

The phenomenon of blogs and theoretical model of blog use in educational contexts

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Abstract

Many educators have attempted to implement a blog in educational contexts to enhance the communication environment among students and teachers. However, it is uncertain as to why traditional computer-mediated communication (CMC) applications should be replaced with blogs. It is time to comprehensively explore the effects of educational blogs by considering the CMC tools. This paper reviews prior studies and develops a model for the use of blogs in educational contexts by taking into account socio-technical systems theory. The model contributes to interactivity, an open system, a visualization tool, and a decentralized environment of online communication circumstance.
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Keywords: Computer-mediated communication; Intercultural communication; Blog; Socio-technical systems theory; Inclusive design

1. Introduction

1.1. Research problem

Currently numerous studies have focused on the use of social network systems such as blogs and Wikis in educational settings (Divitini, Haugalokken, & Morken, 2005; Glogoff, 2007; Huck, 2007; Huffaker, 2005; Lin et al., 2006; Maag, 2005). On the other hand, a lot of researchers still employ traditional computer-mediated communication (CMC) applications (e.g., email) to enhance students' communication and collaboration (Bloch, 2002; Huang, Lu, & Wong, 2003; Young, 2003). There is a lack of effort to compare blogs with traditional CMC applications. As a result, prior research has failed to answer why blogs should be used over traditional CMC tools.

In addition, there have been contradictory results: some studies (Lin et al., 2006) have revealed that blogs successfully contribute to students' online engagement; on the contrary, others (Divitini et al., 2005) have claimed that blog technology has failed to motivate students to become involved in the online activity.

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The objective of this present study was to review prior literatures on educational blogs and traditional CMC applications by analyzing benefits of educational blogs over traditional CMC tools. In addition, based on the socio-technical systems theory, this paper attempted to explain the phenomenon of blogs and propose a theoretical model of blog use in educational contexts.

2. Literature review

2.1. Computer-mediated, asynchronous communication support tool

A wide range of technologies support educational environments by facilitating communication and collaboration among students (Barnes, 2003). Especially, in distance learning contexts, instructors often attempt to integrate the CMC applications in instruction to support students in communicating and collaborating with other peer students (Amponsah, 2003). Today's students become better able to communicate, discuss problems, or exchange ideas with their peer students in more effective ways through the distance education systems (Ocker & Yaverbaum, 2001). Additionally, many studies pointed out the advantages of the computer-mediated, asynchronous communication support systems (Table 1). For instance, it was claimed that students using CMC tools are more likely to improve critical thinking skills, problem-solving skills, and communication skills as compared with students without CMC tools (Ocker & Yaverbaum, 2001; Young, 2003).

2.2. Shortcomings of CMC applications and replacement with a blog

In addition to benefits, the educational CMC tools also have limitations. For instance, students are less likely to be voluntarily engaged in the e-learning environment (Upton, 2005). The CMC tools fail to motivate students to use the e-tools (Johnson, 2007). Certain students are even unsure that a Blackboard system is helpful to enhance their academic performance (Upton, 2005). Furthermore, the students prefer going back to a traditional type of class without the Blackboard system (Upton, 2005). There is a possibility that centralized current e-education systems cause students to participate less in online discussion. Current e-education systems were built in a *centralized* environment (Dalsgaard, 2006; Rick & Lamberty, 2005; Weingardt, 2004) in which students need to visit a major hub site (e.g., Blackboard) to participate in communication. Therefore, students have no clue whether discussion is initiated and in progress on the hub site unless they receive a notice or regularly visit the site. As a result, there is a higher likelihood of missing a chance to participate as well as losing interest. Numerous studies cited additional limitations of the CMC technology in current education settings, which are summarized in left column in Table 2.

Table 1
Advantages of computer-mediated, asynchronous communication tools

Advantages	Reference
Inclusiveness enhanced for intercultural encounters	(Zeiss & Isabelli, 2005)
Equal participation due to a reduction in social context e.g., appearance, age, gender, etc. and a reduction in dynamic cues e.g., frowning	(Amant, 2004; Schwienhorst, 2004)
Removal of accents or intonations as students' linguistic limitations	
Better learning outcomes (more creative and high quality) over traditional, face-to-face courses	(Ocker & Yaverbaum, 2001; Vess, 2005)
Reduction of students' psychological barrier to enable them to express opinions freely	(Young, 2003)
Enhancement of critical thinking skills, problem-solving skills, and communication skills	(Ocker & Yaverbaum, 2001;
Improvement of metacognitive skills as self-reflection and revision in learning through text-based communication	Young, 2003)
Knowledge construction	(Johnson, 2007)
Sufficient time to reflect on and structure their ideas	(Pena-Shaff et al., 2005)
In-depth discussion of topics	
Access to diverse perspectives	
Archived database of topics and integration of class materials with increased control	

Table 2
Weblog is recommended to overcome limitations of current CMC system

CMC limitations	Description	Overcome with Weblog	Description
Management of communication	Coordination may be uneasy to set up since students have to agree on how frequently to communicate/post comments (de Bruyn, 2004; Ocker & Yaverbaum, 2001)	RSS delivery	RSS automatically delivers a list of updated information to blog users. Users are able to check the list of information at their convenience (Kim et al., 2007)
Lurking	Lack of posting is often observed and online activity becomes diminished (Johnson, 2007; de Bruyn, 2004; Ocker & Yaverbaum, 2001)	Personal blog	Blog is available to anyone for free. Each student work on their own blog to communicate with other peer students. A sense of ownership of a task increases the likelihood of successful online communications (Tolmie & Boyle, 2000). In addition, the sense of ownership helps students reduce anxiety of participation in online communication (Pena-Shaff et al., 2005)
Ownership	Current CMC systems do not provide a sense of ownership (Pena-Shaff et al., 2005)		
Anxiety	Students feel uncomfortable with participating in online communication (de Bruyn, 2004; Pena-Shaff et al., 2005)		
Instructor-centered system	Current system is based on teacher-centered, dissemination-based instruction rather than learner-centered, constructivist learning environment (de Bruyn, 2004; King, 1998) The primary use of Wiki is to keep teams' work information in one hub place and up to date (Treese, 2004)	Decentralized system	Bloggers have control over the structure of individual blog entries, which contributes to more comfortable circumstances where students are able to be encouraged to make reflections/comments (Karger & Quan, 2004; Lin et al., 2006). In addition, blogs are more likely to support both social learning and individual learning (Lin et al., 2006)
No archives	Email does not support archiving data so certain users have difficulty to catching up (Treese, 2004). Email users have to view long threads of discussion that is poorly organized (Treese, 2004). Current CMC systems are more likely to cause users to receive overloaded information (de Bruyn, 2004)	Archives	Blog enables users to archive their entries and visitors' comments in chronological order or category-based order (Beldarrain, 2006; Nardi, Schiano, Gumbrecht, & Swartz, 2004). RSS contributes to a "pull" rather than "push" technology, which makes users feel less intrusive (Schiano, Nardi, Gumbrecht, & Swartz, 2004)

One of the emerging technologies, blog, is often employed by educators to overcome the weakness of current CMC technology (Divitini et al., 2005; Lin et al., 2006). However, there are a couple of important issues with regard to the blog technology, especially in education contexts. First, most studies give no clear evidence that current CMC technology should be replaced with a blog. Second, there are inconsistent results in terms of the effectiveness of blog use in educational contexts.

The present study first explored attributes of a blog that contribute to overcome the limitations of current CMC technology (right column in Table 2). For instance, Really Simple Syndication (RSS) system may serve to decentralize settings of today's e-educational systems, which would help students increase their motivation to participate in e-discussion. Blog users no longer need to regularly visit any other blogs to check for updates because RSS technology automatically delivers a list of updated information to other bloggers that are subscribed (Montanez, 2006). In addition, other attributes such as *easy-to-publish and easy-to-access* are more likely to increase the likelihood of accommodating younger students' needs in that today's generation of students are easily dissatisfied with a system requesting too many steps to obtain online information (Maag, 2006). For instance, when students attempt to initiate discussion using Blackboard, they might need to go through several steps such as registration, login, location of a desired e-classroom, and search for proper features to initiate discussion, and so on. As a result, the multiple tasks increase the likelihood that students are reluctant to adopt the educational communication support tool. In contrast, a blog may be helpful in this regard since the blog enables users to begin communication (by publishing an entry/comment) with fewer steps as compared to Blackboard. Furthermore, even anonymous bloggers are allowed to join the communication without a logon procedure because a blog is inherently designed to be an open system. Additional advantages of a blog technology are listed in the right column Table 2 by considering limitations of the current CMC system.

Current students take advantage of blogs to enhance their study. For instance, students share their learning experiences and express their thoughts to the instructor and peers through course blogs (Maag, 2005). More specifically, students post examples related to course assignments as well as discuss reflections on course materials (Betts & Glogoff, 2004; Maag, 2005). In addition, blogs facilitate a series of extended discussions beyond class meetings (Betts & Glogoff, 2004). It was reported that blogs implemented in MBA courses contributed to increase in students' interactivity in terms of their intellectual exchange (Williams & Jacobs, 2004). Even students who read blog postings but rarely write are also able to benefit from considering their peer students' entries and comments as important feedback (Lin et al., 2006). Linkages between blog postings and course materials serve as a critical factor of the teaching that ties together lecture and students' own study (Betts & Glogoff, 2004).

As noted earlier, there are, however, contradictory results associated with the effectiveness of blogs to enhance communication among students. For instance, a study (Lin et al., 2006) indicated that a blog technology successfully enhanced interactivity among students (e.g., overall, 31 students posted over 700 entries on the course blog, and the top 40% active blog users shared approximately 80% of the total blog entries for the three-month curriculum). On the contrary, another study (Divitini et al., 2005) revealed that the blog implemented in the course was unproductive in terms of interactivity among students (e.g., total nine entries were posted on the blog for a one-year course). The two studies were conducted under similar experimental conditions: both studies (1) employed identical number of participants ($n = 31$) in higher education, (2) enabled the students to use the blog along with a learning management system (i.e., Blackboard), (3) did not require students to participate in blogging, and (4) allowed the students to communicate in their native language. The only different condition between two studies was that Divitini's study provided students with a communal blog in which everyone was allowed to post a comment or entry. It is expected that the shared-blog serves as a centralized system where students are required to go to the shared blog (i.e., hub site) to communicate with their peer students. As a result, students in Divitini's study might become dissatisfied with the centralized system and less engaged in blogging activities as compared to the students in Lin's study. Although both studies did not further investigate the effect of the shared blog, the shared space might be the determining influence for the students' engagement.

Furthermore, little attention has been paid to the use of blogs along with current, traditional CMC applications. Today, there are two types of implementation of blogs in educational contexts; that is, either only blogs or blogs along with traditional CMC tools. Current educators are given no guideline but just choose one of the two implementation types. The results of this do not seem positive. For example, Divitini and his colleagues (2005) studied the blog usage along with the traditional CMC tool among students in higher education. Only 19% of students in their study used the blogs to post entries or comments. The students complained that they cannot find time to use any other learning support tools (i.e., a blog) besides the traditional CMC application. In addition, the students still relied on a variety of traditional communication systems such as e-mail in stead of the blog.

2.3. Socio-technical systems theory and blogs

The socio-technical systems (STS) approach was originally developed by Trist and Bamforth (1951). Trist and Bamforth stated that four components (i.e., social, psychological, environmental, and technological systems) should be assessed as a whole to understand human and organizational outcomes. More specifically, STS theory consists of (a) a technical subsystem, (b) a personnel subsystem, (c) an external environment, and (d) a work system design, all of which are mutually interdependent (Hendrick & Kleiner, 2001). The concept of STS theory recognizes organizations as open systems that are *influenced by* and *influencing* their external environments (Heller, 2001; Hendrick & Kleiner, 2001; Majchrzak & Borys, 2001; Robertson, 2001). For instance, if the personnel subsystem is changed, it will influence (1) the technical subsystem, (2) work system, and (3) the interaction between work systems and external environments. Therefore, the key perspective of the STS theory is that success of an organization depends on how the three subsystems (i.e., a technical subsystem, personnel subsystem, and work system) interact with one another as well as the external environment (Hendrick & Kleiner, 2001).

Given the concept of STS theory, this present study explored the blog phenomenon by investigating the interactions between blogging tools (a technical subsystem), blog users (a personnel subsystem), factors external to blogosphere (an external environment) and a blog (work system) (Fig. 1). More specifically, the investigation was performed in terms of (1) interactivity, (2) an open system, and (3) non-technical Internet users.

Du and Wagner (2006) stated that blogs contribute to the enhancement of interactivity among blog users. The interactivity is recognized as the key to the success of social network systems such as blogs (Williams & Jacobs, 2004). In general, the interactivity among blog users is achieved by reading other blogs, acquire resources, and express their thoughts by posting comments to entries. Blog comments are viewed as essential to the interactive nature of blogs (Mishne & Glance, 2006). The way of communicating through a blog differs from traditional CMC tools (e.g., message board or listserv) since a blog takes advantage of a permalink that is referred to as a link to the permanent URL of a specific entry on a blog (Treese, 2004). The permalink enables blog users to communicate by posting comments in a simple and effective way as compared to the traditional CMC applications (Mishne & Glance, 2006).

Active blogging interactivity can be described by Lawler's theory (Lawler, 1994) in terms of motivation. Lawler stated that motivation is influenced by the expectancy of outcomes. The expectancy among bloggers might be to receive comments from other bloggers. Pena-Shaff and her colleagues (Pena-Shaff, Altman, & Stephenson, 2005) studied online discussion in education contexts to determine whether students' participation and interaction in the online communication was related. It was discovered that 94% of the students often checked an online communication site to see whether their own posts were replied to by other peer students. The users of online communication expected feedbacks (i.e., expectancy) from others, which motivated themselves to participate. The result of this study might be applied to projecting the expected outcomes of blogging activities; that is, bloggers interact with each other to give and receive feedback by posting entries and receiving comments. If bloggers receive more comments from others, they might become more self-motivated to engage in blogging.

In addition, a key feature of blogs is an open system. According to Hendrick and Kleiner (Hendrick & Kleiner, 2001, p. 24), the open system is defined as "a work system has permeable boundaries exposed to the environment in which they exist". The system of blog-based social software maintains interaction with its external environments (i.e., other social software). The other social software, for instance, includes video-based social software (e.g., <http://YouTube.com>), photo-based social software (e.g., <http://Flickr.com>), bookmark-based social software (e.g., del.icio.us), and human network-based social software (e.g., <http://linkedin.com>). Blogs (Fig. 2) are all receiving resources (e.g., video clip, photo, etc.), transforming into desired outputs (e.g., embedded into a blog entry section), and sending these outputs back (e.g., permalink) to external environments. The blogs even interact with non-social software systems, such as traditional websites. The blogosphere leverages the compatibility with other work systems such as YouTube.com. According to Rogers' innovation theory (Rogers, 2003), the compatibility is positively related to the technology adoption. Based on this logic, the interaction with other social software in external environments might promote the blogging phenomenon.

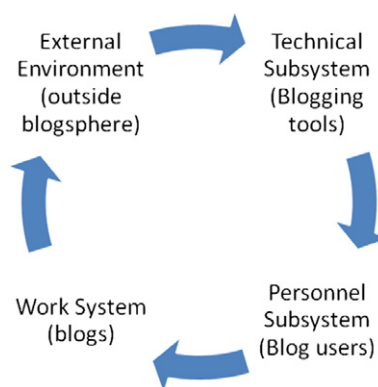


Fig. 1. Mutually interdependent components of socio-technical systems regarding the phenomenon of blog.

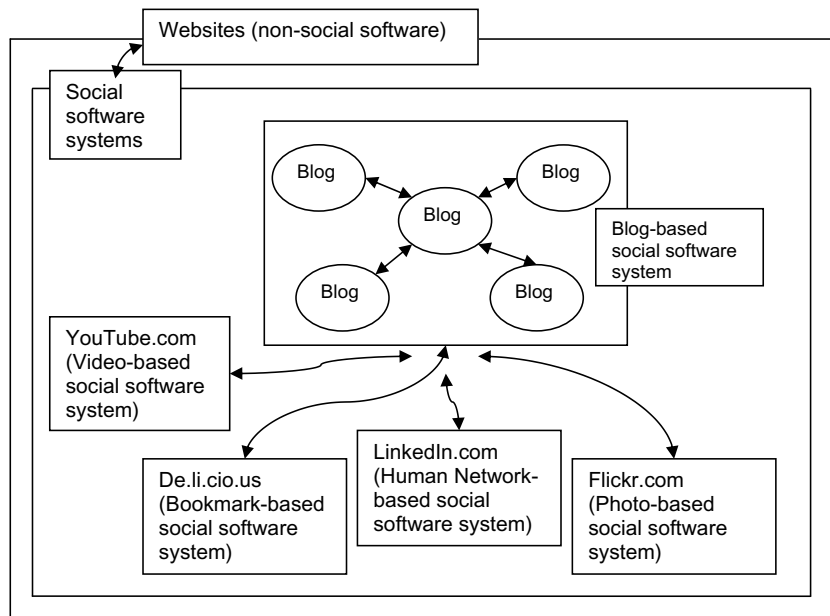


Fig. 2. Diagram for the open system of blogs that are compatible with other social software and websites.

Last, not only technical savvy users but also many non-technical ones are able to make use of a blog (Cold, 2006; Divitini et al., 2005; Maag, 2005; Sauer et al., 2005). The technology acceptance model (Stoel & Lee, 2003) explains that “the more a user perceives a new technology to be easy-to-use and useful, the stronger will be their attitude towards the technology, and the greater will be their intention to use the technology” (Stoel & Lee, 2003, p. 365). A blog is regarded as easy-to-use in terms of publishing on the Web (Divitini et al., 2005; Lin & Yuan, 2006). In the early blogging days, the late 1990s, bloggers were required to manually code their blogs by hand (Du & Wagner, 2006). However, current blog technology supports users to easily publish contents with various blogging tools (Herring, Scheidt, Wright, & Bonus, 2005). Bloggers no longer suffer from writing HTML code. As a result, the blogging phenomenon might be positively influenced by the *easy-to-use* that is facilitated with blogging support tools, such as user-friendly editors, permalink, trackback, blogroll, and alert system of other bloggers’ comments.

In summary, according to socio-technical systems (STS) theory, the blog phenomenon has not evolved by a single component, but rather by all components (i.e., a personnel subsystem, a technical subsystem, external environment, and work system design). More specifically, personnel subsystems (bloggers) and technical subsystems (tools for posting entries and comments) mutually influence each other to enhance interactivity in the blogosphere. External environments (other social software and websites) and work system (blog-based social system) are positively influenced by leveraging the compatibility for personnel subsystems (bloggers). Each subsystem influences each other and attempts to achieve balance (i.e., joint optimization) instead of maximizing any single component, which is consistent with fundamental aspect of the STS theory. Based on the STS theory, the current study explained how bloggers, blog system, blogging tools, and external environments mutually affect each other in their blogosphere. In addition, the present study offered explanations for how users were motivated to engage themselves in blogging activities.

2.4. Model for blog use in educational contexts

This paper reviewed prior literature and the STS theory by identifying determinants of successful usage of the blog systems. First of all, to improve the interactivity among students, students should be encouraged to allow other students to post comments on their own blogs. As a result, it is expected to increase the amount of feedback, which enhances self-motivation.

Second, because a blog is inherently designed to be compatible with other social software and websites, instructors and students are recommended to seek relevant information from other websites, regardless of information format, and share the information on a blog. The information could be text, video, or audio-based materials through other social software such as a Wiki, YouTube.com, and Podcast.

Third, the RSS system is recommended to be embedded in a blog. In addition, instructors and students are required to learn how to use the RSS system. Students are more likely to satisfy with easy-to-use systems in which they are able to obtain information with fewer steps (Maag, 2006). RSS delivery might help students save time and effort on retrieval information since RSS automatically informs students of ongoing discussions they are interested in. Additionally, numerous studies have been conducted to help Internet users find information in a short amount of time. For example, Wang and his colleagues (2007) suggested a dynamic blog-based learning map that enables educators to reduce time and effort in seeking relevant information among a lot of Internet resources. In other words, bundled course materials are delivered by teachers through a system so that students could quickly find information. However, such a system is still based on the traditional learning environment in which a teacher should be a primary contributor who is supposed to release qualified resources. Consequently, the success of the system relies on teachers' capability of providing the resources. Although blogs from external environments are linked to the system as supplementary, a question still remains as to easy-to-find relevant information. In general, a blog consists of multiple components such as entries, comments, tags, blogroll, permalinks, podcast, images, and so on, all of which includes a large number and variety of keywords (Montanez, 2006). Thus, a single search query could result in many hits from the components. Furthermore, given a consideration of constantly growing blogsphere (Bar-Ilan, 2005; Fujimura et al., 2006; Montanez, 2006), simply linking blogs to the system is not a solution but rather may cause confusion.

A visualization tool can be employed to enhance the information retrieval. Shneiderman (2007) claimed that appropriate UI designs facilitate integration of data mining with information visualization, especially for blog users. In general, website search engines (e.g., Google and Yahoo) enable users to easy access to billions of web pages and find what users are seeking. However, the keyword-based search is not sufficient when it comes to blogs particularly in educational contexts (Qi & Candan, 2006). Many educational blogs contain entries that are correlated with real world occurrences such as class materials, homework, and so on in chronological order; therefore, it is critical to understand the development of structure of blog entries and comments (Qi & Candan, 2006). Yet, it is not easy to detect the development pattern by using the traditional search method (Qi & Candan, 2006). Furthermore, scanning blog data in tabular form is difficult to read and time-consuming (Shneiderman, 2007). In contrast, the visualization tool is considered the software contributing to well structured displays of a large amount of information for blogs (Shneiderman, 2007). Generally, such a display is organized with color-coded meters or iconic markers to provide at-a-glance information. Given the overview of the blog data as a whole, users are able to recognize relationships among blog data without reading all the details. Accordingly, users easily find information on the topic of interest in a short amount of time (Tirapat, Espiritu, & Stroullia, 2006). For instance, Takama and his colleagues (2005) attempted to develop a visualization map that contributes to interactive blog search. The visualization map is facilitated by linking keywords of blogs. However, since the understanding of structure of blog entries is important in educational setting, the visualization software is required to display the way that a relationship between relevant entries is identified, in addition to display of simple linkages. For example, Karger and Quan (2004) presented a visualization system that displays messages from multiple blogs together as a reply graph. In other words, a diagram describes relationships between a message and all comments related to the message. Therefore, users are able to understand how the relevant issues are constructed and related.

Harris (2006) claims that access to a wider audience than the traditional student–teacher relationship is more likely to reinforce collaboration and feedback. Based on Harris' logic, blogs facilitate the connection to wider audience if blogs are linked to similar other course blogs that belong to different schools across the states. The visualization tool might also be used in this regard to help students find desired blogs and information.

Fourth, ownership of a blog might contribute to a decentralized system (Fig. 3). Students with blogs no longer need to intentionally visit a hub site to communicate with others. Instead, the students concentrate on blogging activities on their own site and simultaneously communicate with other peer students by using

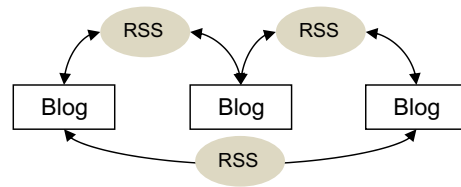


Fig. 3. Diagram of the decentralized system without a shared blog.

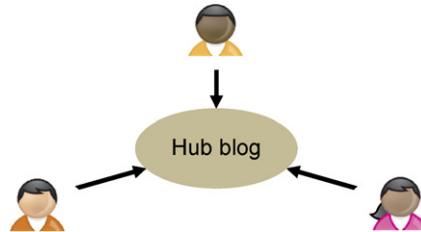


Fig. 4. Centralized e-education system.

the RSS system. The RSS system delivers a list of updates of comments and entries. Students merely check whether an interesting discussion is in progress.

Furthermore, a shared-blog space is viewed as a possible hindrance to online activities since such a centralized environment might cause anxiety of students when they communicate (Fig. 4). The ownership is a critical impact factor that motivates students to voluntarily join online activities. According to the spiral of silence theory (Noelle-Neumann, 1984), people tend to become anxious when they speak in public because they are worried about belonging to the minority group. If people are allowed to speak in their own personal space (i.e., blogs), they are likely to speak out without fear of isolation. A personal blog provides a cyber place in which an owner of a blog feels safe and is more likely to speak up.

3. Conclusions

This paper reviewed current communication support tools in education contexts by comparing strengths and shortcomings. Numerous studies have emphasized benefits of current communication support tools in educational settings. However, shortcomings were also revealed with regard to usage of these tools. Consequently, many educators are currently attempting to seek new systems to overcome the limitations. A blog, one of social software, is often employed to enhance communication environments in education domain. Indeed, the blog has often been used to facilitate personal diary and communication among citizens (Huck, 2007; Kim, Kavanaugh, & Smith-Jackson, 2007). Current educational blogs are normally not customized for educational purposes in terms of user interface and, functional features. Despite the early stage of implementation, there are many studies that list advantages for using blogs in class (Divitini et al., 2005; Glogoff, 2007; Huck, 2007; Huffaker, 2005; Lin et al., 2006; Maag, 2005; Williams & Jacobs, 2004). It is worth attempting to implement a blog in educational fields.

However, most studies do not clarify why blogs should replace current communication support tools. This paper reviewed studies to justify the blog use in educational contexts.

In addition, contradictory results were found with regard to the adoption rate of blogs among students. Certain researchers claimed that blogs successfully motivate students to use the blogs, while others found that students are not excited enough to maintain ongoing usage. More specifically, this current study investigated two different research results and discovered that students with a shared blog were less interested in blogging as compared with students with a personal blog. Thereby, the personalized-blogging circumstance might enhance online communication activities so that a shared blog environment might be unnecessary.

This paper discovered that there was a lack of literature considering intercultural communication – for example, students from Korea communicate with other peer students from USA via blogs. Indeed, a blog is one of the social network software in which diverse users intend to share the identical interface of social network software. Such an intercultural communication on blogs is more likely to occur in present higher education; we need to take into account cultural differences in the design phase of blogs. In general, the universal design approach is a method in developing user interfaces for all users. However, the universal design approach is inapplicable to accommodate blog users as numerous studies pointed out that a universal product is difficult or nearly impossible to achieve (Jhangiani, 2006; Kyoko, 2005; Newell & Gregor, 2000; Nicolle & Abascal, 2001). Inclusive design is currently used instead (Keates & Clarkson, 2003). However, the existing inclusive design approach mainly aims to consider users with physical disability and elderly population. As a result, what is mostly considered in current design phase is anthropometric data such as height, weight, and capability to carry objects. Therefore, there is a need to expend more effort to expand the boundary of inclusive design to include users with different cognitive structures such as different communication style, different learning preference, and different reasoning pattern. A future study will elaborate on the inclusive design method by including users with different cognitive styles.

Yet, a debatable issue in developing the inclusive design is how to accommodate both groups of users who have different (or opposite) needs in terms of user interface. A blog is defined as social software in which diverse users are freely allowed to access to the blog and directly post their thoughts on the blog. In other words, anyone is able to be an author of the site. However, the blog is intended to maintain a single user interface that is required to fit all users. Once the social software is employed in educational contexts, designers should take into account the inclusive design approach since there is a higher likelihood that a class in higher education contains culturally heterogeneous students. Every year, numerous international students are enrolled in higher education in the United States, and current classrooms are already globalized (US Department of State's Bureau of Educational and Cultural Affairs, 2006). Keates and Clarkson (2003) suggested top-down and bottom-up approaches in order to include as many diverse users as possible. Top-down approach aims to first satisfy users with a challenge and then accommodate users without a challenge. In contrast, bottom-up approach first emphasizes users without a challenge and then includes users with a challenge in design phase. It is theoretically assumed that there is a certain group of users who are willing to negotiate their needs when their needs are different from the existing system (Keates & Clarkson, 2003). Therefore, certain users who have different needs from counterpart users are expected to adopt a system that is designed for the counterpart users. Designers/developers are required to find ideal margin to accommodate as many users as possible by using the top-down or bottom-up approach. However, it is still a challenge to find the ideal boundary of accommodating two different users and include as many users' needs as possible. The future research will attempt to find the ideal boundary in designing educational blogs.

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