# Exploring the Potential of WAP Technology in Online Discussion

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## Introduction

The intent of this study is to explore how WAP (wireless application protocol) technology mediates online discussions. The key focuses of this research are on the implications of WAP technology for online discussions, the types of discussion topics that are most suitable for WAP-based discussions and the finding of the combination of WAP- and WEB-based discussions.

Multiple methods of inquiry were employed in this study. A survey, face-to-face and focus group interviews were conducted to find out the participants' perceptions of using the WAP-enabled mobile phone as a communication tool, and how such a tool has facilitated or impeded their learning processes both technically and cognitively. A content analysis was made on the postings generated from WAP- and WEB-based forums.

This study is one of the very first attempts at investigating the use of WAP-enabled mobile phones for online discussions in one of the higher education institutions in Singapore. By exploring the potential of this newly developed technology, it is hoped that this study may provide guidelines to educators as they reflect on the way online discussions can be integrated into a course and also laying a foundation for future development of a mobile online learning environment.

## Online Discussion as a Sociocultural Tool

In this study, participants were requested to participate in asynchronous online discussions. Asynchronous communication refers to anytime-anywhere communication between two or more individuals. In such a communication, participants are unrestrained by space, time and pace. They may read the messages that are posted in a central location or delivered to their email box at their own convenience. Wireless technologies can free learners from the need to be tied to a particular hard-wired location to access information (Gunawardena & Msisaac, 2004). There are several common forms of asynchronous communications. These include e-mailing, threaded discussion and newsgroup. In this paper, online discussions refer to the use of a web-based application that enables participants to create and edit messages that are stored in an area that is accessible to group members who organize messages into "threads" of conversation (Curtis & Lawson, 2001). In this study, the participants were given the option to participate either in the WAP- or WEB-based forums via WAP-enabled mobile phones or their own personal computers.

Asynchronous online discussion offers a range of advantages to learners such as self-paced participation and reflective thinking. In an online discussion environment, students are likely to obtain more experiences managing their interactions with the content themselves. Online discussions require learners to manage their own learning, free from the teacher-centered settings; this then provides an opportunity for learners to progress independently (Lee, 2002). Researchers also found that online discussions are more task-oriented than face-to-face discussions. Also, reading and writing are employed discursively as a means of focusing members of a classroom community on matters of joint interest (Lapadat, 2000). Moreover, as asynchronous discussion is text-based, the meaning of a text-only message is divorced from the sender's physical presence and verbal delivery style and all that remains is what the person actually says (Altanus, 1997).

This study does not intend to make comparison between different technologies on how they perform in online discussions. Rather, it seeks to explore how the various technologies compliment each other and mediate online discussions. When engage in online discussions, learners should be given more avenues to log on to participate. Web-based course when combined with other CMC tools such as email or bulletin board allows the learners to learn and follow their own path, enriching the exchange of ideas among learners (Box ,1999).

One of the key concepts in Vygotsky's work is the zone of proximal development (ZPD). The ZPD is the range of difference between what an individual may accomplish in an activity or task alone and what he or she may accomplish in the company of others (Althauser & Matuga, 1998). It is in the ZPD that

scaffolded learning takes place to support learning.  Scaffold assistance can come from both cultural tools and more knowledgeable peers or experts in one's learning environment (Jarvela & Hakkinen, 2000).

Sociocultural researchers point out that instruction should take place in an environment in which learners use socially mediated and intellectual tools to achieve cognitive development (Rogoff 1990; Salomon 1993).  Bonk and Cunningham (1998) comments that collaborative technologies can offer opportunities for both peer and mentor electronic guidance and feedback that stimulate student discussions and internal reflections in a scaffold learning activity.  It is through online discussion that they may "voice their opinions and reflect on their learning, thereby increasing inter-psychological and intra-psychological activities to promote individual's cognitive development" (Zhu 1998, p.234).  Online discussion is a key mediational tool for "external display of students thinking processes and interchanges" (Jarvela and Hakkinen 2000, p.8).  It promotes "exciting online learning communities" (King 1998, p.368).

Discussions on brainstorming and case studies were adopted in this study based on the rationale that both types of discussion could enrich the online discussions by offering students opportunities to engage in higher levels of thinking such as critical thinking.  Chong (1998) reported in her study that participants claimed that they have learned tremendously from the magazine articles and that authentic cases taken from real-life provided the complexity necessary to encourage critical thinking and logical argumentation.  Authenticity in case studies did provide a challenging and real life learning environment.  Also, empirical investigations have found that electronic brainstorming groups have generated more ideas than verbally brainstorming groups, particularly for larger group sizes (Gallupe, Bastianutti & Cooper, 1991; Gallupe, Dennis, Cooper, Valacich, Nunamaker & Bastianutti, 1992).  According to the study carried out by Dennis (1993) and colleagues, electronic communication among members has improved the idea-generation performance of large groups.

## Methods of Inquiry

The participants in this study were the pre-service teachers who took the course 'Instructional Technology.'  In this course, students learn how to effectively integrate IT into their classroom practices.  To create a constructivist learning environment, the institution adopted Blackboard, an online learning delivery and management system that allows students to learn independently and instructors to customize the e-learning packages according to their students' need.

This research program was embarked in 2001.  A class of twenty pre-service teachers, each with certain characteristics that might represent the target population was selected to take part in this research program.  On the other hand, as they had a common teaching subject which was Chemistry that would make the discussions more subject-focused.  All the participants were given WAP-enabled mobile handsets for their participation in the online discussions.  They could access the online threaded discussion forum using the given URL anytime and anywhere via their WAP-enabled phones or the web-based forum via home computers.  The participants were required to take part in all the 6 forums which consisted of 3 case studies (with one as a pilot test) and 2 brainstorming discussions.

A pilot test was carried out to test the application and also to explore the implications of the discussions generated within that week.  During this pilot test, pre-service teacher and their course instructor participated in the case study online discussions.  The information gathered and the preliminary analysis was of great value as it helped to identify some possible obstacles and helped to refine the design of the application.  Also, it helped to refine the structure and content of the discussion forums.

A survey for the pre-service teachers was conducted at the end of all 6 forums in order to obtain statistical evidences and also to generate deeper understanding of the study.  A focus group interview with the pre-service teachers and a face-to-face interview with the class instructor were also conducted to gain an in-depth to the phenomena surfaced from the study; the transcripts can also be used to check the accuracy of interview records.  The messages posted on the WAP- and WEB-based forums collected in the form of spreadsheet were then translated and analyzed into simple message maps that showed the flow of messages.

To analyze WAP- and WEB-based discussions, Jonassen's (2000) rubrics for quality discussions and Järvelä and Häkkinen's (2000) classification of such discussions were adopted and modified in this study.  The messages posted in the both forums were categorized into five different types of discussions (suggestion, comment, elaboration, information-seeking and information-sharing) under four criteria with three levels of participation (high-level, progressive-level and low-level).  These four criteria included accuracy, relevance, coherence of the messages, and the levels of perspective taking of messages.   Postings that were irrelevant to the discussion topics were considered as redundant messages and were not analyzed.

# Findings

The result of the survey revealed that 65% of the pre-service teachers thought that brainstorming questions were more suitable for WAP-based discussions. The pre-service teachers felt that brainstorming questions would generate more new ideas, and since short messages were needed, it would be easier to share ideas in a more efficient way. The other 35% thought that case study questions were more suitable for WAP-based discussions because they were more focused than brainstorming questions. The results suggested that majority of the pre-service teachers thought that brainstorming questions were more suitable for WAP-based discussions. However, the findings from the messages posted on the forums and the transcripts from the interviews revealed another set of findings.

The percentages of messages in both forums were low. Quantitatively, this suggests that regardless of whether it was a brainstorming discussion or a case study discussion, it does not affect the percentage of WAP-based messages posted in these forums. This outcome suggested that the nature of brainstorming discussions and case study discussions might not determine the discussion outcome. The discussion questions might throw some light on this phenomenon. During the focus group and face-to-face interviews, the pre-service teachers and instructor mentioned that the topics and the way the questions were phrased did determine the pre-service teachers' responses. One pre-service teacher mentioned : "I think it's the discussion topic that matters. For the discussion on school experience…I have experience to share with them (the other students) so I would create a thread, if not, I would just see what people have to say." Similarly, another pre-service teacher said: "for the school experience, I know the kind of environment so I can comment in that forum." Their class instructor also emphasized that "the factor that determines the participation is not so much of whether it is case study or brainstorming, rather the nature of the discussion question itself. If the nature of the question can appeal to them, it will generate greater interest and thus they will participate more." This might explain why some pre-service teachers preferred brainstorming discussions while others found that case study discussions more challenging. The more the students could relate the discussion topic to their own personal experiences, the higher the level of interest they would have and naturally the level of participation would increase.

As shown in table 1, both WAP-and WEB-based forums produced limited number of high-level quality messages. However, WAP-based forums had yielded more low-level quality messages and less progressive-level quality messages than WEB-based forums. The physical and technical constraints of WAP-enabled phones might not have supported lengthy messages. Although statistical results suggested that WAP-based forums have produced more low-level quality messages than WEB-based forums, the usefulness and the contributions of WAP technology should not be ignored. In the survey that was conducted at the end of the course, 65% of the pre-service teachers agreed that WAP technology has helped to build a learning community. They believed that the WAP-based forum has formed a closely knitted group, and everyone was able to participate and learn from each other.

| Quality messages / Types of forums | High-level quality messages | Progressive-level quality messages | Low-level quality messages |
|---|---|---|---|
| WAP-based forum | 6% | 29% | 56% |
| WEB-based forum | 7% | 63% | 29% |

Table 1. *Percentages of Quality Messages for WAP-based and WEB-based Forums*

WEB-based discussion was introduced in the midst of forum 3. The introduction of the WEB-based forum encouraged online participation and it did not negate all WAP-based postings. Five students continued to visit the WAP- and WEB-based forum at the same time. This suggested that the WAP-based forum complemented the WEB-based forum. The pre-service teachers were able to use WAP-enabled mobile phones or computers to participate in the WAP- or WEB-based forums. In this case, the advantages of both tools could optimize and enhance the online discussions. In other words, WAP technology provided another alternative to the online discussions, allowing opportunities for further collaboration and social interaction. During the interview, one of the pre-service teachers commented that she could better contribute to the discussion forums when she had a choice to use WAP-enabled phone if she was on the move or use her computer to log on to WEB-based forum when at home. The other pre-service teachers

said: "when you are on the move, at least you have the WAP-enabled phone to view the unread messages." Generally, the discussions in both the WEB- and WAP-based forums were rather subject-focused, content-related and constructive. Irrelevant messages were minimal.

The language that was used in the WAP-based forum discussion was a unique one. It was a feature found in neither formal writing nor does it resembled the messages found in the WEB-based forum. In WAP-based message, the number of short forms used was more frequent and perspective taking was not obvious. Although statistical results suggested that WAP-based forums produced more low-level quality messages than WEB-based forums, the potential and the contributions of WAP technology should not be ignored. In the survey that was conducted at the end of the course, 65% of the pre-service teachers agreed that WAP technology helped to build a closely knitted community. They believed that the WAP-based forum has formed a closely knitted group, and everyone was able to participate actively and learn from each other. By looking into the language pre-service teachers used in the WAP-based forum, we might be able to understand why WAP-based forum helped to build a closely knitted community. Some of the common short forms that were used in WAP-based forums were: "stu" for "students", "n" for "and" "chem" for "chemistry" and "2" for "to" etc. For someone to be able to understand the syntax of these messages, one must be part of the community long enough to learn how to represent own ideas in such unique ways that only members of this community could understand.

Another interesting phenomena found in this study was that pre-service teachers and class instructor, adopted different roles subtly. In many other situations, pre-service teachers in the class also played the role of a mentor by giving constructive suggestions and comments. One of the pre-service teachers created threads in order to better guide the rest when discussing. Although their class instructor did not assign such roles to the students, they have adopted diverse roles subtly to facilitate their online discussions. The majority of the pre-service teachers also agreed that the class instructor played a crucial role in the online discussions and that he had fulfilled his job as mentor, guidance and listener.

## Conclusion

Learners' changing characteristics prompt us to look into other new modes of course delivery. This study revealed the potential of WAP technology as an effective online communicating tool when coupled with other tool. It also documented the pioneering efforts of using WAP technology in the online discussions. More studies are needed to explore the possible ways of making WAP technology a successful social and intellectual tool for mediating individual learning and enhancing the social construction of knowledge.

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