



## Using smart mobile devices in social-network-based health education practice: A learning behavior analysis



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### SUMMARY

Virtual communities provide numerous resources, immediate feedback, and information sharing, enabling people to rapidly acquire information and knowledge and supporting diverse applications that facilitate interpersonal interactions, communication, and sharing. Moreover, incorporating highly mobile and convenient devices into practice-based courses can be advantageous in learning situations. Therefore, in this study, a tablet PC and Google + were introduced to a health education practice course to elucidate satisfaction of learning module and conditions and analyze the sequence and frequency of learning behaviors during the social-network-based learning process. According to the analytical results, social networks can improve interaction among peers and between educators and students, particularly when these networks are used to search for data, post articles, engage in discussions, and communicate. In addition, most nursing students and nursing educators expressed a positive attitude and satisfaction toward these innovative teaching methods, and looked forward to continuing the use of this learning approach.

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### Introduction

Social networks enable people to rapidly acquire information and knowledge and have been promoted using diverse applications for interpersonal interactions, communication, and sharing (Davison et al., 2013). Because of the rapid development of wireless and mobile technology, users can immediately and conveniently access Internet resources by using mobile devices, using the information-sharing functions in virtual communities to advance their existing knowledge (Bennett et al., 2008) and achieve individual and organizational goals. Accordingly, in this study, a tablet PC and Google + were introduced into a health education practice course; tablet PCs were used as the primary learning tool. Google + has become a learning platform, allowing virtual communities to share knowledge and exchange feedback. Google + integrates numerous software applications, facilitating simple operation and the rapid sharing of information by using various devices (Fitzpatrick and Lueck, 2010). In addition, Google + provides application functions that are not available in social networks or virtual learning communities (Ovadia, 2011). These Google + functions, including real-time support and services and virtual information sharing, were incorporated into a health education practice course; among the nursing students, this facilitated understanding the connection between theory and practice, applying abstract concepts to specific

operations, and enhancing knowledge structures, providing additional opportunities to apply the theories discussed throughout the course.

In addition, project-based learning was used as the teaching strategy, guiding students to accomplish their projects by using Google + on tablet PCs. The study was conducted to elucidate the student perspective, acceptance of the proposed learning module, and specific behaviors exhibited during the social-network-based learning process.

### Background

Learning is a social and collective outcome that is achieved through conversations, the spread of knowledge, and social networking (Brown and Duguid, 1991). In a learning community, knowledge is acquired from teachers, study materials, and the interactive contents distributed within the community. Numerous pieces of information are consolidated through the processes of discussion, communication, negotiation, sharing, and exchange; thus, community members enhance their level of knowledge by sharing knowledge (Cabrera and Cabrera, 2005). Hendricks (1999) noted that knowledge sharing is a process of communication. When learning new information or sharing knowledge with others, a person must use the knowledge rebuilding process to achieve a meaningful learning experience. Nooteboom (2000) indicated that knowledge sharing can create value. The knowledge gathered through interaction can be beneficial, introducing novel elements to enhance the intellectual assets of an organization. Assimakopoulos and Yan (2006) noted that organizations must share knowledge to remain future oriented.

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Virtual communities allow comprehensive information sharing, involving convenient feedback systems. Numerous studies have introduced the characteristics of virtual communities into traditional instructional activities, developing innovative teaching and learning methods; for example, *Bruckman (2002)* demonstrated that in a virtual environment, learners can stimulate the ability to learn new skills by interacting with each other. *Wasko and Faraj (2005)* suggested that using the highly interactive knowledge-sharing features of a virtual community can increase student learning motivation. *Zhang and Tanniru (2005)* evaluated virtual learning communities, discovering that the powerful sharing environment in such communities can prompt passive viewers to gradually become active knowledge seekers. In addition, *Eales-Reynolds et al. (2012)* built a WRAP system based on Web 2.0, applying it to a course for nursing students. They found that the diverse resources provided in virtual communities promoted the critical thinking, problem analysis, and problem-solving skills of the nursing students.

The prevalence and convenience of mobile devices foster using diverse learning methods (*Jeng et al., 2010; Wu et al., 2014*). The convenience of mobile devices allows users who work in fast-paced medical environments to immediately acquire the resources required to solve medical problems, control emergency situations, and promptly provide medical support (*Ruland, 2002; Tooley and Mayo, 2003*). In addition to being used in general hospitals, mobile devices have been gradually introduced to nursing school practice courses, such as clinical practice courses (*Wu et al., 2011*); the tracking of administered medication (*Brian and Jamieson, 2002*); outpatient clinics (*Edwards, 2001*); and nursing homes (*Hassett, 2002*). Introducing mobile devices into nursing practice courses saves effort, reduces errors, and enables rapid information searches (*Miller et al., 2005*). In addition, instant feedback and core knowledge support enhance the professional knowledge and skills of nursing students (*White et al., 2005*). *Skyscape (2004)* found that introducing mobile devices could reduce medical errors and increase the effectiveness of practice-based learning. *Carroll and Christakis (2004)* explained that introducing mobile devices could reinforce accuracy when performing medical procedures. *White et al. (2005)* discovered that using mobile devices to assist in practice-based learning can improve the self-confidence of students when they use their own expertise. In addition, *Jeffries (2005)* confirmed that introducing emerging technologies in a clinical practice environment can provide students with additional learning opportunities and improve the accuracy of acquired data. Furthermore, *Wu et al. (2011)* have pointed out that convenient and practical mobile devices can complement the lack of a traditional learning environment, encouraging student confidence

and active participation in the learning process. Therefore, educators should incorporate mobile devices in their courses because such devices provide educational benefits to nursing students.

### Using Google Plus in Health Education Courses

To match the goals of health education practice courses, implement technology into these courses, comply with traditional teaching methods, and increase the nursing experience of students in an innovative learning environment, a project-based learning approach was used that was originally adopted as a basic teaching strategy at nursing schools. During the project-based learning process, the nursing students worked in teams to analyze and discuss client data by using tablet PCs. Five procedures are used in project-based learning to guide students to complete their practice: preparation, implementation, presentation, evaluation, and reflection. By using teamwork, the students planned how to approach the exploration data, collect the required information, make decisions, conduct home visits, and publish studies. In the process of completing the practice activities, the students both learned by doing and learned by performing experiments for their own study. The process used to introduce Google + into a health education practice course is detailed as follows:

Throughout the course, the nursing educators guided the students by using Google + software applications to facilitate interterm communication, coordination, and discussion, using the conclusions drawn during discussions to analyze various problems. Google + provides various applications (e.g., Google Picasa, Google Docs, Google Maps, Google Location, Hangouts). The nursing students simply created an account to use the numerous services and applications offered as part of Google +, facilitating rapid notification and access and using the information to enhance knowledge flow and accessibility.

Before the students conducted a home visit, a nursing educator could use the Google + “circle” function to organize the students into teams and the “bulletin board” function to remind students to schedule client appointments, complete purpose-of-visit forms, and plan their routes to the client homes. Nursing students can use Google Maps to plan their routes, use Google Docs to edit documents, and share this information on Google +. When learning communities are implemented, nursing students share knowledge, communicate, interact with each other, and use negotiation to achieve a consensus. This process can strengthen individual learning and promote the growth of team knowledge. *Fig. 1* shows the Google + interface used in the learning process. During the home visit, the students could plan travel routes and view

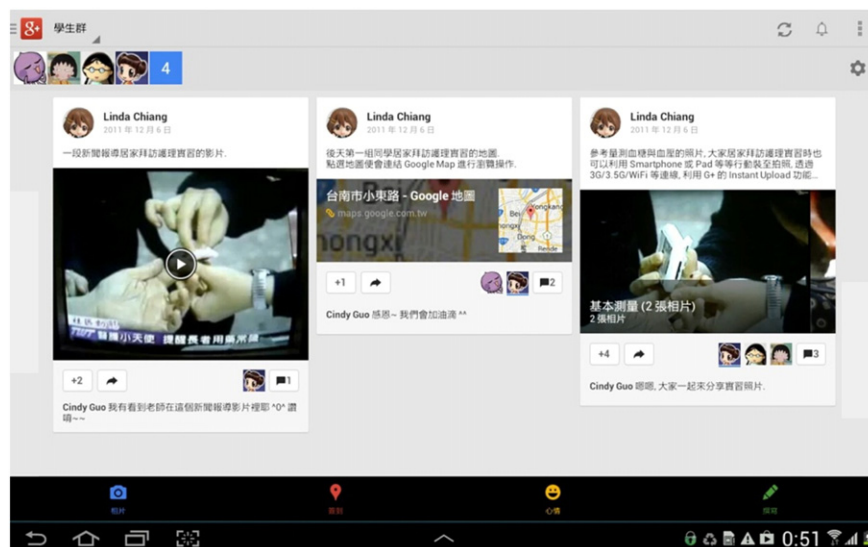


Fig. 1. User interface of Google +.

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