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Communication Privacy Disclosure Management: An Empirical study of socialization support in a Pseudo-Online Course

Misook Heo
Duquesne University

Abstract

This study investigated the boundaries of online learners' information disclosure, relationship building, interpersonal integration, and motivation by drawing upon the theoretical frameworks of the social information processing and communication privacy management theories and the hyperpersonal model. A total of 103 students from a higher education institution participated in the study. Results indicated that participants were willing to share their social information with others, but in varying degrees depending on the audiences, indicating that they were balancing privacy and disclosure as described in the communication privacy management theory. It was also witnessed that participants not only concealed sensitive information, but also in some cases fabricated them as explained in the hyperpersonal Model. The use of the experimental communication privacy and disclosure management system, however, did not affect participants' interpersonal integration and motivation, thus it failed to support the social information processing theory. Overall, considering the fact that today's students are conscious about their social information disclosure and are willing to share information, a systematic approach to social information sharing that will facilitate online learning communities is recommended.

With advancements in Internet technology such as online blogging, instant messaging, Internet-based virtual worlds (e.g., Second Life), and social networking (e.g., Facebook), students' awareness of themselves and of one another over the Internet has changed (Turkle, 2004). They actively participate as online personae that express their opinions and reactions. They are the actors of their online personae, have control of their thoughts, actions and others' accessibility to their online identities, as well as with whom they want to connect, and how the world sees them. Like in the physical world, online personas interact with each other using mutually accepted rules and regulations, and their relationships develop and continue seamlessly.

While there continues to be significant discussion regarding whether today's students in higher education are as technology savvy as it has been assumed by many researchers and practitioners (Bayne & Ross, 2007; Bennett, Maton, & Kervin, 2008; Joint Information Systems Committee, 2008; Kennedy, Judd, Churchward, Gray, & Krause, 2008; Krause, McEwen, & Blinco, 2009), it is clear that an increased number of students actively use multiple modes of information technology (IT) to communicate, socialize, and stay connected with friends (EDUCAUSE Center for Applied Research, 2009). For example, 90.3% of 30,616 undergraduate student respondents from 115 institutions in the United States reported that they use social networking sites, which is a 32.6% increase since 2006 (EDUCAUSE Center for Applied Research, 2009).

While online social communication has become a main component of computer use among today's students, the use of social communication in courses, especially in online courses, is limited (Alexander, 2008), and facilitation of a social network as a part of course design in higher education is rarely considered. For example, only 27.8% of undergraduate student respondents from the above mentioned EDUCAUSE survey reported that they used social networking sites in courses (EDUCAUSE Center for Applied Research, 2009).

Many research studies empirically prove that social networks help college students build integration among their peers (Haythornthwaite, 2002) and, thus, improve retention (Cain, 2008), provide students with the opportunity to exchange resources and knowledge among members of a group (Cho, Stefanone, & Gay, 2002) and improve educational outcomes such as student satisfaction, group performance, and individual grades (Baldwin, Bedell, & Johnson, 1997). When students experienced belongingness in their learning environment, they showed the tendency of being more engaged, motivated, and successful in their learning (Osterman, 2000; Ryan & Patrick, 2001).

The advantages of social networking, however, come with costs. There has been continuous criticism that today's students in higher education do not fully understand the importance of protecting their privacy in online social networks (Cain, 2008; Gross, Acquisti, & Heinz III, 2005). In fact, about 90% of the EDUCAUSE study population revealed first name and personal photos on social networking sites' profiles, and younger respondents were more likely to reveal all types of information such as last name, date of birth, email address or Instant Messenger screen name, and cell phone number (EDUCAUSE Center for Applied Research, 2008). Most respondents (87.4%), however, controlled their profile disclosure based on different audiences (i.e., who could view their profiles).

This study investigated the boundaries of online learners' information disclosure, relationship building, interpersonal integration, and motivation by drawing upon the theoretical frameworks of the social information processing and communication privacy management theories and the hyperpersonal model.

Theoretical Frameworks

The idea that learners establish relationships within an online education environment with socially relevant information, specifically selective disclosure, are vital components of the social information processing theory, hyperpersonal model, and communication privacy management theory.

Social information processing theory and hyperpersonal model. The social information processing (SIP) theory addresses how individuals develop interpersonal relationships via computer-mediated communication (CMC) (Walther, 1992; Walther, Anderson & Park, 1994). CMC has been reported as less personal, less friendly, less emotional, and more task-oriented than is face-to-face communication (Schweizer, Paechter & Weidenmann, 2001; Walther, 1992). The SIP theory acknowledges the absence of nonverbal cues over CMC and limited social presence, which is needed for interpersonal relationship development. According to the SIP theory, while individuals take more time to develop online relationships than traditional face-to-face relationships due to the limitation in and slow rate of social information exchange online (Lampe, Ellison & Steinfield, 2007; Walther et al., 1994), individuals will eventually adapt to the limited cues available via CMC to compensate for the nonverbal cues that might have been used for relationship building in a face-to-face environment (Tidwell & Walther, 2002; Utz, 2000) and exhibit socially revealing behavior (Walther, 1992).

Drawn from the SIP theory, the hyperpersonal model is grounded on the belief that individuals using CMC adapt to diminished nonverbal cues. According to the model, individuals adapt the CMC's limited nonverbal cues to optimize impressions about themselves through selective or edited self-presentation to others (Walther, 1996); individuals reallocate the resources from masking nonverbal cues to strategically develop other messages, which can improve others' impressions about themselves (High & Caplan, 2009). In the hyperpersonal model, the lack of nonverbal cues, which had been thought of as a disadvantage of CMC, is viewed as a factor that helps form positive impressions of individuals over CMC (Ando & Sakamoto, 2008; Walther, 1996).

Communication privacy management theory. The Communication Privacy Management (CPM) theory addresses how individuals understand and manage their privacy and disclosure decisions (Petronio, 2002). Privacy is understood as an individual's right to determine when, how, and to what extent personal information is disseminated to others (Schoeman, 1984; Westin, 1967). According to the theory, the forces of privacy and disclosure exist in a state of logical tug-of-war. The tension, between the demand to maintain privacy and the demand for disclosure and connection with others, changes via constant re-evaluation of the two demands.

Information disclosure provides individuals with benefits and risks: while disclosure cultivates interpersonal closeness and development (Derlega, Winstead, Wong, & Greenspan, 1987; Greene, Derlega, & Mathews, 2006), it can also lead to personal vulnerability in general (Altman & Taylor, 1973). Thus, according to the CPM theory, individuals establish boundaries to distinguish between public relationships and private information, and make decisions to either conceal or disclose private information through rule management processes. Petronio (2002) argues that individuals believe they have ownership and control rights over their private information.

While balancing privacy and disclosure is vital to the way individuals manage their relationships, doing so with a minimum level of risk is not an easy task (Petronio, 2002). For private information in a low-risk condition, individuals exhibit a high level of disclosure, meaning they are willing to share more personal information with others. Conversely, for private information in a high-risk condition, individuals display a low level of disclosure. That is, they somewhat regulate access to their private information with different boundary settings depending on the degree of perceived risk involved in revealing more or less sensitive information (Metzger, 2007).

Research Question Development

Individuals spend much effort forming personal impressions when they engage in the initial stage of interactions (Walther, Van Der Heide, Kim, Westerman, & Tong, 2008) and decide whether to pursue a relationship with others based upon those impressions (Sunnafrank, 1986). While online impression formation may take more time, as is advocated by the SIP theory, and may be optimized by selective or edited self-presentation, as is suggested by the Hyperpersonal Model, if learners are allowed to have others' social information to form impressions of others early-on in a course, it is possible that the time needed to form an appropriate social relationship may be reduced, especially in an online environment where non-verbal cues are limited. In fact, it has been found that effective communication early in the group's life-cycle is the key factor of developing and sustaining virtual group trust (Frust, Reeves, Rosen, & Blackburn, 2004; Meyerson, Weick, & Kramer, 1996). Also, researchers recommend social interaction to improve interpersonal integration, motivation, and eventually

educational success (Baird & Fisher, 2005-2006; Dawson, 2008; Haythornthwaite, 2002; Osterman, 2000; Ryan & Patrick, 2001). If a systematic approach is available for online learners to manage their communication privacy and disclosure, as with the CPM theory, it is possible that learners' relationship building and motivation for learning will improve.

In examining online learners' willingness toward self-disclosure, the existence of hyperpersonal self-presentation, and the impact of an experimental communication privacy and disclosure management system on their interpersonal integration and motivation, the five research questions listed below were sought. In the scope of this study, self-disclosure was interpreted as the voluntary revelation of a priori collection of characterizations of self that can provide others with a persistent identity of self; and interpersonal integration was explained as construction of a social network that can provide companionship with others.

RQ1. What types of self-disclosed information do learners of higher education acknowledge as useful in online learning environment?

RQ2. Does hyperpersonal self-presentation exist in online learning environment?

RQ3. Are there differences in communication privacy and disclosure management depending on relationship groups (e.g., teacher, teaching assistant, classmate, group, personally close friend)?

RQ4. Are there differences in the online learners' interpersonal integration depending on the levels of viewing frequency and duration within an experimental communication privacy and disclosure management system?

RQ5. Are there differences in the online learners' motivation depending on the levels of viewing frequency and duration within an experimental communication privacy and disclosure management system?

Bandura (1997) has mentioned that people's level of motivation is based on their self-efficacy, a personal judgment of her or his performance capabilities to achieve a specific goal in a given domain (Hoy & Spero, 2005; Schunk, 1985; Teo, 2009). Applied in education, this belief about personal performance on academic tasks at a designated level influences effort, persistence, resilience, and serenity, and eventually academic achievement (Gilman, Furlong, & Huebner, 2009). Besides self-efficacy, the intrinsic value (or interest value), which is the degree of enjoyment an individual gets during an activity (Eccles, 1983), is also viewed as a vital motivational component (Deci & Ryan, 1985; Wigfield & Eccles, 2000) since task enjoyment is considered as the most desirable state of learning (Spinath & Steinmayr, 2008). In the scope of this research, thus, online learners' motivation was understood as self-efficacy and intrinsic value.

Method

Participants

Students from a medium-sized university in a northeastern state were recruited for an experimental study. A total of 103 students were recruited. Participation in the study was voluntary but monetarily rewarded. With the small to medium effect size, $f = .35$, and alpha of .05, the participant size of 103 resulted in the power of .956.

Procedure

At the time of recruitment, voluntary and informed consent were obtained from participants. At the time of consent, participants were assigned a participation identification

number (ID), were asked to answer the pre-experiment online survey questions and were asked to register for the experimental system, which includes privacy and personally close friend settings (see Figures 1 and 2). Upon registration, a short (about 5 minutes) online training video on the system was offered.

During the four-week long experiment, participants completed an asynchronous online pseudo-course where learning occurred at the participants' convenience, but activities were due on certain dates and at designated times. Participants were asked to utilize an experimental communication privacy and disclosure management system as often as possible while they performed the tasks, and their interactions with the experimental system (e.g., which individual's information is viewed, how frequently and how long viewed, when viewed, etc.) as well as their privacy disclosure settings were recorded. During the last week of the experiment, participants were asked to answer the post-experiment online survey questions.

An experimental system.

This study utilized an experimental communication privacy disclosure management system. With the experimental system, learners individually decided what personal information (e.g. name, gender, age, email, etc.) to share with which relationship groups (e.g. instructor, classmates, group members, and personally close friends in the class) by marking the checkbox for each relationship group (Figure 1) and whom they would designate as personally close friends by marking the checkbox next to name of those people in the class (Figure 2). Only the personal information that an individual wished to share with specific relationship groups becomes available when people from the group hover over his/her name on the class roster. Figure 3 shows a snapshot of a system when a learner hovered over a peer's name.

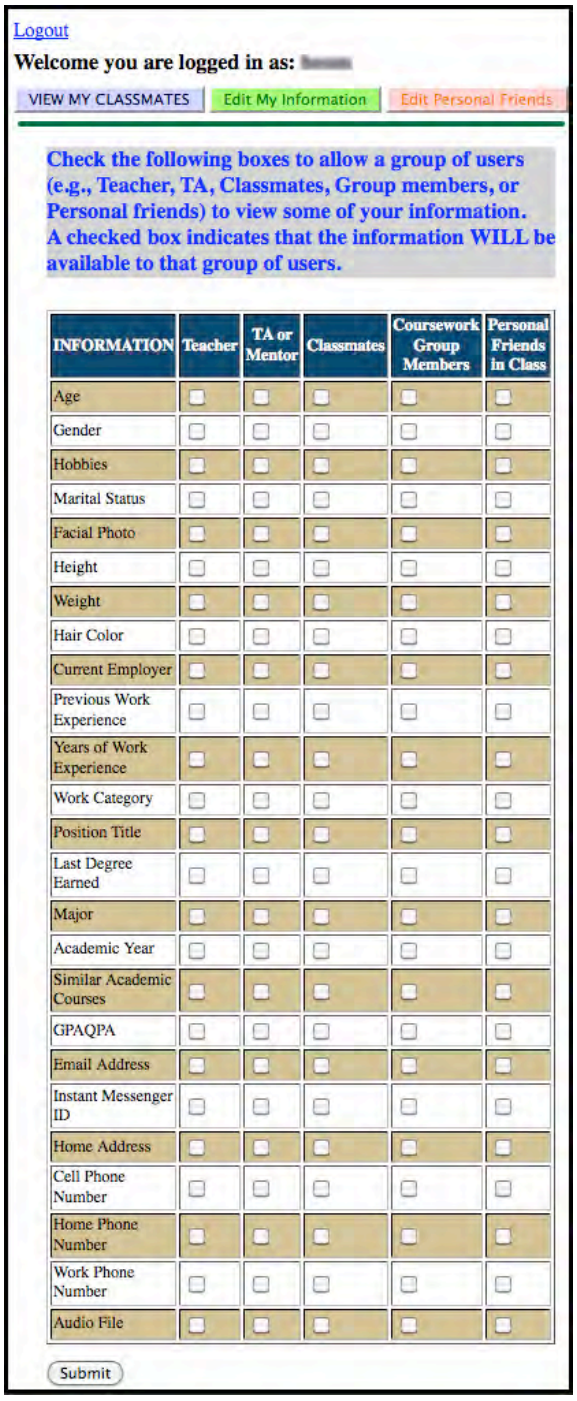

Figure 1. Experimental system window for Setting Privacy Information (Participant's account has been redacted to protect participants' privacy.)

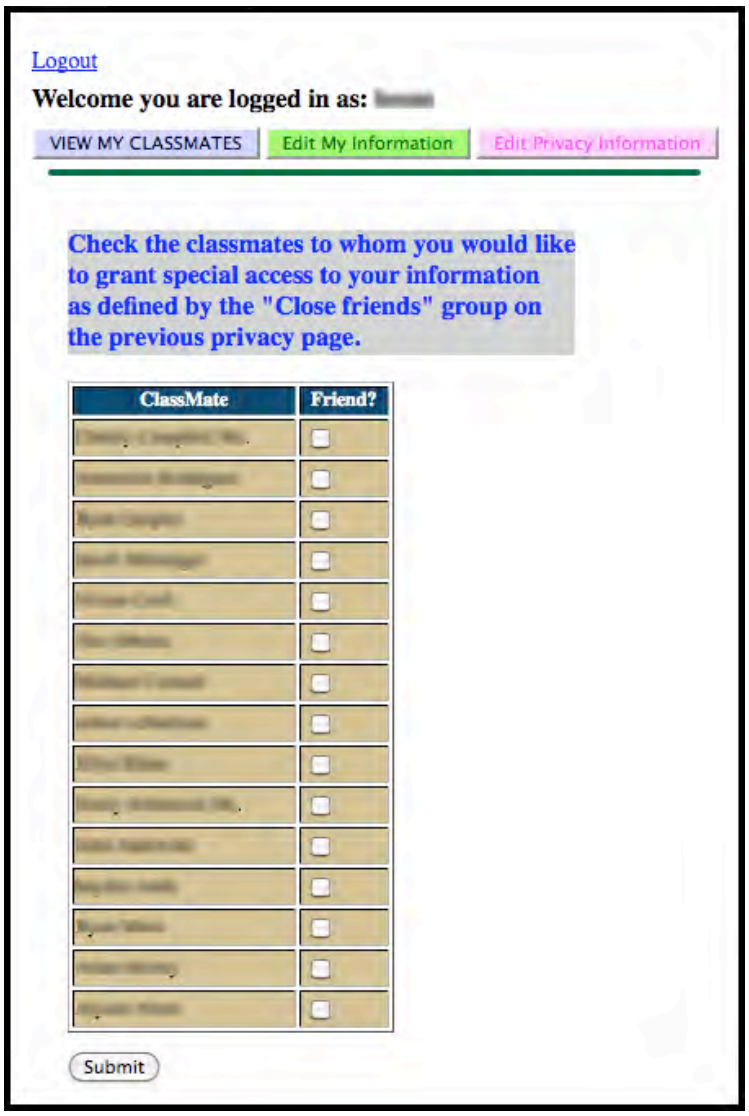

Figure 2. Experimental system window for Setting Personally Close Friends in the Class (Participants' names have been redacted to protect participants' privacy.)

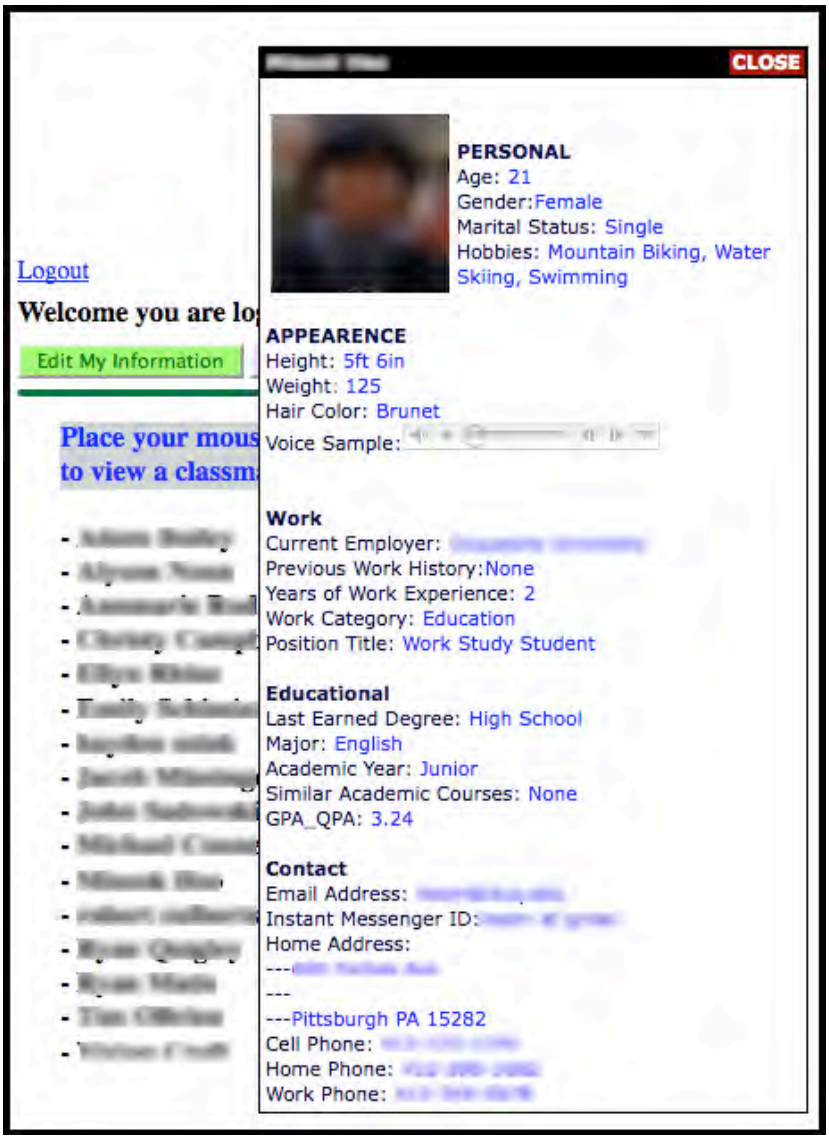

Figure 3. View of experimental system when hovering over a peer's name (Sensitive information has been redacted to protect participants' privacy.)

Instruments

Two online survey instruments were developed for the experiment: Pre-experiment survey and post-experiment survey. The pre-experiment survey was designed to collect participants' demographic information, online learning experience, technology experience, and initial motivation. The post-experiment survey was designed to gather participants' interpersonal integration and motivation after the experiment, as well as participants' experiences with the experimental communication privacy and disclosure management system.

A modified version of the Classroom Community Scale (CCS) (Rovai, 2002) was utilized to measure participants' interpersonal integration. The original CCS instrument includes 10 integration items, each of which is rated on a 5-point Likert scale (5 = Strongly Agree and 1 = Strongly Disagree). Rovai evaluated the internal consistency of the CCS integration items and reported that both the Cronbach alpha coefficient and the equal-length split-half coefficient were

.92. The modified version used in this study had a 6-point Likert scale (6 = Strongly Agree and 1 = Strongly Disagree) to require participants to express a particular point of view.

A modified version of the Motivated Strategies for Learning Questionnaire (MSLQ) was utilized to measure participants' motivation. Out of 81 questions in MSLQ, nine self-efficacy items and nine intrinsic value items, each of which is rated on a 7-point Likert scale (1 = not at all true of me through 7 = very true of me) were selected for the modified version. Both the self-efficacy scale and the intrinsic value scale have been shown to have strong internal reliability – Cronbach's alpha = .89 and .87, respectively (Pintrich & De Groot, 1990). The modified version used a 6-point Likert scale (6 = Strongly Agree and 1 = Strongly Disagree).

Tasks

Task types influence the degree of social presence, communication process, and interaction pattern (Shen, Nuankhieo, Huang, Amelung, & Laffey, 2008; Tu & McLsaac, 2002). Since one of the goals of the current study was to measure the interpersonal integration and motivation in online learning environments with the support of the experimental communication privacy and disclosure management system, tasks that required group work were desired.

According to McGrath's Circumplex (1984), group tasks are categorized into eight types – Planning, Creativity, Intellective, Decision-making, Cognitive conflict, Mixed-motive, Competitive, and Psychomotor tasks. Among the group tasks, online groups mostly perform creative, intellective, and judgmental tasks (Stone & Posey, 2008). For the experiment, creative and intellective tasks were sought because online groups tend to be more productive in creative and intellective tasks than judgmental tasks (Straus & McGrath, 1994).

Creative tasks emphasize action oriented plans (McGrath, 1984). As a creative task, electronic brainstorming, Thumbs, was adopted from Gallupe et al. (1992). The task had two subtasks: 1) to post ideas regarding benefits and difficulties that might occur if everyone grew an extra thumb on each hand, and 2) to expand two of the group members' ideas by combining their ideas. In these tasks, explicit interaction such as comments or affective expressions were not required, but implicit interaction such as building on the ideas of group members was sought. These group tasks had dual purposes: to familiarize participants both with the online pseudo-course site and with the experimental system.

An intellective task refers to a task that has a demonstrable right answer (McGrath, 1984). As an intellective task, a murder mystery with a hidden profile was adopted from Stasser and Stewart (1992). The task packet was 24 pages long and included a series of interviews from a murder investigation, two maps, a handwritten note, and a newspaper article. There was a total of 24 clues in the interviews: six incriminating clues for each of the three suspects, and three exonerating clues for two of the suspects. Among these 24 clues, six exonerating clues for two innocent suspects and three incriminating clues for the guilty suspect were critical in solving the murder case. All the common clues, excluding these nine critical clues, were for all group members to share. The groups consisted of three members. Each member received critical clues on a specific person: six incriminating clues about suspect #1 (a guilty party), six incriminating and three exonerating clues about suspect #2 (an innocent party), or six incriminating and three exonerating clues about suspect #3 (an innocent party). This group task was chosen to promote interaction among group members.

Analysis

The responses were analyzed to answer the research questions. Likert items were considered as interval-level data because equal spacing of response levels was clearly indicated (e.g., strongly disagree, disagree, somewhat disagree, somewhat agree, agree, and strongly agree) and the response levels were more than five. Descriptive statistics were used to describe participants' experience of useful self-disclosed information and the disclosure settings in their profiles. Statistical significance for interpersonal integration and motivation between two sets of groups (high, medium, and low viewing duration groups; high, medium, and low viewing frequency groups) were assessed using the between-subjects analysis of variance (ANOVA) and the mixed design ANOVA, respectively. The Bonferroni correction method was utilized in the post hoc analysis to address the problem of multiple comparisons.

Results

The descriptive data analysis of the pre-test survey indicated that participants were at least 18 years old (M_{age} = 20.91 years, SD = 3.416); most of them were undergraduate students (79.6%); there were more males (64.1%) than females; and the majority (73.8%) had not previously taken online courses. Most participants owned social networking accounts (63.1%: one account, 24.3%: two accounts, 9.7%: three or more accounts), and all had experience with course management systems, M = 4.59 semesters, SD = 2.818.

Data from a series of experiments resulted in a total of 103 user profile entries and 3275 valid experimental system-viewing entries. The overall valid viewing duration was 23,516 seconds; the average valid viewing frequency per participant was 31.22 times; the average valid viewing duration per participant was 228.31 seconds; and the average valid viewing duration per transaction was 6.612 seconds. Data from the group discussion boards were also analyzed to understand the participants' interactions. A total of 155 threaded discussion entries (about 5 discussion entries per group) were created and one third of the groups came to a correct consensus on the most likely criminal.

RQ1: Useful self-disclosed information

The post-experiment survey indicated that peers' academic year, major, gender, and age were the most useful self-disclosed information that helped them to get acquainted with their peers. Some of the course performance related information such as discussion forum posting frequency, content quality of discussion forum posting, attendance, and time for assignment submissions were good indicators for them to know their peers as well. Table 1 summarizes the aforementioned useful self-disclosed information in the online pseudo-course.

Table 1.
Confirmed useful self-disclosed information in online pseudo-course by participants[1]

Self-disclosed information	Average rate of usefulness[2]
Academic year	6.53
Major	6.48
Gender	6.09
Age	6.02
Discussion forum posting frequency	5.93
Facial photo	5.83
Content quality of discussion forum posting	5.78
Hobbies	5.71
Attendance	5.7
Time for assignment submission	5.26
Work category	5.23
Last earned degree	5.15

Note. [1] Only data greater than five points are listed.
[2] Rate was based upon 10-point Likert scale, one being not at all useful and 10 being greatly helpful.

RQ2: Hyperpersonal self-presentation

The analysis of the user profile data revealed that most of appearance and contact information were intentionally chosen for non-disclosure. In addition, the analysis of the post-survey data indicated that while participants were honest about most of the self-disclosed information, in some cases they falsified personal information (Table 2).

Table 2.
Summary of self-disclosure and edited self-presentation

Self-disclosed information		Share with all audience groups		Share with no audience group		Fabrication in profile		Share differently with various relationship-based audience groups	
Category	Information								
Personal	Age	96	(93.20%)	2	(1.94%)	4	(3.88%)	5	(4.85%)
	Gender	95	(92.23%)	2	(1.94%)	1	(0.97%)	6	(5.83%)
	Hobbies	90	(87.38%)	4	(3.88%)	2	(1.94%)	9	(8.74%)
	Marital status	88	(85.44%)	5	(4.85%)	3	(2.91%)	10	(9.71%)
	Recorded voice	81	(78.64%)	16	(15.53%)	1	(0.97%)	6	(5.83%)
Appearance	Facial photo	84	(81.55%)	9	(8.74%)	2	(1.94%)	10	(9.71%)
	Height	2	(1.94%)	95	(92.23%)	6	(5.83%)	6	(5.83%)
	Weight	1	(0.97%)	96	(93.20%)	12	(11.65%)	6	(5.83%)
	Hair color	3	(2.91%)	93	(90.29%)	1	(0.97%)	7	(6.80%)
Work	Current employer	85	(82.52%)	7	(6.80%)	1	(0.97%)	11	(10.68%)
	Previous work history	79	(76.70%)	10	(9.71%)	1	(0.97%)	14	(13.59%)
	Years of work experience	80	(77.67%)	11	1(0.68%)	2	(1.94%)	12	(11.65%)
	Work category	81	(78.64%)	9	(8.74%)	0	(0.00%)	13	(12.62%)
	Position title	84	(81.55%)	8	(7.77%)	1	(0.97%)	11	(10.68%)
Degree	Last earned degree	87	(84.47%)	7	(6.80%)	0	(0.00%)	9	(8.74%)
	Major	96	(93.20%)	2	(1.94%)	1	(0.97%)	5	(4.85%)
	Academic year	96	(93.20%)	3	(2.91%)	1	(0.97%)	4	(3.88%)
	Similar courses taken	82	(79.61%)	10	(9.71%)	3	(2.91%)	11	(10.68%)
	GPA/QPA	1	(0.97%)	16	(15.53%)	4	(3.88%)	86	(83.50%)
Contact	Email address	84	(81.55%)	5	(4.85%)	2	(1.94%)	14	(13.59%)
	Instant Messenger ID	1	(0.97%)	98	(95.15%)	2	(1.94%)	4	(3.88%)
	Home address	0	(0.00%)	20	(19.42%)	4	(3.88%)	83	(80.58%)
	Cell phone	0	(0.00%)	18	(17.48%)	6	(5.83%)	85	(82.52%)
	Home phone	0	(0.00%)	24	(23.30%)	3	(2.91%)	79	(76.70%)
	Work phone	0	(0.00%)	100	(97.09%)	4	(3.88%)	3	(2.91%)

RQ3: Relationship-based communication privacy and disclosure management

The analysis of the user profile data indicated that there was a tendency for a higher self-disclosure to authoritative figures (e.g., teachers) or personally close friends in class, while showing a lower self-disclosure to others such as classmates and group members (Table 2). Among the self-disclosed information, GPA/QPA, home address, cell phone number, and home phone number were the items that participants consistently exhibited a tendency to selectively disclose based upon relationship-based audience groups.

RQ4: Interpersonal Integration

The between-subjects ANOVA indicated that the experience with the experimental communication privacy and disclosure management system did not yield significant differences

among the three viewing duration groups (low, medium, and high) on any of the integration questions. On the other hand, among the three viewing frequency groups (low, medium, and high), there was a statistically significant difference for the question: "I trusted others in this course," $F(2,100) = 3.341$, $p < 0.039$. A post hoc analysis with Bonferroni correction, however, revealed no significant group difference.

RQ5: Motivation

A 2 (Time) x 3 (Viewing Duration) mixed-model ANOVA revealed a significant main effect for time, $F(1,100) = 26.775$, $p < .000$, with a modest effect size, $\eta^2 = .211$. The responses to motivation – self efficacy question #1 (MSE1), after the use of the experimental system ($M = 4.572$), were significantly lower than the responses prior to the experiment ($M = 5.104$). Following this initial analysis, a series of identical calculations were performed on the remaining motivation – self efficacy (MSE) questions and motivation – intrinsic value (MIV) questions. A significant main effect for time was apparent in five of the nine MSE questions and in five of the nine MIV questions (Table 3).

A 2 (Time) x 3 (Viewing Frequency) mixed-model ANOVA revealed a significant main effect for time, $F(1,100) = 25.777$, $p < .000$, with a modest effect size, $\eta^2 = .205$. MSE1 responses after the use of the experimental system were significantly lower, $M = 4.554$ versus $M = 5.065$, respectively. A series of identical calculations on the remaining MSE and MIV questions indicated that there were significant main effects for time in five of the nine MSE questions and in four of the nine MIV questions (Table 4).

Additionally, the main effects for viewing duration, $F(2,100) = 4.678$, $p < .011$, and viewing frequency, $F(2,100) = 4.526$, $p < .013$, were significant for the MSE1. A post hoc analysis with Bonferroni correction, however, revealed no significant group difference. Subsequent analyses of the main effects for viewing duration and viewing frequency failed to produce statistically significant differences for any of the remaining MSE and MIV questions. The time and viewing duration interaction effect was not obtained, either.

Table 3.
Mixed-model ANOVA (Time x Viewing Duration): Main Effects for time

DV	Mean (Pre)	Mean (Post)	F	Sig.	Partial Eta Squared
MSE1	5.07	4.53	26.775	.000	.211
MSE2	4.96	4.49	16.029	.000	.138
MSE3	5.06	4.63	15.713	.000	.136
MSE4	5.08	4.69	11.886	.001	.106
MSE9	4.99	4.59	14.110	.000	.124
MIV2	5.14	4.50	28.808	.000	.224
MIV4	4.50	3.55	59.343	.000	.372
MIV6	5.21	4.96	11.496	.001	.103
MIV7	4.62	4.00	36.311	.000	.266
MIV9	4.82	4.16	33.610	.000	.252

Table 4.
Mixed-model ANOVA (Time x Viewing Frequency): Main Effects for time

DV	Mean (Pre)	Mean (Post)	F	Sig.	Partial Eta Squared
MSE1	5.07	4.53	25.777	.000	.205
MSE2	4.96	4.49	17.624	.000	.150
MSE3	5.06	4.63	14.390	.000	.126
MSE4	5.08	4.69	14.246	.000	.125
MSE9	4.99	4.58	12.516	.001	.111
MIV2	5.14	4.50	27.098	.000	.213
MIV4	4.50	3.55	50.373	.000	.335
MIV7	4.62	4.00	24.179	.000	.195
MIV9	4.82	4.16	28.830	.000	.224

Discussion

In line with a previous study where a national sample of 377 had identified their beliefs about useful social information in online learning environments (Heo, 2009), the current study has demonstrated that participants were willing to self-disclose. The study has also identified the participant's major, discussion forum posting frequency, and content quality of discussion post indeed helped participants to get acquainted with others in an online pseudo-course. The high self-disclosure could be an indication of participants' acceptance of the CMS as a low-risk condition indicated in the CPM theory. Unlike the national sample study, the current study has identified that non-school related information such as age, gender, facial photo, and hobbies also helped participants to get acquainted with others in the online pseudo-course. This implies that while communication over CMC is more task-oriented than face-to-face communication, non-task oriented, personal information that usually helps face-to-face interpersonal relationships is also beneficial in developing acquaintances in online learning environments.

While participants were willing to share the majority of their personal information with others in their online pseudo course, their willingness in self-disclosure changed depending on the information. For example, while participants were open in sharing most of the personal, work and academic degree related information, they exhibited high sensitivity in disclosing most of the appearance and contact information. Participants not only concealed this information, but also indicated that they fabricated some of the information in their profiles in line with the Hyperpersonal Model. This could be evidence that the support of selective concealing and editing self information helps transform one of the major weaknesses of online learning (the lack of nonverbal cues) into ways to develop positive impressions of individuals over CMC.

Participants were also willing to self-disclose more to authoritative figures such as teachers or personally close friends, while showing lower disclosure to less authoritative figures such as classmates with whom they did not have a close relationship. That is, there existed a differentiated communication privacy and disclosure management depending on relationship groups, in accordance with the CPM theory. This suggests that a systematic approach for communication privacy and disclosure management is needed in online learning environments to facilitate online learners establishment of different boundaries to distinguish between public relationships and private information, and make decisions to either conceal or disclose private information through rule management processes.

Unlike the expectation, however, participants' interpersonal integration was not improved by the use (neither the amount of time nor the frequency) of the experimental communication

privacy and disclosure management system. While the reason for this warrants further study, one can speculate that the failure to construct social integration in this study could be due to minimum interactions witnessed during the group tasks. Sufficient interaction among members of the CMC environment is necessary for social integration (Walther, 1992). Another possible explanation is that the duration of the experiment (four weeks long) might not have been enough time to establish interpersonal integration. As the SIP theory indicates, although individuals can develop interpersonal relationship via CMC, it takes longer than face-to-face communication.

The use of the experimental communication privacy and disclosure management system did not impact participants' motivation in terms of both the self-efficacy and intrinsic value, either. Rather, participants' self-efficacy and intrinsic value have declined over time. While the minimum interactions for the group tasks may explain this decline in motivation, to a certain degree, since strong relationship exists between social presence and student motivation (Weaver & Albion, 2005), it becomes quite ironic: a system that can increase the perceived social presence of online learners should be used often enough to be effective, yet in order to achieve the maximum social presence, learners must be motivated to do so almost immediately. This supports future research on the innovative ways to integrate the supporting system in the curriculum.

Limitations

While this study does have important implications for the online education community, several limitations need to be considered: First, the experiment was conducted in an online pseudo-course. While the pseudo course site in the Content Management System (CMS) was very similar to a typical online course site with instructor information, course materials, communication channels, assignments and so on, participants might have had a different set of expectations for the online pseudo-course than real world online learners would have for their academic courses. As Utz (2000) mentioned, if a person is not motivated to get to know other individuals, she verbalizes nonverbal communication to a lesser intent. Thus, although tasks for the pseudo course were carefully chosen to promote participants' collaboration, participants' interaction found in the intellective task was rather sparse. One potential solution to these challenges in future studies is implementing experiments in a real online learning environment. If the experiment is conducted with the help of online instructors in their online courses, participants would be more active during the experiment since they need be involved in their real world online classrooms for their own learning, regardless of their participation in the experiment.

Another limitation was that interpersonal integration and motivation were measured in terms of participant self-reports: no measure of behavior or achievement was assessed. The external corroborative measures and in-depth qualitative analysis of discussion messages will help better understand interpersonal integration and motivation of the participants; however, they were not directly examined within the present research design.

Conclusion

Considering the fact that today's students routinely use online social communication, are conscious about their self-disclosure and are willing to exchange information with their peers to establish common ground and build a learning community, current online education is now obliged to respond to the needs of online learners. The current study provides a means for online

learners to be treated as individually differentiated, feeling, intentional, thinking and social human beings, rather than merely names in their course management systems. In addition, this study provides online instructors with a technological method of meeting their students in a more personable manner.

Since there is a prevailing abundance of private information over social networks and the risks of misuse by dishonest perpetrators is evident, many educators worry about their students' information privacy. Although it is a quite relevant issue in general, when it applies to course management systems to which only registered students and instructors have access (i.e. a low risk environment), the view of minimizing disclosure for the sake of privacy is worthy of questioning.

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