

Contextualized Framework for Ubiquitous Learning Support Using a Learning Management System

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Abstract— This paper proposes a contextualised framework for ubiquitous learning support by means of a learning management system and mobile supporting tools. Learners in higher education are not fixed to particular locations, yet access to learning resources tend to be fixed to certain locations and times. This paper argues that ubiquitous learning could be realised if these resources are availed consistently through the use of a learning management system that supports mobility of learners. The purpose of the study was thus to understand learners' mobility and learning support activities. A case study was carried out at two South African universities - one a contact university and the other, a distance learning provider. Using Activity Theory as a lens, a framework was contextualized based on empirical evidence and sensitive to the South African context. The paper concludes that learning management systems could provide the necessary ubiquitous learning support if learners' context and background is considered in their design and implementation.

Keywords- Activity Theory, Ubiquitous learning support, Learning management system

I. INTRODUCTION

Incidents of delayed service, long queues during registration periods, and inadequate learning support are not uncommon at institutions of higher learning in South Africa. These issues may be related to the lack of or improper use of information systems. In most South African universities, Learning Management Systems (LMS) are some of the systems put in place. However, they are not fully utilised or adequately used to support learning ubiquitously. LMS can be described as an online system that allows instructors and learners to interact with each other, share course material, make class announcements, submit and receive assignments [7]. Although recent reports show that over 98 % of higher education institutions in South Africa have implemented some type of LMS product for their learners [1], these systems are not exploited to the benefit of the learners so as to enhance the learning and the university experience. Currently, LMSs have tools such as discussion forums, chat capabilities, blogs, and wikis; these tools enable active online interaction preferred by today's generation of learners [11]. LMSs are seen to also provide the opportunity to be used innovatively - from just being a source of transmitting information to the facilitation

and management of learning, in line with constructivist approaches. Despite these potentials, most LMSs in developing countries continue to fail, have failed partially or have failed completely [13], with South Africa falling within this category as a developing country.

Although this paper proposes a framework for ubiquitous learning support, it also investigated how learners support each other through awareness of context and social presence afforded in the LMS environment. [5] argues that context awareness and context are important in learning environments where a learner is not permanently situated at a fixed place. The context awareness that learners should have include the use of mobile technologies that they already possess, resources available through the LMS and knowledgeable peers they could interact with when not in fixed formal learning environments. Using Activity Theory as a lens, the paper aims to provide an understanding of how ubiquitous learning can be supported using a LMS and mobile supporting tools.

The rest of the paper is outlined as follows: firstly, background to the research problem is given, this is followed by a brief review of literature and the theory underpinning the study is then discussed. The next section gives the research methodology followed in the study; following this is the discussion of the contextualized framework for ubiquitous learning support. The paper is then concluded.

II. BACKGROUND TO THE RESEARCH PROBLEM

As mentioned in the introduction, incidents of delayed services, long queues especially during registration periods, and inadequate or inconsistent learning support are not uncommon at South African institutions of higher learning. The South African government is under mounting pressure to increase access and participation of learners from previously disadvantaged communities in higher education, and to produce the skills required by society [9]. A general picture of education in South Africa can be described as teaching excessively but with a lack of personal interaction between the learners, lack of personal interaction between the learners and instructors, as well as a poor curriculum plan [6]. Additional challenges in higher education include issues of academic unpreparedness, English language as a medium of instruction

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but not a first language for both instructors and learners, as well as large classes which in turn breeds high instructor-to-learner ratios [4].

Another constant challenge faced by higher education institutions in South Africa is that of providing ubiquitous learning support sensitive to learners' educational and social backgrounds [3]. This paper argues that ubiquitous learning support through a LMS using mobile devices can be one of the solutions to address the above mentioned problems as learners have the ability to learn and get support from anywhere and at any time, using tools they already have.

III. REVIEW OF RELATED LITERATURE

a) *Ubiquitous learning*: Ubiquitous learning represents learning that occurs anywhere, at anytime, with the right resources [12] where learner's learning actions may include searching for information and learning resources, interacting with each other and with instructors and collaborating with peers via the LMS.

b) *Learning support*: Learning support is any help that a learner receives so as to progress with a learning task, after 'being stuck'. Thus, ubiquitous learning support refers to the provision of anywhere, anytime academic help for the learner as they move about different locations [11].

c) *Context awareness*: Context awareness and context are important in learning environments where a learner is not confined to a particular place [5], [8] in [5] define context as the evidence produced by changing relationships.

d) *Learning management systems (LMS)*: A learning management system is a web-based tool that provides functionalities and educational services to manage learning content and resources, as a means to support distance education and supplement traditional teaching [7]. Examples of LMSs used in higher education include *WebCT*, *Moodle*, *Sakai*, *Saba*, *learningSpace*, among others. The LMSs used in the case study were *MyUnisa* at the University of South Africa (UNISA) and *MyTutor* at the Tshwane University of Technology (TUT). *MyTutor* is a variation of *WebCT*, *MyUnisa* is developed by *Sakai*.

IV. UNDERPINNING THEORY

The underpinning theory for this study was Activity Theory (AT). AT can be simplified by stating its key words "internalisation, mediation, subject, object, tool, transformation (Process), rules, community, division of labour and outcomes" [10]. In AT, the activity system is the basic unit of analysis with a focus on activity and context [10]. This paper investigated how learners support each other on the LMS environment when they move in various locations. From an AT perspective, the interaction that happens between the learner and the LMS is regarded as an activity system. The

different components of the system are joined together by dependent activities of actors using mediators, with the aim of achieving a common objective - in this case, a learning support. Ubiquitous learning then becomes the unit of analysis in this context. Figure 1 is based on Engeström's activity system. The activity system was applied in the LMS environment and was used as a lens to collect and analyse empirical data. Figure 1 represents a contemporary view of an activity system.

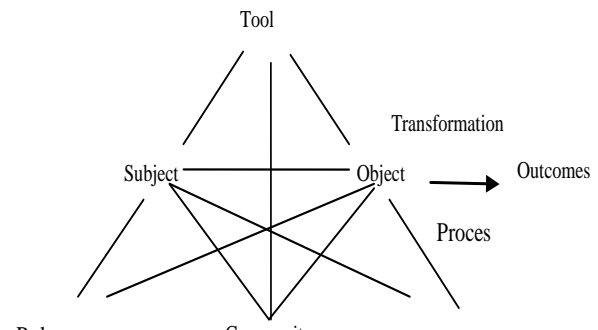


Figure 1. An activity system [2]

In Activity Theory, both activity and context feature extensively. The activity of learning support through an LMS was a unit of analysis, in this study. Activity theory was chosen as a lens because it has successfully been applied previously as a basis for understanding context-based investigations of individual and social transformations in information systems research, as well as in studies for the adoption of LMS in a university [e.g 10].

The activity system in this study had the following elements; the **tool** which is the institution's LMS (*MyTutor* and *MyUnisa*), the **subjects** being UNISA and TUT learners who believe in the usefulness of the tool (LMS) as an enhancer and enabler of the work activity towards the object, the **object** is learning support, **issues of empowerment** where learners can be able to learn alone or from peers without the instructor being physically present, **rules** such as a need to first register at the institution for a particular program and login authentication to the LMS, the **community** was peers, tutors, and instructors acting different roles within the LMS environment, **division of labour** where instructors, tutors, and peers, perform different learning tasks but all towards the provision of ubiquitous learning support, as an **outcome**.

V. RESEARCH METHOD

Interpretive research philosophy was followed using qualitative approach. The study favoured a case study as a research strategy in the collection of data at the two case units:

Tshwane University of Technology (TUT) and the University of South Africa (UNISA). Learners at TUT were given an open-ended questionnaire to respond to questions relating to their use of the LMS on campus, the questions were grouped according to themes following AT elements. The following five themes emerged from AT in relation to the LMS: learners knowledge and awareness of *MyTutor*, accessing information and learning resources on *MyTutor*, communication on *MyTutor*, How learners learn (learning actions) and completing group work. Each theme was analysed using AT elements and the contradictions that emerged were classified as findings of the study. Below is a brief description of the two institutions as to create an awareness of the context where the study took place.

a) Tshwane University of Technology (TUT)

Tshwane University of Technology (TUT) was established on the 1st of January 2004 as the result of a merger of the former Pretoria Technikon, Technikon Northern Gauteng, and Technikon North-West. TUT annually enrolls about 60 000 learners; it is the biggest residential university in South Africa in terms of learner population. TUT’s LMS is called *MyTutor (WebCT)*.

b) University of South Africa (UNISA)

2004 was the year UNISA merged with Technikon SA and Vista VUDEC University (The distance education arm of Vista University which helped primary and high school teachers upgrade their qualifications) to form the current UNISA. UNISA is an ODL (open and distance learning) provider with over 300 000 registered learners dispersed all over Africa. UNISA’s LMS is called *MyUnisa (Sakai)*

1) Participants

The participants from TUT were undergraduate second year level learners from the information and communication technology (ICT) faculty, studying towards an informatics national diploma in Pretoria campus, the learners were enrolled for a course called management information systems (MIS121). The participants have over eighteen months using *MyTutor*. They were given an open-ended questionnaire to fill in about how they use *MyTutor*. The questionnaire was given to forty-five participants during their scheduled class lecture and forty were returned and used. The learners were also observed in a laboratory setting while they engaged with *MyTutor*.

The participants from UNISA were undergraduate learners from various faculties in the institution; they were learners who were enrolled for a computer literacy course (CLC131T), the participants had varying experiences in using *MyUnisa*; from six months. Their textual interactions were also extracted and analyzed from *MyUnisa*’s discussion forums. The textual interactions were from January- September 2011.

VI. CONTEXTUALISED FRAMEWORK FOR UBIQUITOUS LEARNING SUPPORT

From the thematic analysis of the empirical data the framework was conceptualized. From the study the following findings were documented: *The type of information on the LMS*. Learners expressed dissatisfaction about the information on the LMS; they said it was old and irrelevant which in turn made the learners perceive the LMS as a not go-to tool for their studies. *Language disconnect*. Most of the learners if not all are second language or third language English speakers yet communication to them on the LMS is in English, there should be an inclusion of indigenous languages as South Africa has eleven official languages. *The LMS appeal and transition*. Learners said they would like the LMS to be as appealing as social networking systems; it must be more interactive and a better graphical user interface (GUI), they said this will make them use the LMS more and transition easier from social media to the LMS; otherwise the LMS would have failed. With that said, the LMS already has features similar to those of social networking media, the difference lay in how the LMS is used by instructors and administrators. *Availability of communication features* like the chat function; this should be available at all times so that there is constant interaction between the learners and between learners and instructors on the LMS. Despite challenges faced by learners, they believed in its usefulness and it already has institutional support. Below is the conceptualised framework for ubiquitous learning support.

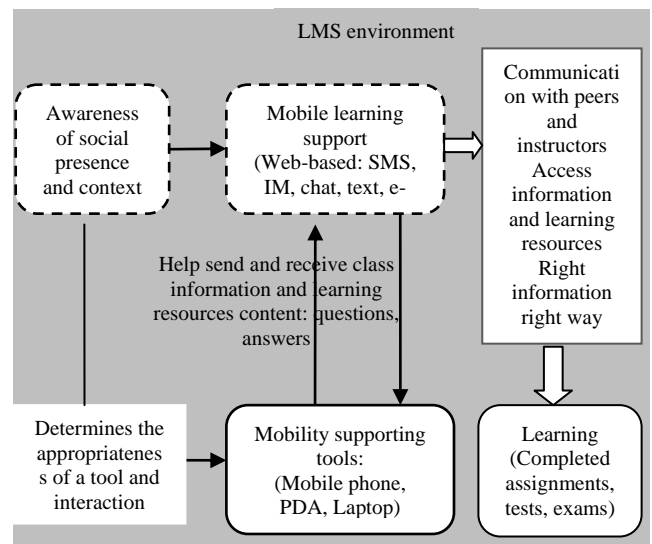


Figure 2. Contextualized framework for ubiquitous learning support using an LMS

From the contextualised framework an ideal LMS should allow learners to use the tools that the majority of them already own i.e PDAs/palmtops/handhelds, smartphones and mobile phones – to provide mobile learning support. The LMS environment should, allow learners to interact back and forth with the LMS by receiving and sending information to the

system. That is, learners should be able to use their mobile phones to send text (SMS)-based questions to the LMS and receive quick responses from the LMS environment. Since almost all learners have mobile phones, mobile learning support would ideally be realised, where learners can get help anytime and from any place, if LMSs were to be interfaced with text messaging services through mobile phones. This idea is informed by Ng'ambi's work where learners at the University of Cape Town are able to use a five-digit phone number to send questions and responses, via mobile phones [11]. The questions and responses are immediately posted and available in a Web-based environment called a dynamic frequently asked questions (*DFAQ*) [11]. This environment could be seen as an ideal mobile learning platform where learners support each other by responding and commenting to questions posted. The learners receive the responses, comments and questions via the tool they already own, their mobile devices. They could also use the language they are conversant with.

An example of how this framework could be used is when a learner is off campus and would like to access information on the LMS; the learner simply takes their mobile phone and sends an SMS using a five digit code to request the information needed. A response would then be sent back to the learners' mobile device. This is just an example of how the LMS with an awareness of social presence and context coupled with mobile tools to support ubiquitous learning.

VII. CONCLUSION

This paper showed a framework for ubiquitous learning support in a LMS environment. Learners can use mobile devices that they already have to access the LMS and request information using short messaging service (SMS); the LMS then sends responses to the mobile device based on the learner's question.

Adding the mobility supporting tools not only makes the LMS easy to access it will also be fulfilling its purpose of providing the ubiquitous on-demand information to learners. Since the requests to and from the LMS are text-based, any type of a mobile phone can be used to use this service (no need for Internet connectivity). This is achievable as a LMS already has institutional support and learners believe in its usefulness.

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