Students' Experience in Using Twitter
for Online Learning:
Social-Affective and Cognitive Perspectives

Hyungshin CHOI

Chuncheon National University
of Education

Soungyoun KWON[*]

Joongbu University

Korea

The current study investigated whether SNS such as Twitter can be an assisting tool to compensate the limitations of online learning from social-affective and cognitive perspectives. Such limitations include low level of motivation to participate, feeling of isolation, rare exchanges of ideas and feedback from peers or instructors. This paper reports findings from a research study on the use of Twitter in online learning in Higher Education. Survey and subsequent interviews were conducted to examine students' perceptions about the cognitive and social-affective aspects of their participation in Twitter activities. Some of the challenges and potentials in integrating Twitter into online course are also addressed. It can be concluded that Twitter contributes not only to building close relationships among peers and instructors but also to opening a communication channel that can extend cognitive potentials.

Keywords : Social network service, Twitter, Online learning, Social-affective impact, Cognitive impact

* Dept. of Teaching Profession, Joongbu University
  sykwon@joongbu.ac.kr

Introduction

The challenges that online learners encounter are low levels of motivation to participate and feeling of isolation. The reason is in part the fact that all contacts are electronic with minimal face-to-face interactions (Argagon, 2003). Isolation and the uncertainty of co-presence with others can make students feel lost and uneasy (Huges, Ventura, & Hando, 2007). Consequently, this may cause students to drop out from the online courses or leave the learning environment prematurely. In addition, most online learning environments focus on delivering information and the dynamic exchanges of ideas with peers and instructors are generally lacking. Although online discussion boards are provided, asynchronous communications often result in delayed feedback and inadequate attention to students' messages. Therefore, online learners often feel disconnected, due to the absence of "being there" cognitively (Garrison, Anderson, & Archer, 2001).

Recognizing the limitations of online learning in social-affective and cognitive areas, many studies have been conducted to mitigate the negative impacts and to provide alternatives to enhance the effectiveness of online learning (McInnerney & Roberts, 2004b; Garrison & Anderson, 2003; Gunawadena & Zittle, 1997; Rovai, 2002; Tu, 2002). Recently along with the exponential growth of Social Network Service (SNS) such as Twitter and Facebook, researchers and educators have begun to consider their educational potentials. Despite the rapid expansion of SNS, educators have been slow in exploring the affordances and integrating these burgeoning technologies into their learning environments (Garrett, 2009).

Among many SNS tools, Twitter is one of the most popular tools that allow users to publish brief online text updates of usually less than 140 characters (Holotescu & Grosseck, 2009). Its brevity enables users to easily share their ideas. While blogs are used to write lengthy writings or essays, microblogging using Twitter is for posting ideas or brief updates (McFedries, 2007). Twitter allows users to have the autonomy of setting relationships by choosing whom to follow. All the

messages posted by the person whom one is following will show up in one consolidated space called timeline. That is, without the need of visiting other people's site, all the messages are delivered automatically based on the preset follower relationship. In addition, Twitter enables users to create their identities by personalizing their own profile including selecting a username, a page design, a picture, and bio (Antenos-Conforti, 2009). In the timeline, users see one's photo and tweets side by side. In this way, users feel more connected with the person who tweeted.

Every month, more than 7 million people become new members of Twitter, and the number of accumulated members now stands at more than 50 million globally (Moore, 2009). In South Korea alone, the number of visitors in Twitter has increased exponentially from 70 thousand in February, 2009 to 1 million in August, 2009 (Ahn, 2009).

Despite the increasing popularity of Twitter, its pedagogical impacts and educational usage have gained little attention in the literature (Yu, Tian, Vogel, & Kwok, 2010). Emerging practices with social networking technologies should be guided with more empirical evidence. Therefore, the current study sought to explore and investigate the social-affective and cognitive impact and implications for learning when Twitter is incorporated in an online higher education. Specifically, the question of whether Twitter can be a supplementary tool to compensate the shortcomings of online learning was investigated. In addition, this paper examined the students' perceptions of their participation in Twitter activities, in particular their perceptions about the challenges or potentials they had encountered. With this in mind, we raised five fundamental questions as below:

- How do students perceive their participation in Twitter activities from a social-affective perspective?
- How do students perceive their participation in Twitter activities from a cognitive perspective?
- How do students perceive the effectiveness of Twitter on learning?

- What are the potentials and advantages of using Twitter in a learning context?
- What are the challenges and limitations of using Twitter in a learning context?

Theoretical Background

Social-Affective aspect of SNS

Stemming from the lack of face-to-face interactions, online learning faces constraints in terms of promoting social and emotional exchanges with participants, and it is thus difficult to establish a cohesive relationship with peers and instructors. However, social-affective aspect is an influential factor that determines the success of online learning, and the factor will inevitably have significant bearings on learning outcomes (Baker, 2004; Jones & Issroff, 2005; McInnerney & Roberts, 2004a). It is therefore of paramount importance to surmount the above mentioned limitations to look into the possibilities of enhancing the social-affective aspect of learning (Walther, 1992).

Recently along with the rapid expansion of SNS, this new type of communication tool has become an alternative for enhancing interactions for online learning platforms. People usually use SNS for gratification of their social-emotional needs since SNS enables them to be more connected and in turn improve their interpersonal relationships as well (Rau, Gao, & Ding, 2008). When we turn our attention to the educational field, we find that research on SNS for educational purpose is relatively rare, but we can still gleaned several advantages of using SNS from the social-affective perspective.

Firstly, SNS alleviates the feeling of isolation, facilitates the bonding of social relationships and fosters a sense of community. In SNS, students participate in dialogue more often and have more chances to interact with peers and instructors, seek help and collaborate with each other. These communicative and participatory

behaviors can build strong ties that provide social support and a sense of community. According to Yu, Tian, Vogel and Kwok (2010), online social networking engagement is positively correlated with social acceptance by peers, which manifests in individuals developing satisfying relationships with peers and becoming integrated and acculturated into the affiliated social circles. Based on a survey conducted by McCarthy (2010) which is disseminated to a group of university students in a design course, most students agreed that Facebook had increased their interaction with peers and helped them to develop social relationships. Students also expressed that it is useful to form online connections at the start of a semester, and this embryonic connection will have the opportunity to develop into meaningful relationship in due course.

Secondly, SNS provides students with a more open and informal space to communicate, so that they have an avenue to talk about social, off-task and private topics (Ebner, Lienhardt, Roh, & Meyer, 2010; Jones & Issroff, 2005). When compared to other platforms such as Learning Management Systems (LMS), Dunlap and Lowenthal (2009) contend that communication in LMS is often mandatory and decontextualized from the day-to-day experiences of participants. It tends to lose the traits of informal, emergent, free-flowing, and just-in-time banter. These shortcomings of LMS can be compensated by using SNS tools like Twitter to enable immediate and informal communication that reflects participants' daily life experiences. As there is a personal touch to these daily-life accounts, such affordance promotes solidarity amongst peers and the teacher as the members become more attuned to the personalities of one another in a more profound level. Informal and casual communication can also enhance social presence to the degree which can be perceived as "real" in mediated communication (Gunawadena & Zittle, 1997). The indicators of social presence are expression of emotions, use of humor and self-disclosure (Garrison & Anderson, 2003) and these types of interactions can be more easily triggered in informal communication. Above all, social-affective dialogue is significant because it can become a building block for

task-oriented dialogue.

Lastly, SNS can support immediacy in conversation and feedback similar to that of face-to-face communication (Ebner et al., 2010; Holotescu & Grosseck, 2010). The absence of 'real time' response has been referred to as a barrier to online interaction (Kim, Liu & Bonk, 2005). The students in asynchronous communication complain about the delayed response time, which perpetuates frustration and affects their interest in partaking in online conversation (Contreras-Castillo, Favela, Perez-Fragoso, & Santamaria-del-Angel, 2004). In Twitter, however, as participants' tweets come into Twitter's timeline synchronously and chronologically, the participants can converse with others continuously and receive feedback from others immediately. Thus, the process of communication in Twitter is more proactive and interactive.

Cognitive aspect of SNS

Since one of the key purposes of education is to enhance the cognitive development of students, what Twitter could possibly do to address this cognitive aspect is of primary interest to educators (Garrett, 2009). First, students can share their knowledge and engage in individual or collective sense-making endeavors with others via Twitter. According to Bandura's social learning theory (Bandura, 1977), there are three elements which affect individual learning outcomes: individual learners, peers, and situation. In this respect, Twitter can provide individual learners with effective learning environment to meet peers and instructors in authentic situations. Twitter exposes ideas and opinions in an open environment and subsequently students encounter other perspectives and reflect on their initial thoughts. The sustained discourse can facilitate the construction of meaning and validation of understanding within a community of students and experts (Garrison & Anderson, 2003).

Twitter can also encourage students to express their ideas clearly and in a more

concise manner (Dunlap & Lowenthal, 2009). In addition, Twitter helps students to articulate their thoughts and to be more selective, which enables students to make tacit knowledge explicit (Herrington & Kervin, 2007). Blogs tend to be considered as a knowledge saving platform whereas Twitter is for expressing thoughts, ideas and quick reflections (Ebner & Schiefner, 2008). Additionally, this nature of Twitter reduces the burden of writing a long post and therefore encourages students to participate more frequently. In contrast, the same aspect makes skeptics think that Twitter's 140-characters-limit causes students to respond in a superficial level as communication of complex ideas or thoughts are eschewed (Ebner et al., 2010).

On the other hand, Twitter can provide an authentic learning environment where real-life learning resources can become readily available. Perceived lack of authenticity is one of the contributing factors as to why students become disinterested along the course. But via social networking tools such as Twitter, integrating students' experience into a course can be realized (Arnol & Paulus, 2010). Re-tweeting and following-follower mechanism in Twitter works in such a way that students can have access to real-life learning content or cases as well as experts' comments on related topics. For example, in the area of foreign language, Twitter provides opportunities to receive authentic inputs from native speakers in the community (Antenos-Conforti, 2009). In addition, various learning resources can stimulate and expand the students' perspective as they grasp a more realistic and diverse view of targeted content.

Lastly, Twitter can create a scaffolding channel for teachers to intervene and to facilitate for deep learning. Through the timeline of Twitter, teachers can monitor the learning process and intervene to stimulate students' thinking by asking thought-provoking questions or to provide other perspectives that are often being overlooked. As McLoughlin and Lee (2010) indicated, one of the key challenges of integrating Web 2.0 tools into lessons is to maintain an optimal mix between enabling autonomy and self-direction on the student's side while still providing essential structure and scaffolding. Appropriate levels of scaffolding from an

instructor with Twitter can contribute to more positive cognitive learning outcomes.

Methods

Participants

The participants in this study are 43 students from a graduate-level online course in Korea, including 18(41.9%) male and 25(58.1%) female students. This study used a convenience sampling method where participants were recruited based on their availability and willingness to participate. Most of them are in-service teachers working in elementary to high school levels. Their ages varied from 30 to 59 as shown in Table 1.

Table1. Demographical information of participants

Variables	Category	N(%)
Gender	Male	18(41.9)
	Female	25(58.1)
Age	30~39	12(27.9)
	40~49	23(53.5)
	50~59	8(18.6)
Job	Elementary school teacher	15(34.9)
	Middle school teacher	11(25.6)
	High school teacher	9(20.9)
	Others(etc.)	8(18.6)

Interviews were conducted for the selected four participants (1 male, 3 females) who had been relatively more active in tweeting. The demographical information of the interviewees is shown in Table 2. The rationale for selecting them is that their intensive usage of Twitter will enable researchers to draw more insights regarding the research questions. That is, the more experience the participants have, the more insights they would have embodied regarding the potentials of integrating the new tool in the learning context.

Table 2. Demographical information of interviewees

ID	Age	Gender	Job
T1	53	Female	Elementary school teacher
T2	41	Male	Elementary school teacher
T3	36	Female	High school teacher
T4	43	Female	Middle school teacher

Learning context and Twitter activity

The students participated in the online course, 'teaching and learning theory', and they self-studied the subject with the video clips of lecture and course materials uploaded in the LMS during the 14-week course. In addition, the students participated in asynchronous online course, they were required to use Twitter during the whole class. First, the students tweeted their short reflections regarding the week's topic using Twitter. In these reflections, they included what they had internalized from the course or how they could apply the theories to their own teaching contexts. The students were also encouraged to reply to peers' reflections freely. Second, they used Twitter for greetings, having an everyday conversation and sharing useful information with peers. So, these activities were more focused on a social aspect.

The instructor (one of the authors) accessed Twitter 2 or 3 times a day, reading

the students' tweets and tweeting with regard to the learning content and her personal life. In order for the students to adapt to the Twitter environment, the instructor spent two weeks orienting the students in using Twitter features such as creating Twitter IDs, learning how to tweet and reply, setting up their profiles and selecting follow-following relationships. Prior to the main Twitter activities, the instructor had the students tweet greetings and social messages, and helped them get familiar with the Twitter interface.

Data collection and analysis

Both quantitative and qualitative data were collected through survey and interviews. The survey was administered during the offline session at the end of the semester. The researcher explained to the students what the purpose of this survey and received their consent to participate in it. The survey used in this study was developed based on the literature review on social-affective and cognitive aspects in online learning (Garrison, Anderson, & Archer, 1999; Kang & Choi, 2008; Richardson & Swan, 2003). Then for a validity, two experts (professors majored in educational technology) reviewed the content and formats of the survey. The survey consists of five parts: demographic information (gender, age, occupation, Twitter experiences, access methods to Twitter, and the average frequency of connecting to Twitter), social-affective aspect, cognitive aspect, satisfaction and effectiveness, and difficulties or shortcomings of using Twitter. 5-point Likert scales were used for the social-affective aspect, cognitive aspect, satisfaction, and effectiveness, while an open-ended question was asked for the difficulties or shortcomings of Twitter. The internal reliability for each category is high (Cronbach alpha above .80) as shown in Table 3.

Upon the analysis of the survey, the interview questions were designed to draw more insights from the participants. The focus of the interview was threefold: (1) to determine why students have favorable perceptions about the survey items that

they rated highly in both social and cognitive aspects (i.e., "Did you come to feel closer to your professor by this twitter activities?", "If yes, what was the reason of such feeling?", "Was it helpful that sharing ideas with peers to understand the content?", "What specific aspect was helpful when you shared ideas with peer?"), (2) to capture why students perceived negatively about the items that they rated lowly in both aspects(i.e., "Why was it difficult to express your feeling in Twitter?", "If you didn't get much useful information in Twitter, why wasn't it useful?"), (3) to identify the benefits and challenges of using Twitter in a learning context and participants' perceived potentials of Twitter for future teaching contexts (i.e., "Do you have any idea to use Twitter in your class?", "What is the disadvantage of Twitter in using educational purposes?"). The interview was conducted for more in-depth investigations with the selected four participants. The interview data was transcribed and re-organized according to the research questions. Thereafter, both researchers examined and analyzed the interview data in order to find the participants' own voice regarding our research questions.

Table 3. Internal reliability of the survey

Category	Cronbach's alpha	No. of items
Social-affective	.96	13
Cognitive	.96	8
Satisfaction and effectiveness	.85	3

Results

Statistics of Twitter use

Before we analyzed the social-affective and cognitive outcomes of Twitter in detail, we have collected the statistics of students' Twitter use (see Table 4). Among

the participants, 70% of them used Twitter for the first time in this course, or for less than three months.

For the Twitter activities in this course, most of the participants (86%) have accessed Twitter via a PC and the rest via a smart phone. In terms of frequency, 21 participants (48%) have accessed Twitter once or twice a week, 16(37.2%) of them have accessed three times or more a week, and the rest have accessed two or three times a month.

Table 4. Statistics of Twitter use

Variables	Category	N(%)
Twitter experience	First use(less than 3 months)	30(69.8)
	3~6 months	10(23.3)
	Over 6 months	0(0)
	Over 1 year	3(7)
Access method	PC	37(86)
	Smart phone	6(14)
No. of connection	Over 5 times a week	8(18.6)
	3~4 times a week	8(18.6)
	1~2 times a week	21(48.8)
	2~3 times a month	6(14)
	None	0(0)

Social-Affective outcomes by using Twitter

The results of social-affective outcomes by using Twitter in the online course are presented in Table 5. The respondents' overall perception toward social-affective outcomes was slightly higher than the middle of the scale (M=3.53). Among 13 items, 'I think I become close with the instructor by Twitter.' showed the highest

score (M=3.98, SD=.85), followed by the item 'I felt excited using Twitter.' (M=3.75, SD=.84).

Table 5. Social-Affective outcome by using Twitter (N=43)

Rank	Question	Mean	SD
1	I think I become close with the instructor by Twitter.	3.98	.849
2	I felt excited using Twitter.	3.75	.839
3	I felt like learning together with peers by using Twitter.	3.70	1.00
4	I was interested in communicating with others by Twitter.	3.68	1.05
5	By using Twitter, I became interested in what peers did.	3.68	.883
6	I used Twitter not only for sharing information but also for enjoying Twitter itself.	3.64	.942
7	I felt like belonging to the same group with my peers.	3.61	.895
8	I have built a trust in peers by Twitter.	3.55	.975
9	My peers and I helped each other.	3.52	.100
10	I felt like becoming close with peers by using Twitter.	3.45	.901
11	Peers were interested in me by Twitter	3.41	1.04
12	I could talk personal things on Twitter.	3.00	1.08
13	I tended to express my feeling on Twitter.	2.95	1.03
	Total	3.53	.772

In the subsequent interview, students expressed their opinions confirming this result of the survey. First, students agreed that they became closer with the instructor by using Twitter because the instructor had provided feedback more immediately and frequently than when interfacing in LMS. Consequently, students could have more chances to communicate with the instructor. In addition, they could share snapshots of their private life with the instructor casually, which might enhance the instructor-student relationship. One student expressed the opinion about closeness with the instructor as follows: "*I think I become closer to my professor by*

Twitter. We could share each others' pictures, personal life … then I felt growing closer to my professor and I was able to ask some questions easily." [T3]

Second, students expressed much interest in the new media, Twitter, and they were especially proud of trying something innovative. Students considered Twitter as a symbol of the new generation, and felt 'we-feeling' with the young generation. One student said that *"I've heard much of Twitter from diverse media, so I've had a curiosity about Twitter. By having a chance to use the new media in our class, I think I follow a new trend. I was so interested in using such a new media!"* [T4]

Third, students asserted that they perceived a presence of others because they could interact with peers more often in Twitter. Although students do not get to see each other face-to-face in online learning environments, interacting with peers via Twitter augmented the reality of their peers' presence. They could also grasp peers' inclinations and emotions easily in Twitter, which led to the establishment of fellowship with peers.

On the other hand, the lowest ranked item was 'I tended to express my feeling on Twitter.'(M=2.95, SD=1.03), followed by the item 'I could talk personal things on Twitter.'(M=3.00, SD=1.08). This result implies the students still did not reveal their own opinion and emotion freely in an open space like Twitter. In the interview, students expressed concerns about showing their private life to unspecified persons, so they were careful in expressing own ideas or posting information in Twitter. Some students were reluctant to present a critical opinion due to the fear of sparking a social debate. As for expressing their feeling, the students were not accustomed to revealing their feeling in online environments. This is also fuelled by the fact that they did not have any pressing need to express their feeling frankly in public. Students think that there might be a discrepancy in dispositions that can be attributed to generational or cultural differences between young and old generations. Some students, however, stated the contradictory idea that *"I can tell my private life because I trust my peers and teachers, and above all, I think expressing my feeling is a first step to be engaged in a learning community cognitively."* [T4]

Cognitive outcomes by using Twitter

The overall responses related to the cognitive impact of Twitter were relatively high (M=3.71). The mean score is slightly higher than the one in the social-affective impact of Twitter. As shown in Table 6, the highest item in the cognitive aspect was 'It was helpful for understanding the content by sharing peers' writings on Twitter.'(M=3.82, SD=.87), followed by the item 'The instructor's opinions on Twitter influenced my thoughts.'(M=3.77, SD=.94). The lowest ranked item was 'I gained some useful information and knowledge by Twitter.'(M=3.61, SD=.95), but its mean score was still relatively high. Overall, the students' perceptions towards the cognitive impact were more homogeneous than the ones for the social-affective impact.

Table 6. Cognitive outcome by using Twitter (N=43)

Rank	Question	Mean	SD
1	It was helpful for understanding the content by sharing peers' writings on Twitter.	3.82	.870
2	The instructor's opinions on Twitter influenced my thoughts.	3.77	.937
3	I had new knowledge and perspectives by using Twitter.	3.75	.866
4	I shared useful information with others by Twitter.	3.75	.866
5	The peers' opinions on Twitter influenced my thoughts.	3.70	.823
6	Twitter was helpful to reflect the learning contents deeply.	3.66	.939
7	It was useful for understanding to summarize the content on Twitter.	3.64	.810
8	I gained some useful information and knowledge by Twitter.	3.61	.945
	Total	3.71	.777

The subsequent interviews also revealed the following positive impacts by using Twitter. At first, Twitter can help students to understand learning content more deeply. Unlike positing a reflection without knowing how other students reflected on the topic in the LMS environment, reading the messages posted by peers made the students try to understand others' messages and gave them chances to consider the subject from a different point of view. Additionally, as students read others' messages several times, they experienced the effects of repetitive learning. Students gained opportunities to compare their own thoughts with others, ponder upon the topic more deeply and critically which, in turn, enhanced their understanding of the learning content.

Another participant of the interview pointed out that reading her peers' short reflections using Twitter helped her to form a common ground with others. One student mentioned that: *"I experienced a learning effect as other students share cases and experiences related to the learning topic in Twitter."*[T4] In contrast, one participant who had accessed Twitter via a smart phone expressed that Twitter is appropriate for sharing authentic cases but not for delivering long reflections of theoretical topics especially when students use Twitter with smart phones. The reason is in part the fact that Twitter limits 140 characters in writing and students usually use smart phones intermittently.

Another reason as to why students' understanding was facilitated is that Twitter encourages concise writing.

With virtue to this attribute, students had to grasp and focus on the core information. As to the instructor's positive influence on students' thoughts, the interview revealed that students liked instructor's activities such as giving feedback through Twitter. Students felt that they were able to follow the instructor's guide in the timeline, and the keywords the instructor presented in Twitter gave students some clues for their assignments. One participant expressed that *"The professor's feedback and keywords made me focus on the important content and helped me to approach the subject more easily."* [T1] In contrast, another student indicated that using Twitter did

not make much difference in terms of instructor's influence.

On the whole, the interview revealed that the students' sense of usefulness of Twitter as learning resources varies. In other words, some students perceived that the useful content is only subject-related, and since the main learning content were not provided via Twitter, their perception toward the usefulness of Twitter was relatively low.

Other students, on the other hand, considered that the usefulness of resources is not necessarily limited to the subject-related content but could include references of emerging events or information stemming from a broader scope. Actually, during our Twitter activity, the students were able to get quick responses to their short questions from their peers.

These responses can be valuable references and information for meaningful learning even though they were not directly related with the course subject.

Although the survey did not include the items of motivation aspect, students indicated that Twitter played a role in increasing their motivation and setting their expectations. One participant expressed that: "*I expected that the professor and peers would provide me feedback and replies. I was curious about how others would respond to my tweets and it made me to tweet even more.*" [T2]

Perceived satisfaction and learning effectiveness

Generally, the level of course satisfaction was high (M=4.36, SD=.72), and students were satisfied with using Twitter(M=3.89, SD=.95). Especially, students perceived Twitter positively in enhancing the learning effectiveness (M=3.95, SD=.99), as shown in Table 7.

Students also expressed much of positive aspects of Twitter during the interview. Because students evaluated Twitter positively and effectively, they agreed with the idea of integrating Twitter in online course. This result showed the potentials of using Twitter for educational purpose.

Table 7. Perceived satisfaction and learning effectiveness

Question	Mean	SD
Overall, I am satisfied with this course.	4.36	.718
I am satisfied with using Twitter in this course.	3.89	.945
This course became more effective by using Twitter.	3.95	.987

Limitations in Twitter for educational use

Students acknowledged several limitations of Twitter in the survey and interviews. First, students were concerned about exposing personal information and opinions in Twitter. Due to the nature of Twitter, their opinions can spread rapidly to anybody and create ripple effect on the society. Therefore, students had some hesitation about expressing their opinions freely in Twitter. Second, since there are many follower-relationships, students suffered from information overload and were not able to look at many tweets but just skipped them. For example, a student who was connected to Twitter sporadically found that there were many tweets unread in timeline, and he felt much burdened from the social obligation to read all tweets. Also in this course, students used both the existing LMS and Twitter, which made students feel that using Twitter is an additional task for their instruction. Third, students felt that it was a little short to express their complicated thoughts within 140-characters. In Twitter, students must make their writing concise, therefore they need to practice tweaking their writing style to overcome the limitations of Twitter. Fourth, most of the students did not have a smart phone to access Twitter, and accessing Twitter via a PC created some limitations to make full use of its advantages, such as 'real-time' communication. Students anticipated that if the number of smart phone users increases, the potentials of Twitter will be more apparent. Finally, some of the students had difficulties adapting to Twitter's interface. Since they were familiar with well-organized menus such as the threaded

discussion forum, the non-hierarchical menu structure in Twitter confused and disoriented them.

Educational potentials and advantages in Twitter

Since most of the participants of the interview were teachers, they considered Twitter a new tool in their own teaching contexts. In terms of subjects, two participants indicated that foreign language acquisition would be a good field for incorporating Twitter in the teaching environment. Probable usages of Twitter, as articulated by the participants, include sharing of ideas and having short discussions. Teachers can provide feedback on students' tweets and authentic cases pertaining to the topic. One participant pointed out that the young generation can easily adapt to a new tool and would enjoy the new learning media. Overall, the perceived advantages of Twitter are its responsiveness, simple interface, and open environment. First, Twitter delivers the messages in real time and its promptness encourages students to participate in the learning activity more actively. Second, Twitter's non-hierarchical menu in general makes the navigation of the space more intuitive and enables students to capture the overview of content at once. In addition, displaying the person's photo and tweets side by side enables students to experience the feeling of closeness and augmented sense of presence. Lastly, Twitter's open environment has a positive aspect as well. The open environment allows easy connection to external learning resources. For example, teachers or peers can share other countries' cases pertaining to the topic of interest as they exchange ideas and opinions.

Conclusions and Discussion

The purpose of this study is to investigate students' experience using Twitter in social-affective and cognitive aspects for educational use. We argue that Twitter

could be a complementary tool to surmount the limitations of online learning. As we expected, our research results revealed meaningful impacts of Twitter on social-affective and cognitive aspects of online learning.

Social-Affective impact

We have paid our attention to Twitter's social-affective role to diminish the limitations in online learning. In our research, participants in Twitter interacted with peers actively, shared non-academic topics such as their daily experiences more often, and exchanged chats with other participants more easily.

By the virtue of interactions, students were able to form closer relationships with their instructor, felt co-presence with their peers during learning, and enjoyed the Twitter activities.

As for relationship building with the instructor, the comfortable and everyday conversation with the instructor in Twitter seemed to foster a closer student-instructor relationship. This is similar to the results of the study done by Kim and Lim (2010), who found that instructors' affective expressions such as calling students by name, greeting them, and sharing socially engender an affective connectedness and a sense of community amongst the students and instructor. Beyond the affective and task-off conversations, the instructor's responsive feedback to students regarding the learning topic as well as raising questions and issues could have elevated the teacher's presence. By this teaching presence, students most likely had perceived the instructor as more real, accessible and connected (Garrison, 2007; Shea, Li, & Pickett, 2006).

Secondly, the students in our study perceived high level of co-presence with their peers.

This has to do with the aplenty interactions with peers via Twitter, which led students to feel a sense of community leading to heightened sense of social presence. Dunlap and Lowenthal (2009, p.1) have indicated that 'free-flowing

194

just-in-time' nature of Twitter interactions can enhance social presence in online course and increased the authenticity level of interactions as compared to the interactions happening in traditional LMS. Arnold and Paulus (2010) also reported that using social networking site fostered students' ability to build a sense of community. Along the same line, in a study by MaCathy(2010, p.738), he found that interactions in social networking site with peers allowed students 'to form connections that developed into friendships'. Additionally a more critical reason to use SNS was addressed in other research studies. This includes the gratification of social-emotional needs via partaking in social activities in SNS (Cheung, Chiu & Lee, 2011; Rau, Gao, & Ding, 2008). These results are in line with those of a study by Chen (2011), who had validated that the sharing of personal experiences and informal communications with Twitter helped people to fulfill need for a connection.

Thirdly, the students in our study indicated that Twitter provided enjoyable and exciting experiences. This may imply that they perceived Twitter as a tool for social exchange and pleasure pursuit rather than a tool for teaching and learning itself (Cheung, Chiu, & Lee, 2010; Rau, Gao, & Ding, 2008; Kim, Sohn, & Choi, 2011; Lai & Chen, 2011; Lin & Lu, 2011). In addition, Twitter is a relatively recent and attention-drawing technology among Web 2.0 tools, therefore this might appeal to the students' curiosity about the new tool. The importance of perceived enjoyment was also noted by Teo and Noyes (2011) and Lai and Chen (2011) who revealed that it was a significant factor in participants' intention to use technology such as adopting the use of blogs in courses.

Our first research question pondered on whether Twitter can be an assisting tool to compensate the shortcomings of online learning. We can conclude that Twitter can mitigate the negative impacts such as a low level of motivation to participate, feeling of isolation, and disconnectedness during online learning (Kim, Kwon, & Cho, 2011). With the empirical evidence reported in this study, we can confirm the benefits of Twitter in social and emotional dimension.

Cognitive impact

In this paper, we argue that there is a need to understand the affordances of Twitter from cognitive aspects as well as social-affective benefits. As Garrison and Anderson (2003) contend, social presence itself is not the ultimate purpose of educational experiences, but a facilitator of learning process for high quality outcomes of learning. Building a close relationship facilitates the creation of pleasant, enjoyable and comfortable learning environments, which in turn, will have the propensity to increase students' willingness to access and engage in online courses, leading to high achievement of learning.

The current study confirms the positive cognitive impact of Twitter. The participants in this study agreed to the fact that reading peer's tweets help them understand the learning content. The participants felt that instructor's thought revealed in tweets influenced their thinking. In addition, the students perceived that exchanging ideas via Twitter offered new perspectives and useful information.

In our research, students indicated that they were able to reflect more deeply by reading the instructor's and peers' tweets and by comparing them to their own thoughts. The students tend to agree that the reflections that arose from tweeting activities had transformed their learning activity from a private to social process (Boubh, Keogh, & Walker, 1985). As for the positive impact of reading blogs, Deng and Yuen (2011) contended that the act of reading blogs triggered students' reflection and amplified the reflections within a community. Reading in an online learning platform does not necessarily appeared to be associated with active interaction explicitly, but it is neither passive because it includes a series of processes such as participation, thinking, and reflection (Beaudoin, 2002; Dennen, 2008; Hrastinksi, 2009). In addition, Twitter enabled the students to understand the target learning content by summarizing it in a concise manner and focusing on core concepts. Summarizing requires students to discern which part of the content is important and therefore understanding the content is the prerequisite of summarizing. The brevity of tweets fosters students to articulate their

understanding, which enables them to make tacit knowledge more explicit (Herrington & Kervin, 2007).

Secondly, the current study provides evidence that Twitter functions as a scaffolding avenue for instructors to stimulate students' thinking toward deeper understanding. A lack of instructor feedback has long been a contributing factor to students' withdrawal from online courses (Ertmer et al., 2007). Many researchers support the importance of instructors' scaffolding in online learning. Scaffolding includes providing feedback or relevant information, keeping the discussion focused and intervening when the discussion digresses (Burge, 1994), supporting critical and reflective thinking (Hiemstra, 1994), stimulating students to generate new ideas (Mason, 1991), and providing good examples (Salmon, 2004). More recently, Yang, Newby, and Bill (2008) indicated that instructor's critical thinking questioning modeling has a positive influence to students' critical thinking and attitudes toward learning. In the timeline of Twitter, instructors can monitor students' learning process by reading their tweets and intervene to stimulate their thinking or to provide different perspectives to the same issue.

Thirdly, the students in our study perceived that the authentic information and cases provided by Twitter was useful and this led to authentic learning. Compare to the existing online learning environment, the interactions among students via Twitter encouraged the students to communicate naturally and to share useful references and information easily, leading them to informal learning. This was evident by the fact that the information students shared in Twitter was practical and authentic rather than structured, theoretical or conceptual. As Herrington and Kervin(2007) addressed, the role of technology is to bring authentic context into classrooms and one of the educational benefits of SNS is the utilization of authentic material.

Our second research question emphasized on that whether there are perceived cognitive benefits of using Twitter in online learning environment. This study empirically supports the stand that incorporating Twitter in online learning process can help students to understand the learning content, to receive timely scaffolding,

and to acquire an exposure to real world materials.

To recap, the current study suggests that SNS can contribute beyond enhancing closeness and the level of social-affective aspect in online learning contexts. Learning embraces the intertwined social and cognitive dimensions. These connections of the two aspects which are bridged by Twitter can alleviate the issue of isolation, cognitive detachment that online learners often encounter. We conclude that microblogging via Twitter is an excellent communication channel that can promote social learning - an indispensable part of all learning- and extend cognitive potentials as well.

Some challenges and potentials of using Twitter

Regarding the advantages and disadvantages of using Twitter for learning purposes, we found that even the same characteristic of Twitter could be perceived as a double-edged sword by participants (Ebner et al., 2010). That is, students in our research expressed that word limit could be useful in helping students grasp the main points and simplify complicated ideas. However, some educators are skeptical about the educational value of Twitter and felt that such word limit degenerates students' responses to a superficial level (Garett, 2009). We argue that it is not always necessary to write long messages, and we can still gain cognitive benefits by utilizing the brevity of Twitter under suitable conditions, including articulating ideas, summarizing ideas, grasping salient points, and conversing with peers.

Another characteristic that is evaluated both positively and negatively is Twitter's openness that encourages free-flowing communication, connection to learning resources, and establishing relationship with people, even with well-reputed communities of experts outside the class (Dunlap & Lowenthal, 2009; Ebner et al., 2010). Consequently, this leads to a richer and authentic learning environment. Students, however, were also worried about the negative impacts of openness that could possibly lead to an invasion of their privacy. Lastly, Twitter's non-hierarchical interface makes the navigation of space more intuitive and enables students to

capture the overview of ideas easily. But this characteristic can also be unsettling to some students who prefer ideas to be organized in a structured manner. In sum, Twitter has characteristics that might be perceived as favorable or unfavorable depending on students' traits or learning contexts, and therefore instructors are required to consider its suitability as they integrate Twitter activities into class.

Limitations and suggestions for future research

This study faces some limitations. The research methodology is primarily based on self-reported measures and the sample size is relatively small. In addition, the selection of this particular course could have caused uncontrolled bias due to the fact that most of the participants were school teachers and some of them used Twitter for the first time meaning that they had no distraction in Twitter.

Even though we have found many potentials of using Twitter in learning contexts, further research is needed to examine the process of learning in Twitter, and to provide some instructional strategies for using Twitter in teaching and learning contexts. For future research, it would be beneficial to analyze the content of tweets to gain deeper understanding about the learning process in Twitter. After conducting the qualitative analysis, we can identify what types of messages mainly appear in Twitter and what the most important roles and contributions of Twitter are. For example, we can identify how tweets contribute to high-level knowledge construction like critical thinking. Furthermore we should examine in-depth how improved social relationships through Twitter may influence the processes of collaboration, problem-solving, or development of collective intelligence by incorporating group activities in online learning platforms. Specifically, it is important to know how we can tap on social relationships for enhancing the cognitive aspects of learning with multiple sources of data. More studies can be conducted to delve into how we can incorporate Twitter in instructional design so as to bridge online and offline classes more seamlessly.

References

Ahn, J. M. (2009). Use of twitter in USA and South Korea. *Policy of broadcasting and communication. 473*, 60-66.

Antenos-Conforti, E. (2009). Microblogging on twitter: Social networking in intermediate Italian classes. In Lara Lomicka and Gillian Lord (Eds.), The next generation: Social networking and online collaboration in foreign language learning. (pp.59-90). Calico Monograph Series, No. 9. (book chapter)

Aragon, S. (2003). Creating social presence in online environments. *New Directions for Adult and Continuing Education*, *100,* 57-68.

Arnold, N., & Paulus, T. (2010). Using a social networking site for experiential learning: Appropriating, lurking, modeling and community building. *Internet and Higher Education, 13*(4), 188-196. doi:10.1016/j.iheduc.2010.04.002

Baker, J. D. (2004). An investigation of relationships among instructor immediacy and affective and cognitive learning in the online classroom. *Internet and Higher Education, 7*(1), 1-13.

Bandura, A. (1977). Social learning theory. Englewood Cliffs, NJ: Prentice-Hall.

Beaudoin, M. F. (2002). Learning or lurking?: Tracking the "invisible" online student. *The Internet and Higher Education*, *5*(2), 147-155.

Boud, D., Keogh, B. R., & Walker, D. (eds)(1985). Reflection: Turning experience into learning. London: Kogan page.

Burge, E. (1994). Learning in computer conferenced contexts: The learner's perspective. *Journal of Distance Education, 9*(1), 19-43.

Chen, G. M. (2011). Tweet this: A uses and gratifications perspective on how active Twitter use gratifies a need to connect with others. *Computers in Human Behavior, 27*(2), 755-762.

Cheung, C. M. K., Chiu, P. Y., & Lee, M. K. O. (2011). Online social networks: why students use facebook? *Computers in Human Behavior, 27*(4), 1337-1343.

Contreras-Castillo, J., Favela, J., Perez-Fragoso, C., & Santamaria-del-Angel, E.

(2004). Informal interaction and their implications for online courses. *Computers* & *Education, 42*(2), 149-168.

Deng, L., & Yuen, A. H. K. (2011). Towards a framework for educational affordances of blog. *Computers* & *Education*, *56*(2), 441-451.

Dennen, V. P. (2008). Pedagogical lurking: student engagement in non-posting discussion behavior. *Computers in Human behavior, 24*(4), 1624-1633.

Dunlap, J. C., & Lowenthal, P. R. (2009). Tweeting the night away: Using Twitter to enhance social presence. *Journal of Information Systems Education*, *20*(2), 129-135.

Ebner, M., Lienhardt, C., Rohs, M., & Meyer, I. (2010). Microblogs in higher education – A chance to facilitate informal and process-oriented learning? *Computers* & *Education, 55*(1), 92-100.

Ebner, M., & Schiefner, M. (2008). Microblogging – more than fun? Proceeding of IADIS Mobile Learning Conference, Algarve, Portugal, p. 155-159.

Ertmer, P. A., Richardson, J. C., Belland, B., Camin, D., Connolly, P., Coulthard, G., Lei, K., & Mong, C. (2007). Using peer feedback to enhance the quality of student online postings: An exploratory study. *Journal of Computer-Mediated Communication, 12*(2), 412-433.

Garrett, H. (2009). Twitter and the classroom. Retrieved January 10, 2011, from http://cnx.org/content/m32253/1.1

Garrison, D. R. (2007). Online Community of inquiry review: social, cognitive, and teaching presence issues. *Journal of Asynchronous Learning Networks*, *11*(1), 61-72.

Garrison, D. R., & Anderson, T. (2003). E-Learning in the 21st century: A framework for research and practice. NY : Routledge Falmer.

Garrison, D. R., Anderson, T., & Archer, W. (1999). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2*(2-3), 87-105.

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education, 15*(1), 7-23.

Gunawadena, C. N., & Zittle, F. (1997). Social presence as a predictor of satisfaction with computer mediated conferencing environment. *American Journal of Distance Education*, *11*(3), 8-26.

Herrington, J., & Kervin, L. (2007). Authentic learning supported by technology: 10 suggestions and cases of integration in classrooms, Retrieved March 18, 2011, from http://ro.uow.edu.au/edupapers/28

Hrastinski, S. (2009). A theory of online learning as online participation. *Computers & Education*, *52*(1), 78-82.

Hiemstra, R. (1994). Computerized distance education: The role for facilitators. Journal of Adult Education, *22*(2), 11-23. Retrieved on June 22, 2011 from the web site: http://www-distance.syr.edu/mpaea.html.

Holotescu, C., & Grosseck, G. (2010). Learning to microblog and microblogging to learn. A case study on learning scenarios in a microblogging context. The 6th international scientific conference, elearning and software for education, Bucharest. Retrieved from http://adlunap.ro/else2009/journal/papers/2010/1290.1.pdf

Honeycutt, C., & Herring, S. (2009). Beyond microblogging: Conversation and collaboration via Twitter. Proceeding of the Forty-Second Hawai'i International Conference on System Sciences (HICSS-42). Los Alamitos, CA: IEEE Press.

Hughes, M. Ventura, S., & Dando, M. (2007). Assessing social presence in online discussion groups: A replication study. *Innovations in Education and Teaching International, 44*(1), 17-29.

Jones, A., & Issroff, K. (2005). Learning technologies: Affective and social issues in computer-supported collaborative learning. *Computers & Education*, *44*(4), 395-408.

Kang, M., & Choi, H. (2008). Developing a social presence scale for measuring students' involvement during e-learning process. *Educational Technology International*, *9*(2), 1-15.

Kim. J, Kwon, Y., & Cho, D. (2011). Investigating factors that influence social presence and learning outcomes in distance higher education. *Computers & Education*, *57*(2), 1512-1520.

Kim, J. J., & Lim, J. Y. (2010). A study on relation between social presence and learning outcome in distance education. *Journal of Lifelong Education, 16*(1), 1-24.

Kim, K. J., Liu, S., & Bonk, C. J. (2005). Online MBA students' perceptions of online learning: Benefits, challenges and suggestions. *Internet and Higher Education*, *8*(4), 335-344.

Kim, Y. J., Sohn, D., & Choi, S. M. (2011). Cultural difference in motivations for using social network sites: A comparative study of American and Korean college students. *Computers in Human Behavior*, *27*(1), 365-372.

Kim, S. H., & Kim, M. J. (2006). The effects of types of instructor facilitation on learners' social presence, interaction, satisfaction, and learning achievement in an asynchronous web-based discussion. *Journal of Educational information and Media, 12*(3), 299-321.

Kwon, O., & Wen, Y. (2010). An empirical study of the factors affecting social network service use. *Computers in Human Behavior, 26*(2), 254-263.

Lai, H. M., & Chen, C. P. (2011). Factors influencing secondary school teachers' adoption of teaching blogs. *Computers & Education,* 56(4), 948-960.

Lin, K. U., & Lu, S. P. (2011). Why people use social networking sites: An empirical study integrating network externalities and motivation theory. *Computers in Human Behavior, 27(3)*, 1152-1161.

Mason, R. (1991). Moderating educational computer conferencing, Retrieved on June 23, 2011 from the web site: http://home.nki.no/morten/index.php/ english-menu/online-journals/deosnews/95-deosnews-volume-1-number-19. html.

McCarthy, J. (2010). Blended learning environments: Using social networking sites to enhance the first year experience. *Australasian Journal of Educational Technology*, *26*(6), 729-740.

McFedries, P. (2007). All a-twitter, IEE spectrum. Retrieved March 19, 2011, from http://spectrum.ieee.org/computing/software/all-atwitter

McInnerney, J. M., & Roberts, T. S. (2004a). Online learning: social interaction and the creation of a sense of community. *Educational Technology* & *Society*, *7*(3), 73-81.

McInnerney, J. M., & Robert, T. S. (2004b). Collaborative or cooperative learning? In T. S. Roberts (Ed.), Online collaborative learning: Theory and practice (pp. 203-214). Hershey, PA: Information Science Publishing.

McLoughlin, C., & Lee, M. J. W. (2010). Personalised and self-regulated learning in the Web 2.0 era: International exemplars of innovative pedagogy using social software. *Australasian Journal of Educational Technology*, *26*(10), 28-43.

Moore, R. J. (2009). Twitter data analysis: An Investor's Perspective. Retrieved January, 3, 2011, from http://www.techcrunch.com/2009/10/05/twitter-data- analysis-an-investors-perspective

Rau, P. P., Gao, Q., & Ding, Y (2008). Relation between level of intimacy and lurking in online social network. *Computers in Human Behavior, 24*(6), 2757-2770.

Richardson, J. C., & Swan, K. S. (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction. *Journal of Asynchronous Learning Networks*, *7*(1), 21-40.

Rovai, A. P. (2002). Sense of community, perceived cognitive learning, and persistence in asynchronous learning networks. *Internet and Higher Education*, *5*(4), 319-332.

Salmon, G. (2004). E-Moderating: The key to teaching and learning online. (2nd ed.) London: Taylor & Francis.

Shea, P., Li., C. S., & Pickett, A. M. (2006). A study of teaching presence and student sense of learning community in fully online and web-enhanced college courses. *The Internet and Higher Education, 9*(3)*,* 175-190.

Teo, T., & Noyes, J. (2011). An assessment of the influence of perceived enjoyment and attitude on the intention to use technology among pre-service. *Computers*

& *Education*, *57*(2), 1645-1653.

Tu, C. H. (2002). The measurement of social presence in an online environment. *International Journal of E-Learning*, April-June, 34-45.

Walther, J. B. (1992). Interpersonal effects in computer-mediated interaction: A relational perspective. *Communication Research*, *19*(21), 52-90.

Yang, Y. C., Newby, T., & Bill, R. (2008). Facilitating interaction through structured web-based bulletin boards: A quasi-experimental study on promoting learners' critical thinking skills. *Computers* & *Education*, *50* (4), 1572-1585.

Yu, A. Y., Tian, S.W., Vogel, D., & Kwok, R. C. (2010). Can learning be virtually boosted? An investigation of online social networking impacts. *Computers* & *Education*, *55*(4), 1494-1503.

Hyungshin CHOI
Assistant Professor, Dept. of Computer Education, Chuncheon Nat'l Univ. of Education. Interests: CSCL(Computer-Supported Collaborative Learning), Technology Integration, Computational Thinking
E-mail: hschoi@cnue.ac.kr

Soungyoun KWON
Assistant Professor, Dept. of Teaching Profession, Joongbu University. Interests: SRL(Self-Regulated Learning), Design of Learning Environment, e-Learning
E-mail: sykwon@joongbu.ac.kr