

Social Presence and Context Awareness for Knowledge Transformation in an m-Learning Environment

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ABSTRACT

Knowledge transfer is a human-to-human process. One of the essential facets of learning is the social interaction in which knowledge is an outcome of individuals sharing experiences. When learners intermingle, there is shift in knowledge due to the social interaction. Consequently, knowledge transformation is a social process which occurs during and when there is an interaction among learners. In a contact university, learners perform tasks in three locations: formal contexts, semi-formal contexts, and informal contexts or non-academic settings. Learning tasks are presumed to be constant but a mobile learner carries the tasks in different environments. As learners move across different contexts, they do not have access to the same social networks for sharing experiences and knowledge transfer. In this paper, we conceptualize a mobile learning environment that provides social presence awareness as a learner traverses different learning contexts. The paper concludes that social presence through the synchronous mobile instant messaging provides learners with continuous awareness of available social support and facilitates on demand sharing of knowledge.

Keywords

Knowledge transformation, Social presence, social interaction, instant messaging, context-aware consultation

INTRODUCTION

The social interaction whose outcome is knowledge transformation is location and time independent. Although this experience is ubiquitous, learners are usually unaware of available social resources they can draw upon for knowledge consultation. Whereas learners encounter problems that may need immediate attention or are time-driven, the lack of social presence awareness makes it difficult to provide them with context sensitive and anywhere, anytime support as they traverse varied locations. Social resources refer to knowledgeable peers or experts (e.g. tutors and lecturers). Context can be understood as the situation in which a learner or a group of learners find themselves. Accordingly, context is defined as any information that can be used to characterize the situation of an entity. An entity is a person, place, or object that is considered relevant to the interaction between a user and an application (Dey and Abowd, 1999).

In a knowledge transformation environment where learners are engaged in a learning activity and knowledgeable peers provide social support, our position is that awareness of social presence is a useful characteristic. On this basis, there are three visible challenges. At the outset, the social network (providing social support) and the learner (engaged with a learning activity) are both not fixed to particular locations. Secondly, learning environments exist to support knowledge transformation and when a learner moves, the environment ought to move with them. Thirdly, the learner and the social network ought to be aware of the social presence of available resources while engaged with location independent tasks.

In this paper a learner is consciously aware of the presence of available social support for a learning problem. The learner is then able to socially interact with knowledgeable peers or experts for immediate and instant resolution of the problem, while moving across locations. Our conceptual model is an environment that supports the mobility of

a learner and the social network. The central feature of the mobile learning environment is the provision of social presence awareness for the purposes of instant interactive consultation and opportunistic knowledge acquisition and sharing. To this end, environment is a synonym for context.

The rest of the paper is organized as follows; background, discussions on knowledge, social presence, instant messaging, conceptualized model, and conclusion.

BACKGROUND

Learners in South African universities come from very diverse backgrounds, with different languages and cultures. Social awareness of knowledgeable peers with shared background, languages and cultures regardless of a learning location would enrich the learning and knowledge transformation experience. Some learners come from previously disadvantaged schooling systems where direct social interaction or one-on-one contact with an instructor is unusual due to limited resources. For these learners, the potential of tailored support on sharing learning experiences through social presence awareness could be positive.

Accordingly, one of the prevailing educational challenges in South Africa is that of providing tailored social support to under prepared learners. Hence, the practical contribution of this paper is towards enriching support through social presence awareness. Our view of ideal social presence awareness for knowledge transformation is one that is sensitive to the background of a learner, culture and language, re-organizes these attributes to provide propinquity of available social networks regardless of location of the learner and task at hand. For learners, shared background, culture and language afford a shared interpretation of information that underlies knowledge construction whose outcome could be favorable learning outcomes.

The focus of this paper is on how social presence awareness is used to support a learner moving across different locations. Our conceptual model is a learning environment that facilitates on-demand “anywhere, anytime” consultation and continuously assures a learner of availability of a social support network. To this end, ubiquitous communication and social interaction is exploited to support learner mobility across varied contexts. As the learner moves between contexts, a knowledge sharing environment moves with them hence maintaining both quality and access to available social networks regardless of context.

In this paper, social presence awareness is made possible through synchronous mobile instant messaging (IM) implemented on pocket PCs. The IM knowledge sharing space allows ubiquitous consultation experience for learners through its presence awareness feature.

In the following sections we discuss social presence, knowledge, instant messaging, and the conceptualized model.

SOCIAL PRESENCE

Social presence is a measure of the feeling of community the learner experiences (Tu and McIsaac, 2002) in a mobile learning environment. Incidentally, social presence is the degree to which a person is perceived as a ‘real person’ in a mediated communication (Gunawardena, 1995). It is the extent to which communication medium facilitates awareness of the other. To examine social presence, the relationship between media and socio-cultural construction of knowledge should be explored (McIsaac and Gunawardena, 1996). The theory of social presence (Short et al., 1976) have been explored in online collaborative learning (Gunawardena, 1995) and distance class environments (Tu and McIsaac, 2002) but its application in a mobile learning environment has not been addressed. This paper aims to address this shortcoming.

Social presence theory is defined as the “degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships...” (Short et al., 1976, p65). They define social presence as a quality of the medium itself and theorize that communication media differ in their degree of social presence, and that the differences are key in determining the way individuals interact. The argument that the quality of the communication media determines its social presence or richness may be contradicted by Ngwenyama and Lee (1997) who envisage that the communication richness of a media is dependent on who and how you use it. Rafaeli (1990) argues that social presence is a subjective measure of the presence of others while “interactivity” is the actual quality of a communication sequence or context.

Mediated social presence involves social interaction using a communication medium, such as instant messaging, to come to know the meanings, cognitions, emotions, and behaviours of another mind (Sallnas et al., 2000). It refers to the feeling of being socially present with another person at a different or remote location. Consequently, social presence can be “cultured” among participants (Walther, 1994). For instance, people interacting in a text-based instant messaging (IM) environment tend to develop an ability to express emotions through the use of “relational icons” or “emoticons.” This “socially cultured” argument, yet again, diverges from Short et al (1976)’s argument that social presence is mostly an attribute of the communication medium.

Although social presence theory has not been explored in mobile learning environments, research to date has shown that social presence can be strongly felt by participants in computer-mediated communication (Walther, 1994; Tu and McIsaac, 2002) and that students’ perceptions of social presence have a strong influence on their satisfaction with online courses (Richardson and Swan, 2003; Tu, 2000; Gunawardena et al, 1997). Researchers have demonstrated both that students perceive the presence of others and that they socially present themselves (Gunawardena, 1995; Picciano, 2002).

KNOWLEDGE TRANSFORMATION

Acquiring, sharing, and processing knowledge are all essential activities of learning. Knowledge is an ambiguous, unspecific and dynamic phenomenon, intrinsically related to meaning, understanding and process (Alvesson and Karreman, 2001). Knowledge is fundamentally intertwined with social settings in which it is encountered. Schutz (1997) views knowledge as possessing radically different meanings for different individuals, based on their biography and positions in the social setting. Knowledge is defined as what we know. It involves the mental processes of comprehension, understanding and learning that go on in the mind and only in the mind, however much they involve interaction with the world outside the mind, and interaction with others (Wilson, 2002).

Knowledge transfer is ultimately a human-to-human process. Since this process is inherently interactive and dynamic, the knowledge, in essence, transforms while or during the very process of its transfer (Shariq, 1999). Knowledge transformation is, therefore, a social process which occurs when there is a shift in knowledge due to the social interaction.

In this paper, the interactive and dynamic knowledge transfer process is realized through mobile instant messaging (IM) as learners communicate by writing text and graphic messages. However, such messages do not necessarily carry 'knowledge', but rather, they constitute 'information', which a knowing mind may assimilate, understand, comprehend and incorporate into its own knowledge structures (*ibid*, 2002). These structures are different for the person writing the message and the receiver, because each person's knowledge structures are biographically determined (Schutz, 1997). Therefore, the knowledge built from the messages can never be exactly the same as the knowledge base from which the messages were uttered. Nevertheless, there is a shift in knowledge that takes place in learners’ minds as they exchange messages.

In mobile IM environment, the volume of information exchanged via text instant messaging is relatively small. That is, cognitive load is reduced as learners acquire and share information in small chunks. Information in this paper refers to all learning task-related content discussed during a social interaction. Knowledge sharing and transfer then refers to the written exchange of information between learners and their social support network.

Mindful that social setting or context in which knowledge is encountered contributes to its meaning, our view of ideal social presence awareness for knowledge transformation is one that is sensitive to the background of a learner, culture and language therefore affording shared interpretations or meanings. Shared meanings are very important to social interaction (Garfinkel, 1967). The meaning of the text (Ricoeur, 1991) in IM interaction derives from its context. In other words, knowledge is socially constructed when IM text message is socially and contextually interpreted. The emphasis of this paper is on exchange of knowledge between learners. Knowledge transformation is the outcome of learners sharing experiences while building helpful and socially rewarding networks of people. For social interaction to begin taking place, learners ought to be aware of the *social presence* of available social resources.

KNOWLEDGE INTERACTIVE SPACE

In this paper, the knowledge interactive social space is Instant Messaging. Instant messaging (IM) is a tool that successfully supports formal and informal communication (Grinter and Palen, 2002; Grinter and Eldridge, 2001) and hence offers the potential to facilitate knowledge transfer, instantly. Cases have been reported where instant messaging was preferred to informal face-to-face conversation because it is less intrusive and allows multitasking (Nardi et al., 2000). According to studies by Grinter and Palen (2002) and by Nardi et al. (2000), IM has been adopted by teenagers for socializing, and by adults for both social and work purposes. Nonetheless, there is lack of research of instant messaging in a mobile learning environment. A better understanding of the social presence in instant messaging that enables and supports the informal social interaction and communication would help in determining and explaining its value in knowledge transfer and education. This paper aims to contribute to that effect.

From observing IM interaction and literature, two broad facts emerge about instant messaging. Firstly, IM conversations have a specific character: they tend to be brief (but could also be used for longer, discontinuous interactions among peers or learners) and mostly cover a single topic, and both media switching and multitasking are prevalent. During the IM social presence, learners could still engage in other activities while maintaining the presence. Secondly, IM is used for the following general functions: quick questions and clarifications, coordinating learner-tutor related meetings, coordinating impromptu social meetings, and keeping in touch.

With the social presence ensured through IM attributes, the paper aims to explicate how these may effect knowledge transformation and learning through social interactions – noting that the social space is mobile-enabled and thereby affording the time and location independency. In this mobile environment, the learner and the social support network are both mobile and hence social presence is no longer limited, unlike in the wired communication space or environments. The learner will be ensured of the opportunistic and appropriate social interaction anytime, anywhere, with the social network in their contact list. Serendipitous learning and knowledge transformation may be realized in this social space.

In the next section, we formulate a conceptualized model that provides social presence awareness as the South African learner experiences various learning contexts.

CONCEPTUALIZED MODEL

Providing personalized academic support to under-prepared learners stands as one of the prevalent educational challenges in South African higher education. Our conceptual model is located in a contact university where learners attend formal lectures and laboratories. In a contact university, there tend to be disproportion in access to available social networks between when learners are attending scheduled or formal classes and when away from scheduled classes. We make distinctions among the three learning contexts: formal contexts e.g. scheduled classes and laboratory sessions (where a learner's behavior is modeled according to an institutional timetable); semi-formal contexts e.g. libraries, walk-in laboratories, and mingling areas (these contexts may represent informal spaces on campus used by learners while waiting for the next lecture to start); and lastly in-formal contexts (although it is difficult to be explicit on the characteristics of an informal learning context, these contexts include working during after-hours, week-ends; or in residences and homes).

We argue that since acquiring, sharing, and transferring knowledge are location independent learning activities, the available resources for social support ought to *move* with a learner. In this regard, the problem is that of ensuring that the resources remain socially present and consistent for supporting a learning task regardless of the location of a learner. We use the term resources pragmatically to mean lecturers, tutors, knowledgeable peers, and other expert personnel.

Providing personalized academic support to learners includes recognizing the huge and sometimes complex volumes of information a learner deals with. To alleviate this challenge we sought a model that helps reduce cognitive loads by providing on demand information in smaller chunks and at the right time, regardless of location. This model provides ubiquitous knowledge transfer and learning support to a learner as he or she traverses the varied contexts. Our goal is to create a presence and context-aware consultation system. Dey and Abowd (1999) assert, "context-aware applications look at the *who's*, *where's*, *when's* and *what's* (that is, what the user is doing) of entities and use this information to determine why the situation is occurring."

Our presence and context-aware consultation environment provides a knowledge transfer and sharing social space and supports a *learner* (who) as he or she engages with *learning tasks* (what), in the *various contexts* (where),

anytime (when) through the use of context-aware social presence mechanisms. In our model, the mobile learners have access to the same social network and resources regardless of their location and context.

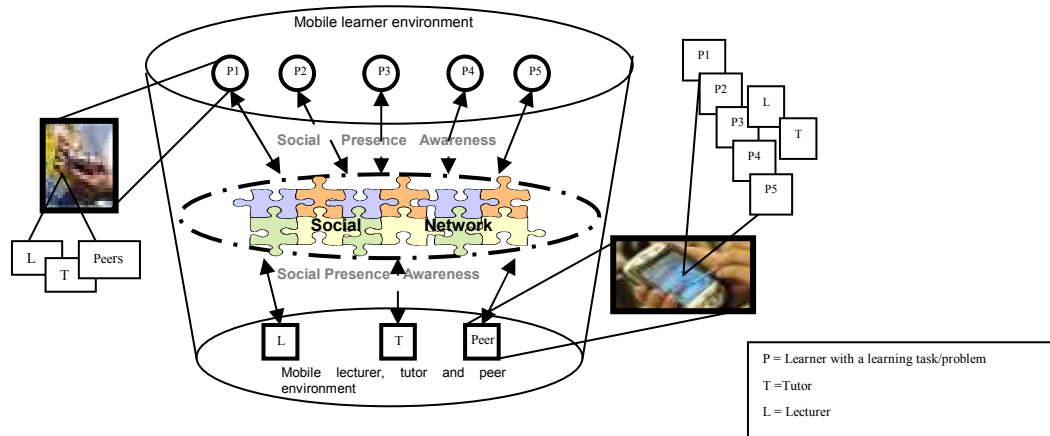


Figure 1. A framework for ubiquitous social presence awareness in m-Learning environment

The conceptual framework (Figure 1) depicts social presence and awareness in a mobile learning environment. In our view, social awareness is a mental concept where a learner becomes aware of the social network that *follows him or her* while moving across the different learning contexts. In the figure, a learner is consciously aware of available tutors, lecturers and knowledgeable peers should they encounter a learning problem for which they need to consult. By the same token, a peer is consciously aware of other mobile learners as well as available experts (lecturers or tutors) should they not be able to address the learning problem encountered. They both access a consistent quality of social network and resources even though the wired and wireless network fades as they move away from university campus. The social network provides a necessary social interaction whose outcome is knowledge transformation in the mind of a learner.

The context-awareness and social presence are achieved via mobile instant messaging (IM). IM interactive space is used to exchange and transfer knowledge in a textual form. Current pilots involve the use of a Jabber client for pocket PCs called iMov messenger. The need for a WiFi enabled PDA is to support synchronous interaction in varied contexts using wireless network hotspots.

While the IM knowledge sharing environment is serving as a useful source of context information on available sources of consultable peers and mentors, some of the current challenges include: i). Integrating IM with the location awareness that is built into cellular phone systems, ii). Access problems to either PDA devices or wireless network hotspots outside the university campus, needless to say there are very few hotspots on campus, though this is expected to change in future, and iii) Seamless interface between Jabber instant messaging and the online consultation system is under investigation. The envisaged future work of the IM environment will allow learners to pick up knowledgeable peers or tutors who are nearest to their location and available for social interaction based on WiFi hotspot proximity. This mobile IM environment through its social presence awareness feature will show a learner who among his or her tutors or social network is available for a potential immediate and impromptu face-to-face consultation.

CONCLUSION

Given that knowledge transfer is a location and time independent human-to-human process, mobile instant messaging allows learners the unusual presence awareness of available social resources they may draw upon for consultation. In this paper we have suggested how social presence awareness could be used to support a mobile learner. Our

conceptual model is a knowledge transformation environment that supports a learner, continuously assuring them of consistent access to social networks and resources. We have argued how ubiquitous communication and social interaction through the use of a context-aware social presence mechanism is employed to support a learner as they traverse the varied learning contexts.

Although social network and resources are static, *they move* with the learner through social presence awareness, regardless of a learning context. Therefore, social presence afforded by synchronous mobile instant messaging could successfully maintain social networks constituted for anywhere, anytime learning and social interaction whose outcome is knowledge transformation. Thus, the model supports synchronous collaboration between geographically distributed learners. Our conceptual model also provides learners with reduced cognitive load. That is, learners do not have to remember or memorize volumes of information since they are consciously aware of available social network that could provide on demand smaller chunks of information for a specific learning task.

The paper has also highlighted some of the implementation challenges with our model which we are addressing using pragmatic approaches. In this paper we approached mobile instant messaging in a South African higher education environment, where personalized academic support is a growing need but delivery is fraught with challenges. Hence, mobile IM allows us to determine the local value it brings to learning and knowledge sharing, as well as its place among other forms of social and educational communication.

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