. It is therefore important that at the various components of an E-learning system, the design should maintain an awareness of among others, the learner's profile.

Accepting that E-learning systems are likely to be used by learners who potentially will have different learning profiles, the system hence needs to be designed with the capability of building learner profiles as one of the primary requirements before the actual learning process begins. A continuous awareness of the variables that have some influence on the learner's profile is thus an important aspect of developing adaptable learner centered E-learning systems. This can be challenging. Extending these systems with a model for self-adaptive system capability is even more challenging in its requirement for an involvement of intelligent cognitive models.

Of the different components of an E-learning system, closest to the learner is the E-learning application interface and the E-learning device. It is through these that the learner begins to develop a view of E-learning as effective or otherwise, approach to learning. Therefore, even though the effective performance of an E-learning solution depends on all its components, the interface is the user's view to the system, and hence the importance of interface designs.

Even as we hope that this paper has further highlighted and emphasized on some fundamental aspects of the socio- cultural view to the development and use of E-learning systems and E-learning support systems, we recognize the challenges in developing fully socio-cultural aware systems that rely on very little or no human support particularly in the extensive formal learning environment. The hope is therefore that, as this research progresses, some additional insight to the role of the socio-cultural domain in today's world of developments in converging technologies will emerge and contribute in mapping out best practice on how technology, particularly mobile and related technology, can be designed to take along those socio-cultural aspects of value as it develops. The aim of further work in this area is therefore to focus on the development of the socio-cultural reference model.

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