ANALYSIS OF SOCIAL PRESENCE AND CONTEXT AWARENESS FOR UBIQUITOUS LEARNING SUPPORT IN SOCIAL NETWORK ENVIRONMENT

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ABSTRACT
On one hand South African institutions of higher learning are English language environment dominated by underprepared learners and overpopulated classrooms. On the other hand the country has seen an increase of learners entering higher learning fraternity with a fair demonstration of social media proficiency. It was for these reasons this study aimed to conceptualize a framework for ubiquitous learning support in a social media environment. The paper adopted Information System (IS) theories: Context Awareness (CA) and Social Presence (SP) to analyze the textual interactions between learners and their teachers on a social network platform. The analysis was based on how CA and SP manifest and influence learning in the social networking environment. Following a qualitative paradigm, content analysis was used to analyze the data collected in a contextual enquiry. Online focus group and textual interactions (analysis of documentary evidence) were used as qualitative data collection methods for this study. The study found that SP surfaces through the use of predefined modalities of the social networking sites and those that are defined and accepted by the social network sites community. Although contextual task awareness dependents on the user, CA indicators such as temporal and identity takes place automatically through contextual reconfiguration. In this study learners revealed that they were able to converse using any language at any given time and space, including their home language, English or even informal spoken language when interrogating the learning content online.

KEY WORDS
Ubiquitous Learning, Learning Environment, Social Media Site, Social Presence, Context awareness

1. Introduction
Communication and social interaction has never been faster and more seamless than in this current era of the Web 2.0 technologies such as social networking sites. This paper argues that learners and instructors should be able to reach each other or have learning interactions among themselves with minimal place and time constraints. Social networks, as emerging technologies, have become part of people’s daily routines and operations, facilitating our daily lives. For example, learners who find it difficult to communicate or interact with instructors in a face-to-face (F2F) environment due to upbringing and cultural differences can now rely on technology to help them in the academic discourse, such as asking questions and remarking on learning content. Since the higher education learning community in South Africa (SA) is populated by underprepared learners and overpopulated lecture rooms in predominantly English settings, it was argued in this paper that ubiquitous learning support can be effectively leveraged through emerging technologies, notably the social networking environments. This study then developed two research question which reads as follows: (1) how does social presence and context awareness influence the learning interactions among learners in the social media environment? (2) In what way do social presence and context awareness manifest in social media environment? The results and findings of this study were discussed based on these research questions.

This paper is organized into seven sections with introduction being the first. Here is how the rest of this paper is organized. The second section discusses the survey of the literature including social networking sites and the learning environments. Thereafter the researchers discuss in the third section the information system theoretical framework underpinning this study. The theories include Social Presence (SP) and Context Awareness (CA). The fourth section is covering a brief discussion on the research methodology. In the fifth section, researchers discuss the results and findings of this paper and use these findings to conceptualise a framework for ubiquitous learning support in the sixth section of this paper. The last section discusses the conclusion of this research and recommends the future work related to this study.

2. Survey of the Literature
2.1 Social networking site (SNS)
SNS focuses on functionalities such as (1) identity, (2) conversation, (3) sharing, (4) presence, (5) relationships, (6) reputation and (7) groups to cultivate online
interactions [1]. Since its inception, SNS has faced serious criticism from the global public. It is believed to be addictive and offers a playground for bullies and harassers.

Moreover, social networks keeps users checking on their status now and then while ignoring more vital activities. More learners feel disengaged from the world without their connection links such as Facebook and most learners do not feel linked to those physically close to them unless they have digital connection. The adoption of SNS as a principal approach in higher learning environment has improved communication between learner and instructor by expanding dialogue out of the classroom or off campus [2]. [3] SNS provides flexibility and a personal touch when compared to the course management systems (CMS) such as Blackboard. The process of getting information from CMS is more complicated and time-consuming because learners are expected to log on to the system according to the course and peruse the sites to locate the information intended for them [4].

2.2 Learning environment

Learning environment settings allows interactions and cooperation of learners with their peers and instructors towards attaining knowledge. In the literature learning environment is conceptualized as a psychological, pedagogical and social context in which learning takes place to shape the attitude and learning behavior [5]. Since researchers got into online learning environment concepts, more and more related entities grouped under this phenomenon were suggested.

In the information system field previous studies suggested E-learning environments, including but not limited to Mobile Learning Environment (MLE); Cloud Learning Environment (CLE); Ubiquitous Learning Environment (ULE) and many more. E-Learning is one of the important development directions of education. It comprises of network and computers used to transfer knowledge between learners and their instructors through applications such as web based and computer based learning [6]. MLE refers to settings where learners exercise urgency to manage their own learning through the use of handheld computers [7]. CLE is referring to responsive and customizable e-learning environments with benefits for learners such as personalization, collaborative learning and self-regulated learning [8]. Both these extended concepts were instituted with a similar objective of supporting learners without time and place limit for accessing knowledge. These led into the ULE phenomenon.

ULE is defined as any settings that allow learners to access learning anywhere/anytime and it is reportedly pervasive and persistent [9]. Learners carry learning with them as they traverse different learning context and they can access it anywhere. Through the context awareness capabilities, the ULE can detect the behavior of the learners. Unlike the previous researches, this study aim to use the social media platform to suggest a learning environment through and this is accomplished through a proposed conceptual framework. For the purpose of this study learning environment in a contact university is understood as formal, semi-formal and informal contexts [10]. Formal context is regarded as fixed environments such as classroom or computer laboratories with a presence of the instructor. Semi-formal is referred to as places such as libraries and mingling areas like cafeterias. Informal context is any place outside the learning simulated context (for example studying in bus or at home).

3. Theoretical Framework

3.1 Social presence theory (SPT)

SPT is classified as the descendant theory of the communication theories [11]. It was developed to determine the appropriateness of communication media for varying tasks. It is the combination of intimacy and immediacy. [12] Intimacy refers to communication factors such as eye contact, physical distance, facial expression and personal topic of conversation. Immediacy is a psychological distance between sender and the receiver of the conveyed message [13]. Immediacy could be enhanced by the use of nonverbal cues such as eye contact, gesture and closeness with the instructor. It serves as an indicator to the learners for enjoyment of the course with an instructor [14]. Within the social media environment intimacy and immediacy could be easily achieved with the use of emoticons or predefined modalities.

This study followed the approach of applying three qualitative categories of social presence (Affective, Interactive & Cohesive) to assess SP on social media learning environment [15]. Affective refers to responses when a person expresses emotions, vulnerability and tease about towards a phenomenon [16]. Interactive refers to the kinds of communication medium that can offer functionalities such as replying, quoting and copying of the content on a medium. Cohesiveness is identified through such as phatic and salutations, vocatives and usage of pronounce like “we”, “us” and “our” [15].

This study argues that communication medium is regarded high with Social Presence (SP) if it could provide users with functionality that can match categories such as Affective, Interactive and Cohesive. In contrast low SP on a medium could weaken the chances of being affective, interactive and cohesive and in turn the acknowledgement between learner and More Knowledgeable Other (MKO) will be lost [13]. This is the reason this study applied the model and template to examine social presence theory on the social media site when used in the learning environment [15].
3.2 Context awareness theory (CAT)

Context-awareness is the ability of a computer application to acclimatise in the current environment and responds accordingly to its users [17]. The application could only be classified as context aware if it is capable of sensing it’s physical, task and social situation [18]. This study acknowledges that context-awareness is a theory applied in the computer science for development of applications that are capable of determining the why, what, when, who and where about users. This study employed five narrative queries: Who, What, When, Where and Why, to archive the conceptualization of the ubiquitous learning environment [18]. Context is typically characterised as location, identity, and the state of objects, service or situation around the current situation [19]. The meaning of contextual information is acceptable if it is made of the above attributes of which the third (state of the object, service or situation) can have multiple meanings. State of the object could be referring to its current time registration, global positioning system coordinates, motion, speed, expiration and so on. The narrative queries can be used to underpin the following fundamental components of Context-Awareness, as identified by [18]: Temporal Awareness—acquiring of date and time (when) within the context; Location Awareness—Determining the name of the places the user is located at that pointing time and date; Task Awareness—Refers to what the user is doing and Identity Awareness—Determining and managing the who [18]. The promise of context-awareness applications in the learning environment is yet to be a realised.

There is few applications developed specifically for education purposes in the literature. [20] Context – awareness applications have the potential of examining one’s current environment and reacts to his/her changing context. Though the social networks could be the revolution in the communication medium, one important aspect which most researchers haven’t explored is the limit on context-awareness [21]. There is very little information around this area in the literature. Context-awareness is a fundamental aspect of learning more especially in environment where learners are mobile [12]. When implemented well in the learning environment, the context-awareness application can achieve a handful. It holds a potential of providing learners with the right information at the right time.

4. Research Methodology

This research employed a contextual enquiry methodology for empirical evidence gathered in Tshwane University of Technology (TUT). Contextual inquiry is a field research framework that depends on interaction with users in the context of their work [22]. This was the reason the study followed the contextual enquiry methodology to examine textual cues of learners in a social network simulated learning environment. For the purpose of this research, learners were perceived as participants taking on learning every day and the Facebook simulated group was perceived as a learning environment. This study relied on two qualitative methods for data collection which included online focus group and analysis of documentary evidence.

The online focus group were conducted through internet randomly with the subscribers of the simulated group page. The researchers posted open questions to the group page and captured the responses of the subscribers of the group page. Due to the under preparedness of the participants this alternative data collection method was suitable for this study. When data is sourced from research subject that are not willing to partake in face-to-face focus groups, the online version provides an alternative for such studies [23].

The documentary evidence is a type of data collection method that only discusses the sorts of documents generated unintentionally for research purposes by the research participants as they take on their everyday practice in life [24]. Though some researchers refer to the data collection method as the “use of documents as data” [25] or “documentary sources” [24], in this study the data collection method is referred to as “analysis of textual interactions” because learners were taking part in learning activities online. In this study the analysis of the textual interactions was the Facebook transcripts in a form of textual cues from the learners’ interactions recorded during the simulated classes. The researchers created a Facebook group to simulate online learning environment. The Facebook group was named after one of their courses called Computing Skills (CMK).

The shifting boundaries of knowledge between the learners and their instructors about the learning content came about in six months from early January to late June in the year 2013. The Facebook page was created by the researcher involving the respective instructors for this course and the graduate students. The researchers copied the textual cues into a word processor document for easy perusal during analysis. Throughout the early days of the semester the researcher made efforts to encourage the learners to participate in the online class. The simulated online class was a pure Facebook environment without any alteration or customisation of some sort. The intention for implementing an unaltered Facebook environment was to preserve the perception of the learners towards the social media site.

5. Results and Discussion

The results presented in this section are interpreted and generalised according to research questions developed for this study. They are solely based on the data collected from the research participants through interview and analysis of textual interaction. This section aims to inform the reader about the meaning of the data collected.
5.1 How does social presence and context awareness influence the learning interactions among learners in the social media environment?

To address this research question the researchers observed the indicators of both the theories (social presence and context awareness) in the amassed empirical evidence from the recorded communication in the simulated online class and online interview. The interpretations in this section were based on the social presence indicators [15] and context awareness indicators [18]. Social presence surfaces through the use of predefined modalities of the social networking sites and those that are defined and accepted by the social network sites community. On the other hand, context awareness takes place automatically through contextual reconfiguration of the awareness of the context such as temporal and identity. This can also happen manually based on the user contextual commands awareness such as task and location. For manifestation of the SPT category (affective, interactive and cohesion) Facebook allows learners to type in text in the input box which in turn is forwarded to all other learners who subscribe to the online simulated classroom. The learners thus express their feelings to other learners, self-disclose their vulnerability and discuss their outside classroom life activities and share a sense of humour on the social networking environment. They do this by simply using the share button to explicitly refer to others’ messages. Through texting learners ask questions on the simulated class at any given time or they can use the like button to express their agreement with or compliment others’ communication. The FB environment allows learner to add the profile names of those they are referring to in their communication. It is a simple mechanism which is auto-completed as the user types in the first few matching characters. This type of communication was evident in the simulated class where learners used inclusive pronouns such as “we, us & our” while passing on a message to the class participants. Occasionally learners use salutations such as “Hi, Hello” when opening discussions on a social network environment.

For manifestation of the context awareness, the simulated class automatically updates the message’s temporal details as the time and date changes. When the user sends the message, it goes through with the attributes such as time and date. Such details will be presented as “few minutes ago, an hour ago, yesterday and so on”. The identity awareness manifests easily because users have created profiles which are requirements to participate in an FB group. The profile reflects their personal details such as home address, pictures, mobile phone number, interests, religious views and data like relationships. All this information in their profile gives the other learners an idea of whom they are communicating with. The task and location awareness also manifests occasionally on a simulated class. It depends on the learners whether they find it important to know such context in order to successfully accomplish the task at hand. Otherwise through the GPS system, integrated in mobile devices using FB applications, learners do share the location-based information with other learners provided it is important to know such information.

Through social media the learners got to know what was happening around them. It was demonstrated in the simulated class that some learners tended to publish their pointing task context wherever they were. They posted information showing that they are busy preparing for exams or working on assignment. When logged onto the social network sites they are informed about the login and logout of their online friends. One learner stated that they are aware of other happenings through phone vibration when someone is texting online. The learner found the feeling irritating when trying to focus on a serious online conversation similarly to when being in a classroom and some learners are whispering in close proximity. In contrast to the face-to-face interaction and classroom, the interruptions in the online environment are much less and users have the option of activating or deactivating the notifications of someone who is entering a social media room. Unlike in a face-to-face situation, noise cannot be absolutely avoided. The learners’ point of discussion is based on their current context. When asked how they would interact with other learners if they knew they were in the cafeteria, they showed an interest in the contextual information or the availability of object or entertainment associated with such a place. The same applies to the classroom - their discussion would then be related to classroom activities. Learners seemed to like asking questions such as, what is X doing there, Who is X with, Is X available, Is X complete?

The location context can easily be accessed and shared online through the use of a global positioning system integrated in the mobile phones. Through the proximate selection offered by such technologies, learners are able to select their closest or located areas and publish the context just like online friends who get to be aware of the location context. When asked which location they were willing to share freely with their online friends, they mentioned general locations such as shopping centres, hospital, church and academic-related locations such as the classroom, library and open computer labs. They found the academic location context important and relevant with regard to their fellow learners so that they could easily find them when in need of an explanation or any information related to the learning tasks.

Most learners believed that it was only fair to consider the feelings of others before communicating on the social media. The status indicators showed learners the feelings of their online friends as users can update their mood indication on social media from being sad or happy by a simple click on their profiles. One learner mentioned that other than using sad/excited faces to express emotions they can also record what they want to say and send it to their friends through the social media and that the tone of voice would indicate their emotional state. This is usually done when they feel that they need someone to listen to
them face-to-face but which is impossible due to their geographical dispersion.

Although it is possible to greet people and do so by name on the social media, many learners do not find it important to greet or call someone by name on the social networking sites. There seems to be no need to greet because through the social media they don’t feel the distance and absence of their friends even when they are away. It feels to them that they are always present and they never part ways and thus they do not find it necessary to greet one another. They just jump into a conversation. The only time they do greet each other is usually in the morning or after a long absence from the social media. Usually names are only used when the learner needs to be specific and refer directly to the person they are sourcing assistance from.

Identity issues in the form of age, race and cultural background do play a small role when establishing a discussion. Many learners do not want to discuss their personal issues with learners who are much younger than themselves. Many prefer to befriend other subscribers with same age, and will only accept a friendship request from older people if they are somehow related by blood. This is because the level of interest may be different.

5.2 In what way do social presence and context awareness manifest the in social media environment?

According to the observed textual interaction and learners responses, learners seem to feel free to say anything on the social network including what that they couldn’t do or say in a face-to-face environment. This is true based on the findings that online class subscribers tend to be more informal and willing to share personal information when they are aware of their peers’ presence [13]. The simulated environment allowed learners that are language challenged to interact in any language with any other learners that can comprehend. Learners are able to converse using any language at any given time and space, including their home language, English or even informal spoken language when interrogating the learning content. This allows each learner an opportunity to participate in the interaction and indicates a higher sense of social presence.

Contextual information of other learners often serves as a motivational element as some will feel envious when they hear of someone studying in the library. This serves learners as a wake-up call if they have not yet started with learning and preparing for assignments and examinations. Learners get to be aware of the social resources available when studying in their own defined learning spaces like home, canteen, parks and so on. This awareness provides learners with abundant social resources that can respond to queries about the learning content when they face problems and obstacles in their personal learning spaces. This awareness is possible because of the nature of social networking sites. These findings complement well the work that articulates Facebook as a communication tool offering users a medium of communication that allows the creation of a virtual identity and network [26].

With social networks is very easy to spread any urgent information related to the learning content because of the continuous presence of other users online, ubiquitous of the environment and the high speed of the transmission. Once learners are aware of the availability of social resources it becomes possible to interact with different knowledgeable peers in different locations. Learners need not to physical move or wait for the formal, scheduled lectures to raise any learning-related concerns. Even when the learners have noticed that their knowledgeable peers are in a formal environment such as a classroom, this awareness will not stop them from communicating urgent matters.

Social networks made it very easily for learners to consult each other when struggling. It appears that their classmates and academic peers are available online almost all the time because the questioned they always get a response when texting within the social network simulated class.

Those who got intimidated by their more knowledgeable other, i.e. the lecturers, managed to interrogate the learning content in their own spaces. It was mentioned in the interview and it was also evident in textual interactions that learners were able to express their vulnerability when they were experiencing problems in their studies. This was possible due to the absence of face-to-face indicators such as eye contact and facial expression that are often intimidating to learners. Though the intimacy of the lecturer is important in communication, body language such as eye contact can weaken it in F2F environment due to the upbringing norms of a learner. These are the challenges that social network eliminated through online classes.

It was easy for learners to be aware of the availability of social resources online because the availability is indicated on the profile status through the presence indicators. Not all learners rely on this functionality, some posts a messages that are emphasised by multiple questions marks “?????” to indicate their uncertainty about a learning task. This finding was dominant in the textual interaction collected from the simulated online class. Some learners used capitalised letters or emoticons to show their emotions.

Usually learners make use of the status or emoticons on social media to share their feelings. For instance, they will put a sad face on social media and the other learner receiving the communication will become aware that the friend is experiencing problems and will ask what the problem is. This confirms the findings on strategies of creating social presence in online environment [27]. The emoticons help the communication to be clearly understood and interpreted when in use. The learners demonstrated to be comfortable having fun in social network conversations, particularly when they share jokes and learning related videos.
6. Conceptual Framework

Figure 1 illustrates a conceptual framework for ubiquitous learning support through social presence and context awareness, using the social network learning environment in higher learning institutions. The framework is illustrated by dotted lines to show that these concepts occur in the human mind. The largest oval in the figure represents a social network environment. Within this social network environment there are two role players, namely the learner and the knowledgeable peer. Learning in higher education institutions takes place between two persons. There is always one person who needs to interact with and learn the content and the other who shares knowledge and provides clarity or knowledge regarding the learning content.

The person on the far left in the figure represents the learner interrogating the learning content. The knowledgeable peer in the far right of the figure represents any individual in a learning environment with a better understanding of a certain phenomenon that the learner is interested in consuming. The smaller ovals surrounding the persons in the depiction show that learners can access and interrogate learning content in any learning environment. Both role players can be in a formal, semi-formal and informal learning context. In other words, through the social network environment learning can take place anywhere/anytime - in the office, home, classroom, garden, public transport or at a party.

The dots in the heads of the two depicted persons illustrate the knowledge of a phenomenon, i.e. the learner is someone with little knowledge of a specific phenomenon compared to the knowledgeable peer. In the two rectangles above the two persons, high context awareness and social presence in a social media environment are illustrated. The lines from the heads of both role players depict the awareness of context and social presence in the two persons involved in learning. This simply means the role players become aware of the presence and contextual information of the knowledgeable peer when traversing different learning environments. This enhances learning in such a way that a learner can look for assistance in the social networking environment through identity awareness when working in isolated learning spaces such as at home. Through this conceptual framework the learner can be aware of the availability of knowledgeable peers; the locations of the peers; show awareness of their peers’ moods (whether they are excited or sad), as well as of the temporal context such as time and date; and show awareness of the location of the more knowledgeable other or peer whom they can call or chat with for assistance in their learning. The indicators of social presence are very noticeable through the expression of affection using social media modalities such as emoticons (sad/happy faces). Due to the ubiquitous presence of the social media sites, the interactions of the learners and the knowledgeable peers are usually frequent and the learners will appreciate the immediacy and the intimacy from their peers. This can provide a sense of the community of enquiry to all the...
role players in the learning process. Role players can perceive themselves as one unit and united in this environment. As a result, learning has the potential of becoming greatly enhanced and accessible anywhere/anytime because of the richness of social presence and context awareness in the social media environment.

7. Conclusion

Social presence and context awareness were found to be high and rich in the social network environment more than in other communication channels such as the telephone and face-to-face for learning situations. Social media have many advantages due to the ubiquitous acceptance and affordability for the global community. Although there are negative reports regarding the use of social networks in general, there is very minimal research output about any negative elements of social networking sites with specific reference to learning. In this study, SP and CA were found to be acceptably high in a social network learning environment.

Some of the criticisms of social networks include issues of addiction such as the fear of missing out (FOMO) which causes many people to constantly tune into social media, this study argues that the disadvantages outweigh the advantages and do not apply across every environment. There are many positive effects that are of benefit to learners. For instance, FOMO in the learning context is very useful as learners will always check for information and news for fear of missing out any contextual learning information. As a result learning can potentially take place all the time. Social network sites are by nature ubiquitous as they are not fixed to place or time.

This study recommends the future research to investigate the constructiveness of the textual interaction pertaining to learning. Although this study found SP and CA to be acceptably high on a social networking site, it doesn’t necessarily means the textual interactions generated during discussions were constructive to learning. The future research should employ the theories such as social constructivism to help mould the social networking into a constructive learning environment.

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