# Scenarios for Mobile Virtual Communities of Students

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## ABSTRACT
*Virtual communities have emerged in the 1990s since the creation of the Web as a tool that made the internet accessible for the citizens at large. Mobile Virtual Communities (MVCs), which have been recently gaining more momentum in research and industry, are expected to be the next step in the development of virtual communities. Tools to enhance the students' experience in the campus environment can play an important role in education. This paper suggests several new ways in which MVCs can be utilized to enhance the students' life experience on campus at the educational, organizational, and communal levels.*

## INTRODUCTION
### Virtual Communities
Humans gather and form groups in order to accomplish tasks that cannot be accomplished otherwise. Cities, schools, and workplaces are the classical meeting places where communities form. The Internet provided the infrastructure for the formation of other forms, but nonetheless similar, communities. Virtual communities meet in virtual places, such as the Internet. In virtual communities, we meet to discuss different issues and collaborate on many different projects, from politics to shopping. Chat rooms, bulletin boards, and email groups are some of they ways that we use to team up and form virtual communities.

Preece suggests a working definition for virtual community (what she calls online communities) that is broad enough to cover a wide range of communities but precise enough to fit into social science definitions (Preece, 2000). According to Preece, an online community consists of:

- Socially interacting *people*, performing special roles or satisfying their needs.
- A *purpose*, which is the reason behind the community.
- *Policies* to govern people interaction.
- *Computer Systems* that support social interaction.

*Virtual communities* are social systems that allow individuals to bond without completely depending on physical interaction rituals. Such physical rituals can still be present in virtual communities, but they are not the only mean by which interaction takes place. Interaction is enhanced and augmented by the virtual dimension.

### Mobile Virtual communities
With the proliferation of wireless technologies and mobile devices, users are expected to practice their roles in virtual communities while they are on the move. New virtual meeting places are being created, with no clear sight of an end. Therefore, a new form of virtual communities with mobile users can only be a natural result of the mobile and wireless technology advancement and embracement. Such communities are called *Mobile Virtual Communities* (MVCs) and they continue to form a very promising research field. At the same time, telecom operators continue to look for the kind of applications that will increase revenues from 3G mobile subscribers (Ahonen & Barrett, 2002).

Different aspects of mobility have been researched during the last few years, dealing with the vision of MVCs, the appropriate technologies, the appropriate user interfaces, the intelligent mobile agents' usefulness, as well as a myriad of applications ranging from leisure to health. Research has been also trying to find a solution to security, privacy and trust issues, in addition to profitable business models.

El Morr and Kawash (El Morr & Kawash, 2007) have Classified MVCs into three categories based on the degree of virtualization they permit, their degree of mobility they embrace, and the degree of cooperation they allow. According to this classification, communities can be purely *physical*, at one end, where members meet in physical places in order to participate in community activities; or at the other end they can be purely *virtual* where they only meet online. In addition, community members can be *immobile*, tied to one place, or can be *mobile*, on the move. Finally, cooperation can take the shape of a simple *notification* which is a limited form of cooperation, or a full *collaboration* through a coordinated activity such as project building (Turban, King, Viehland, & Lee, 2002).

Researchers are proposing new mobile collaborative models based on mobile technologies (El Morr, 2007; El Morr & Kawash, 2007; Kawash, El Morr, & Itani, 2007). Education is one of the prominent potent fields that can profit form MVCs. In this paper, we will propose several scenarios where MVCs can create new opportunities for students' life on campus, enhancing several aspects of their experience: the educational, organizational or communal aspects. These scenarios help us pinpoint some of the challenges that need to be addressed to make these communities a reality. In addition to technological feasibility, these challenges include security and privacy, usability, and personalization.

## MOBILE VIRTUAL COMMUNITIES SCENARIOS ON CAMPUS
In what follows, we will show the utility and importance that an MVC can play on campus to enhance the student experience. We will follow a scenario based approach that gives tangible examples on how an MVC can enable new communication channels among students in terms of notification and cooperation.

### Scenario 1: Communal MVC: Mobile Club
The Human Rights Club has been active on York Campus for many years. Club members were very active in organizing debates, distributing flyers, publishing news releases, motivating students for upcoming demonstrations in town, and managing human rights awareness campaigns.

This year the Human Rights Club has launched a new service "MVC-Rights" that is intended to exploit the massive student use of mobile phones. The club members launched a marketing campaign for their new service, students interested with the service have been told to subscribe to MVC-Rights, signing up with their mobile phone numbers and subscribing to pre-set communities of interests: Middle East, Haiti, Afghanistan, Sri Lanka, Canada, etc. When the MVC-Rights was launched, the categories were pre-set by the MVC-Rights administrator in order to try the concept, but the club was planning to enable the members create their own communities at a later stage.

Each member was able to send and receive news to other community members about issues related to the life of the community and to the club in general. Members could receive the messages on their mobile phones through SMS (Short Messaging Service) or via email, and could also send the information via either of these two means of communication. In addition, members could collaborate to reply to questions coming from each other about a particular topic; in the latest Middle East crisis they were able send latest breaking news, notifications about

TV debates, and community meetings, demonstrations and other activities. Finally, the community has made use massively of the mobile technology in two major aspects: conducting polls on the fly, and call for immediate action, or urgent meetings; this immediacy enabled the club members to conduct a vibrant community life during human rights crises.

**Scenario 2: Organizational MVC: Bus Schedule on the Spot**
Valentina lives in downtown Toronto; it takes her about one and a half hour to reach York University. Her trip consists of a bus, subway, and another bus ride to reach the university. It is very important for her to accurately know the bus schedule, but the problem is that the printed bus schedules consist of time estimates; bus delays due to traffic, weather, and breakdown conditions are very common. The situation that bothers her most is when she is going back home from her 7:00-10:00 p.m. class and she has to wait for the bus to arrive, unaware of the exact arrival time. So many times she was hungry and wished she could buy a snack form a nearby store but she didn't want to risk leaving, fearing that she might miss the next bus.

Valentina is happy tonight, she has subscribed to the on-campus new MVC, "MVC-Bus". She entered into a Web-based system her phone number and the time and days she would like to be notified, the bus routes she is interested in receiving notification for, the bus stops she is interested in, and few other parameters. The MVC-Bus Website stated that it is able to notify Valentina for bus arrivals on the designated bus stops for the designated bus routes on the dates and times that she has chosen. Besides, the MVC-Bus allows Valentina to pull on her mobile, at any moment, the list of buses that are arriving to the bus stop nearest to her position; the MVC-Bus is able to track the exact bus locations using GPS and Valentina's location using her GPS-enabled phone. Valentina felt relieved tonight; before standing in the queue she took a look at her mobile phone and has seen the exact arrival time of Bus route number 196B going to Sheppard Avenue, the bus still needs at least 15 minutes. She went to a nearby store bought a snack and came back on time, she felt less frustrated and was glad to manage her time more efficiently.

**Scenario 3: Educational MVC: Assignments on the Move**
Ning is a very hard working student; he takes his work seriously. Since he entered York University he quickly realized that work in the university is different than in high-school, and that he cannot continue working alone because some assignments are required to be done in groups and some courses are project-based and hence they should be completed in teams. Even though he enjoyed working in a group, one of the major difficulties he and his group members encountered was how to setup meeting times for the assignments.

Last week, he was so happy to know that a new MVC called "MVC-Assignment" has been launched on Campus. MVC-Assignment allows interested students to organize in communities that can be created on demand and then destroyed when there is no more need for them. He decided to establish a *usability community* for his usability project team members in order to facilitate collaboration among the team members during the Fall term. Members use a Web-based application to enter their mobile phone numbers and some notification criteria such as the day and time the student would not like to receive notifications. During the following week, Ning needed to organize a meeting on-the-fly with all or some of the team members. He sent a meeting request notification to all other members, some of whom received meeting inquiry notifications on their mobile phones and responded to it. Ning could easily use his mobile phone to consult a campus map that shows the locations and availability of the team members. He notifies whoever is available to meet in 30 minutes in the student center to have a quick Q&A session in order to clarify few issues related to the project or to discuss new ideas.

Few weeks later, Ning and his team colleagues found that this MVC was also useful to do fun stuff and to enhance their social ties. In so many instances during the semester, Ning and his colleagues searched for each other in order to have a cup of coffee and a chat. Occasionally, Ning received jokes form other team members and invitations to parties. Slowly, some of the team members became close friend and at the end of the semester they were debating if they want to keep this MVC on or to create another permanent one and possibly invite new colleagues to join the community.

## DISCUSSION
Although virtual communities have been developed to support learning(Liebregt, 2005; Miao & Haake, 2001; Prasolova-F, rland, & Divitini, 2003; Sourin, Sourina, & Prasolova-Førland, 2006), none to our knowledge has ventured in mobile virtual communities. Mobile Virtual Communities are still emerging, and their application could cover a wide spectrum, from mobile games to education. The previous scenarios suggest that MVC can be suitable to enhance campus life experience including educational, organizational and communal aspects. The scenarios are presented in order of increasing challenges to the feasibility, adoption, and maintenance of the suggested MVCs. The feasibility of these MVCs is correlated with the availability of the required technologies for the services. Adoption and maintenance require these MVCs to provide for sociability and usability. Some of the concerns relate to the policies that should regulate these MVCs, the user interface used, privacy of the members, and security of the data gathered from the communities.

**Technological Feasibility**
A service providing MVC-Rights does not require more than email and SMS distribution lists, making the implementation and deployment of such a service an easy task. MVC-Bus heavily depends on location determination technologies (LDT), such GPS. In order to generate accurate live bus schedules, it is important that the exact locations of the buses are determined in real time. However, some "diluted" implementations are possible, which require the cooperation of bus operators. In one implementation of such a service, called TraVcom, the bus operators update the bus schedule regularly, using specialized mobile devices or even mobile phones (Kawash et al., 2006). Valentina in Scenario 2 can still make use of the service even if her phone is not GPS-enabled. She can simply key-in the bus stop number and the bus route number to get an accurate arrival time. MVC-Assignment also requires the use of LDT. Cheaper alternatives to GPS can be deployed on campus. Tracking members and generating live maps with the indication of member's locations is an important factor.

All of the three MVCs can be sustained with basic forms of interaction, such as SMS. Since it may not be always possible to support advanced features (such as LDT), these services must be implemented allowing the broadest possible base to users to participate, and at the same time allowing any interested user to take full advantage of the provided features.

**Adoption and Maintenance**
Assuming that the interest in joining a community already exists, adoption of these communities requires usability, trust, and privacy.

A determinant factor of usability is user interface requirements, an issue that originates from the limited mobile device processing power, screen and keypad/keyboard size. Mobility also enforces constraints on the interaction so that new interaction styles should be created (Kristoffersen & Ljungberg, 1999). The right interface design should be investigated in order to enable a friendly and enjoyable experience. The collaboration tools should be studied in close partnership with the students (the end users); their satisfaction is the key success factor for such MVCs. For instance in MVC-Bus, a member should be able to pull the real-time bus schedule with little interaction with the device. A map that shows the proximity of a user in MVC-Assignment, indicating the positions of other near-by members, should be carefully designed.

The willingness of students to adopt an MVC service also highly depends on their trust of it. For instance, MVC-Assignment requires members to be willing to expose some of their private information, particularly their location. The MVC-Assignment service must be secure enough so that this information is not compromised to unauthorized parties, and also must be capable of giving the user's the option of being "non-trackable". Privacy and security policies should be developed, communicated and enforced.

Finally, personalization is a factor that can drive adoption since users will be able to tailor the service to their own needs; the service's ability to provide different levels of privacy is essential for some MVC adoption. Examples of personalization could be seen in a user choosing the bus route number, the bus stops of interest, the notification method desired (SMS, mail or both), the time, etc. For instance, it is important that Ning to be able to choose to be invisible to other members of the community.

## CONCLUSION

While telecom companies are in quest for "killer" applications that can drive traffic and improve their revenue, we contend that Mobile Virtual Community services are the future such applications. We foresee these services may induce a similar social and business impact similar to the Web and email impacts.

The recent technological advancements in wireless and mobile computing have made Mobile Virtual Communities possible. The scenarios presented in this paper can be implemented using existing technologies. For instance, Kawash et al. (Kawash, El Morr, Charaf, & Taha, 2005) present a computer system that can support MVC-Bus, mentioned in Scenario #2. However, the full advantage of these services may not be realized without further deployment of advanced services, such as location determination, and without the constant enhancement of others, such as security.

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