Academic self-concept and social presence in face-to-face and online learning: Perceptions and effects on students’ learning achievement and satisfaction across environments

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Abstract

The purpose of this study was to examine students’ academic self-concept and social presence in face-to-face (FTF) and online version of the same course, and to examine the effects of these two variables on student learning achievement and satisfaction. A total of 257 undergraduate students enrolled in a digital design course were randomly assigned to either of two treatments: one offered FTF instruction, and the other offered online instruction. Individual students’ academic self-concept, social presence and attitudes towards course were measured by widely-recognized and reliable scales respectively. Results indicated that both academic self-concept and social presence are important factors that are closely related to students’ learning achievement and satisfaction, but they are not equally important. FTF students perceived significantly higher social presence than online students; while no significant difference was found on academic self-concept. The effect of social presence on student learning achievement and satisfaction were stronger in online environment than in FTF environment. There was no significant difference between FTF and online students with regard to the effect of academic self-concept on learning achievement and satisfaction. These findings indicate that compared to FTF students, online students are in greater need of higher-level social presence, which has a strong effect on their learning achievement and satisfaction. Academic self-concept is equally important to both FTF and online students. Online students might need more supports on social interaction rather than self-reflection.

1. Introduction

Self-concept and social presence are both motivational-related factors that play an important role in students’ learning (Kornilova, Kornilov, & Chumakova, 2009; Yamada, 2009). The former one relates to students’ perception of themselves and the latter one relates to students’ perception of the relationship with others. There might be differences in students’ self-concept and social presence between face-to-face (FTF) learning and online learning because physical environmental differences often cause different psychological effects on students (Lim, Morris, & Kupritz, 2007; Relan & Gillani, 1997). What’s more, a further question about whether self-concept or social presence is more important to students’ learning achievement and attitude in these two environments is raised. The answer to this question might enhance our understandings of FTF and online students’ psychological mechanisms. Based on the findings, instructors will be able to provide helpful supports for students to obtain better learning achievements and higher satisfaction towards course in either FTF or online learning. Therefore, a study is needed to examine the effects of academic self-concept and social presence on student learning achievement and satisfaction, and compare students’ psychological mechanisms across environments.

This paper intends to make contributions in the following three aspects: First of all, measuring and comparing FTF and online students’ academic self-concept and social presence might help to clearly and accurately present the difference of students’ perception on themselves and their classmates between different learning environments. Second, exploring the effects of academic self-concept and social presence on students’ learning achievement and satisfaction between FTF and online learning will enable us to better understand learners’
psychological mechanism across environments, which may serve as a base for more in-depth analysis and the other future studies. Third, the instructional methods and psychological supporting strategies for traditional FTF learning is much more mature than those for online learning. If the differences between FTF and online learners’ psychological mechanism could be found out, then we can refer to the traditional instructional strategies more effectively and further enrich the online learning theories.

1.1. Academic self-concept

Students’ self-concept was defined by Shavelson, Huber, and Stanton (1976) as an individual’s perceptions of himself based on experience and interactions with the outside world. Based on this definition, Marsh, Byrne and Shavelson (1988), Marsh (1992) gathered a large amount of empirical evidence to divide self-concept into three aspects, namely social, physical and academic self-concept. Among these three aspects, academic self-concept refers to students’ interest, enjoyment and perceptions of his/her own competency in a given academic domain. It was identified as the most important aspect in the context of education because it has a higher correlation with learners’ academic achievement than other aspects of self-concept (Lyon, 1993).

It has been indicated that higher academic self-concept will result on better academic achievement, either on academic grade points or test scores (Cokley & Patel, 2007; Kornilova et al., 2009; Lyon, 1993). Some other studies found that academic self-concept was not only a cause but also an effect of students’ academic achievement (Guay, Marsh, & Boivin, 2003). Although reciprocal effects were supported, the effect of prior self-concept on subsequent achievement were demonstrated to be stronger than the corresponding effect of prior achievement on subsequent self-concept (Marsh, Trautwein, Ludtke, Koller, & Baumert, 2005).

In addition, results of several studies found that learners with higher academic self-concept tended to have higher levels of satisfaction. According to Parker, Martin, and Marsh (2008), students’ academic self-concept was found to be substantially associated with their satisfaction, since the higher the student’s academic self-concept, the more interested he/she was in learning, and the more satisfied he/she was with school. Other researchers also pointed out that students with higher academic self-concept were expected to choose more challenging educational environments and show greater persistence and effort in academic tasks, which may lead to students’ overall satisfaction (Trautwein, Lüdtke, Kastens, & Koller, 2006).

Task persistence is particularly important in online courses because online students might easily feel isolated and lose their confidence and patience since they have limited opportunity to communicate and get direct encouragement from their instructors and classmates. Given that online courses require greater task persistence, which is related to academic self-concept, it is possible that the effect of academic self-concept on student learning and attitudes in online courses may be greater than in FTF courses. In a similar vein, Lim, et al. (2007) indicated that the limited capacity of online instruction to engage learners in learning events need to be considered unless the learners were self-motivated active learners, and possessed strong organizational skills in their learning habits. Therefore, learners with low academic self-concept might not be able to perform well and might be less satisfied with the online course compared to the FTF course. While students’ academic self-concept in both FTF and online courses seems important to examine, there are very limited studies comparing the effect of academic self-concept on student learning and attitudes in FTF vs. online courses. This is one thing that we are going to examine in this study.

1.2. Social presence

Rather than focus on one’s feelings about himself/herself in a specific academic domain, social presence emphasizes more on the feelings of the relationship with others. Social presence was originally defined by Short, Williams, and Christie (1976) as “degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships” (p.65). Later, it was redefined in the context of learning by Garrison and Anderson (2003) as “the ability of learners to project themselves socially and emotionally as ‘real’ people into a community of learners” (p. 94). With the prevalent recognition of the significance of communication cues and immediate responses in the learning process, social presence has received more and more attention in both traditional FTF instruction and in the field of distance education (Gunawardena & Zittle, 1997; Richardson & Swan, 2003; Rourke, Anderson, Garrison, & Archer, 1999; Tu, 2002).

Previous research has demonstrated the positive relationship between students’ social presence and their academic achievement. Gough (1975) stated that students who score high on the social presence scale tend to be clever, enthusiastic, imaginative, spontaneous, active, and expressive. Also, social presence was identified as an important factor for improving learning (Gunawardena & McIsaac, 2004) by motivating learners, enhancing the sense of active community, promoting learners’ engagement (Hall & Herrington, 2010), and facilitating interaction such as requests for help (Leh, 2001). Lomicka and Lord (2007) suggested that social presence enhances the interaction between learners, which, in turn, affects learning performance. It has also been found that social presence effectively promotes interaction in communicative language learning and leads to better learning performance such as the frequency of utterances and reciprocal grammatical modification (Yamada, 2009).

In contrast, there are some empirical studies that have not found significant results in the relationship between social presence and course performance. For example, Johnson and colleagues failed to obtain significant results in their empirical research to indicate the effect of social presence on students’ course performance (Johnson, Hornik, & Salas, 2008). Moreover, Mackey and Freyberg (2010) also pointed out that cognitive learning is not affected by social presence according to their study. The insignificant findings may be either due to the nature of the quizzes given (Johnson et al., 2008) or the engineering course content selected to be taught (Mackey & Freyberg, 2010). Certain kinds of courses or knowledge do not require a rich sharing learning environment, thus social presence might not have much effect on learning. Even though the insignificant results were obtained, these authors still suggested that enhancing social presence may help improve the overall learning experience and make learning more enjoyable for students.

Additional research has found that social presence is a very strong predictor of students’ satisfaction towards course. For example, in Johnson et al. (2008)’s research, the evidence suggested that creating and maintaining a shared learning space within an e-learning environment is important for enhancing participants’ satisfaction. Moreover, Gunawardena and Zittle (1997) found a very strong relationship between learners’ perceived social presence and their overall satisfaction in a text-based medium. In addition, social presence was consistently associated with learner satisfaction in multimedia instruction (Steffey, 2001). Also, Arbaugh (2001) suggested that social
presence can overcome the potential negative reactions by enabling stronger peer connections, reducing feelings of isolation and strengthening feelings of psychological connection and community. This might be the reason why improving social presence can enhance student satisfaction (Arbaugh, 2001). Likewise, Richardson and Swan (2003) found that students with high perceptions of social presence had high perceptions of learning and high satisfaction with their instructor.

Several studies compared the level of social presence between FTF environment and online environment, but the results are conflicting. Some authors believed that FTF activities cannot be replaced by online activities because normal communicative processes are disrupted online by the lack of physical presence, making cognitive, meta-cognitive and social learning more difficult (Lee & Chan, 2007). Supporters maintain that FTF groups’ verbal and nonverbal communication and social exchange produce emotional connections and a sense of community, which are hard to achieve in online settings (Kiely, 1993). Recent research has shown that in a computer mediated environment, one cannot take for granted that participants will socially interact simply because the environment makes it possible (Kreijnsa, Kirschner, & Jochems, 2003). Empirical studies have also found FTF interaction to have the highest social presence or media richness among voice mail, text, and electronic mail (Rice, 1993).

However, opponents have argued that online media can provide a more convenient and less nervous environment for learning communication (Zhan, Xu & Ye, 2011). Supporters for this point mainly come from social presence theorists who maintain that media have the capacity to transmit all the symbolic and social information that is present in human communication (Short et al., 1976). Social media theorists also argue that physical co-presence is not a necessary part for constructing psychosocial learning processes in online activities; what is necessary is communicative exchange among participants (Galimberti, 1994).

Given the differences of opinions and varying research results regarding the effect of social presence in FTF versus online courses, it is surprising that very few studies have examined the effect of social presence on students learning achievement and satisfaction. One of the purposes of this study will be to examine this effect.

1.3. Research questions

In sum, this study will examine the following questions: (1) Do students perceive equal degree of academic self-concept and social presence in both FTF and online learning? Or is one variable perceived to be higher in a specific environment than the other? (2) Are academic self-concept and social presence equally important to both FTF and online learning? Or is one more important in a specific environment than the other?

2. Purpose and hypothesis

The purpose of this study is to examine the effects of academic self-concept and social presence on student learning achievement and satisfaction in different learning environments (FTF vs. online). Since previous studies about the effects of academic self-concept or social presence were either focused on single learning environment, or have yielded inconsistent results when comparing outcomes in FTF versus online learning, it was decided that an additional study such as this would provide useful information for gaining insights into students’ psychological mechanism in FTF and online learning environment.

The following hypotheses were proposed, based on the research questions:

H1. Students’ academic self-concept will be higher in FTF learning than in online learning (ASC_{FTF} > ASC_{online}). This was expected because in FTF learning, students would have more opportunity to communicate and get direct encouragement from instructors and classmates (Lee & Chan, 2007; Lim, 2001), which might result in FTF students having higher academic self-concept than online students.

H2. Students’ social presence will be higher in FTF learning than in online learning (SP_{FTF} > SP_{online}). This was expected because the level of students’ social interaction and emotional exchange (two of the key determinants of social presence) in a FTF environment might be hard to achieve in an online learning class (Huang & Chang, 2010; Kreijnsa et al., 2003; Rice, 1993).

H3. The effect of academic self-concept on student learning achievement will be higher in online learning than in FTF learning (ASC → learning achievement: FTF < online). This was expected because online learning requires student to have better academic self-concept, so as to be more self-motivated (Marsh & Yeung, 1997; Trautwein et al., 2006). If a student doesn’t have a good academic self-concept, he/she might have difficulty succeeding in the online course.

H4. The effect of academic self-concept on student satisfaction will be higher in FTF learning than in online learning (ASC → satisfaction: FTF > online). This was expected because a student with higher academic self-concept might be more willing to present in the public (House, 1992; Lim, 2001; Lim et al., 2007), thus FTF interaction might be more satisfying to them. Conversely, a student with lower academic self-concept will be more willing to stand behind the public, thus they might like online learning better.

H5. The effect of social presence on student learning achievement will be higher in online learning than in FTF learning (SP → learning achievement: FTF < online). This was expected because previous research demonstrated that it was easier for students to perceive higher social presence in a FTF course (Kreijnsa et al., 2003; Lee & Chan, 2007), therefore, if a student feels higher social presence, it might not much related to their achievement. Other factors such as instructional materials or teacher’s expressing skills might be more important for improving students’ performance in FTF course. However, in online course, the situation might just be the opposite because the distance between online learners might make them in greater need of social integration and emotional exchange (Picciano, 2002).

H6. The effect of social presence on student satisfaction will be higher in online learning than in FTF learning (SP → satisfaction: FTF < online). This was expected because social presence might not be as important in FTF course as in online course. Students might take it for granted that they perceived high social presence in FTF course (So & Brush, 2008); however, in online course, if students perceive high social presence, they will be more interested in learning (Garrison, Anderson, & Archer, 2000; Richardson & Swan, 2003) and this will finally lead to higher satisfaction.
3. Method

3.1. Participants

The participants were 257 undergraduate students enrolled in a digital design course in a major university in Southeast China. They were freshmen and sophomores aged from 17 to 22 years old. Among them, 115 were male, 142 were female, and most of them came from middle-class families. The students were enrolled in eight sections which were randomly selected and assigned to FTF or online instruction.

3.2. Measurement

An online survey was used to measure individual student’s academic self-concept, social presence and satisfaction at one time before the course ended. The survey combined selected revised items from previous Academic Self-Concept Scale (ASCS), Social Presence Inventory (SPI) and Course Interest Survey (CIS).

The ASCS was created by Reynolds (1998), and includes 40 common Likert items like “I often expect to do poorly on exams” and “I consider myself a very good student.” The reliability coefficient of ASCS is .88. In the current study, we chose the most related items from this survey.

The SPI was created by Biocca and Harms (2003), and includes five pairs of multiple choice items like “I paid close attention to my classmates.”, and “I think my classmates paid close attention to me”, in order to examine learners’ perceived co-presence, attentional engagement, emotional contagion, comprehension and behavioral interdependence. The reliability of the survey is .83. In the current study, we used all these 10 questions and transfer it into Likert items for use.

The CIS was created by Keller (2010), and includes 34 Likert items like “I enjoy working for this course” and “I feel that this course gives me a lot of satisfaction”. The reliability of the survey is .88. In the current study, we chose the most related items from it.

Individual student’s learning achievement was measured by a 50-item test. All the test items were randomly selected from the final exam test item repository (FETIR), which was used in the last three years for the final exam of the digital design courses. The internal consistency reliability for the posttest was determined to be .873. Students were required to finish all the test items in 105 min in the computer lab.

3.3. Procedure

There were 121 students enrolled in the FTF digital design course in Spring semester, 2011, and there were 136 students enrolled in the same course but online format in Autumn semester, 2011. In order to guarantee the comparability of these two treatment groups, during both courses, we have controlled as many instructional-related variables as possible. All the students followed the same course objectives, use the same text book, under the same supervision of instructor, and finish the same assignments. The same criteria has been used for grading students’ assignments. The only major differences between these two treatments were the learning environment and the accordingly instructional means provided: In the FTF treatment, students had lectures in the classroom and had been involved in relevant learning activities in the computer lab every week. However, in the online treatment, lectures and learning activities could not take place in a FTF manner. Instead, students have lectures through internet and were assigned to at least one online discussion activities every week. Also, they were provided with video clips, instructional resources, assignments and feedbacks regularly.

By the end of the spring semester, a survey had been sent out in the class to assess students’ academic self-concept, social presence and satisfaction. Oral guidance was given and students were noticed that the survey would just be used for research, individual answer would not be shown to the instructor. Similarly, in the Autumn semester, the same survey has been created online and sent out from the course website. Students’ test score were collected from the instructor as the learning achievement data, which could be related to each student’s attitude data.

3.4. Research design and data analysis

Two T-tests were applied to analyze the difference of students’ academic self-concept and social presence between FTF learning and online learning (H1 & H2), since these two hypotheses only compare variable means. While for the next four hypotheses, since they were comparing effects and correlations of the independent variables and dependent variables, a Multi-group Analysis of a Structural Equation Model has been used to analyze the difference between FTF and online students with regards to the effects of academic self-concept and social presence on learning achievement and satisfaction (H3, H4, H5 & H6).

4. Results

257 students’ data (121 FTF students and 136 online students) have been collected in this study. Results are listed as below.

4.1. Reliability measurement

Cronbach’s alpha was used to test the reliability of the study. The alpha coefficient were .863 for academic self-concept, .849 for social presence, .877 for satisfaction and .932 for the total scale, which suggesting a satisfactorily high internal consistency (Cronbach, 1951).

4.2. Factor differences (FTF versus online)

Table 1 presents the mean scores and standard deviations of both groups on each of the four variables examined in this study. As noted in the following paragraphs, analysis of this data revealed no significant difference between the two groups on academic self-concept, scores and satisfaction. However, FTF students perceived a significantly higher degree of social presence compared to online students.
4.2.1. Academic self-concept

T-tests for independent means were conducted on the ASC data using course type (FTF/Online) as the grouping factor. No significant difference in academic self-concept was found between the FTF and online students, t(255) = .679, p = 0.498.

4.2.2. Social presence

T-tests for independent means were conducted on the SP data using course type (FTF/Online) as the grouping factor. Results indicated that FTF students perceived significantly higher social presence than online students, t(255) = 2.077, p = 0.039. The effect size (based on Cohen's d) was .129.

4.2.3. Score

T-tests for independent means were conducted on the score data using course type (FTF/Online) as the grouping factor. No significant difference in score was found between the FTF and online students, t(255) = .010, p = 0.992.

4.2.4. Satisfaction

T-tests for independent means were conducted on the satisfaction data using course type (FTF/Online) as the grouping factor. No significant difference in satisfaction was found between the FTF and online students, t(255) = 1.249, p = 0.213.

4.3. Factor effect differences (FTF versus online)

4.3.1. Test of normality distribution

Multi-group analysis was conducted by AMOS 17.0 to analyze the factor effect differences between FTF and online students. Before the estimation of the structural models, the normality of the univariate and multivariate distributions of the measured indicators were examined. The distributions of the variables were normal for the ASC, SP, score and satisfaction. Skewness ranged from −.347 to .036, kurtosis ranges from −.529 to .838. According to the guideline proposed by Kling (2005), only a skewness value >3 and a kurtosis value >10 would influence the results; thus the obtained data can be regarded as normally distributed for further analyses.

4.3.2. Baseline model

In a multi-group analysis, the first step was to determine a baseline model. The creation of the baseline model involved testing all the hypothesized relationships in the theoretical model (see Fig. 1) using the full sample (both FTF and online samples). The baseline model was evaluated based on its goodness-of-fit indices to determine if the model was a good representation of the hypothesized relationships (Hu & Bentler, 1999). The baseline model produced a χ² value 5.44 (χ²/df = 1.361), NFI = .931, CFI = .928, and an RMSEA value of .052, which suggested an acceptable fit.

4.3.3. Multi-group analysis

To explore the possible difference of the structural paths in the research model between FTF and online students, a multi-group analysis was conducted. This analysis involved testing two models. In the first model, only FTF samples were used. In the second model, only online samples were used. The first and second models, respectively, reflect the differences of the structural paths according to learning environment (FTF vs. online).

Fig. 2 presents the structural coefficients for FTF and online students. According to the critical ratios for differences (CRDiff), the paths which differed significantly between FTF model and online model (CRDiff >1.96) were: (1) SP → Score (CRDiff = 2.856), (2) SP → Satisfaction (CRDiff = 2.087).

Table 1

<table>
<thead>
<tr>
<th>Measure</th>
<th>FTF students Mean</th>
<th>SD</th>
<th>Online students Mean</th>
<th>SD</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic self-concept</td>
<td>3.65</td>
<td>.49</td>
<td>3.61</td>
<td>.44</td>
<td>.679</td>
</tr>
<tr>
<td>Social presence</td>
<td>3.63</td>
<td>.62</td>
<td>3.48</td>
<td>.57</td>
<td>2.077*</td>
</tr>
<tr>
<td>Scores</td>
<td>71.69</td>
<td>6.27</td>
<td>71.71</td>
<td>11.33</td>
<td>.010</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>3.83</td>
<td>.82</td>
<td>3.95</td>
<td>.74</td>
<td>1.249</td>
</tr>
</tbody>
</table>

Note. *p < 0.05.

a Using a five-point Likert scale ranged from 1 (not true) to 5 (very true).
b Maximum possible test score was 100.

Fig. 1. Path analysis of the combined sample. Completely standardized robust maximum likelihood parameter estimations. *p < 0.05, **p < 0.01.
The primary purpose of this study was to examine the effects of academic self-concept and social presence on FTF and online students’ learning achievements and satisfaction. We analyzed the results according to the six hypotheses proposed previously.

The first hypothesis that students’ academic self-concept would be higher in FTF learning than in online learning was not supported. Contrary to expectations, no significant difference was found on academic self-concept between FTF and online students, which failed to support Lim (2001)’s idea. The reason might be that academic self-concept might depend not only on the learning processes but also students’ characteristics and personality which are formed inherently. Therefore, the effect of learning environment might not be strong enough to lead to significant difference of academic self-concept between FTF and online students.

The second hypothesis that students’ social presence would be higher in FTF learning than in online learning was supported. FTF students perceived significantly higher social presence than online students, with a medium effect size. This result corroborates the findings from previous research (Huang & Chang, 2010; Kreijns et al., 2003; Rice, 1993), and it may be explained by the fact that students can communicate more directly and freely in a FTF environment. For example, FTF students could use not only words, but also body languages and countenances to express themselves, which help them to achieve higher social presence.

The third hypothesis that the effect of academic self-concept on student learning achievement would be stronger in online learning than in FTF learning was not supported. Although the correlation between academic self-concept and learning achievement were higher in online learning than in FTF learning, the critical ratio for difference was not significant. This result is not expected, however, it is not surprising, since previous studies have also got insignificant results when comparing learning outcomes between traditional classroom instruction and distance education (Lim, 2002; Relan & Gillani, 1997; Wentling & Johnson, 1999). The possible reason may be that academic self-concept is important to both FTF and online students. Although online students may need it more, however, it may not affect students’ learning achievements to a significant level.

The fourth hypothesis that the effect of academic self-concept on students’ satisfaction would be stronger in FTF learning than in online learning was not supported. No significant result was found in this study, which was inconsistent with previous findings from House (1992), Lim (2001), and Lim et al. (2007) who reported significant results on learner satisfaction between FTF and online learning. This result is also unexpected and suggests that no matter in FTF environment or in online environment, students with higher academic self-concept would have higher confidence and more open to the others, so they often have more fun during learning, which leads to higher satisfaction. Consequently, academic self-concept may be important in both learning environments for increasing students’ satisfaction.

The fifth hypothesis that the effect of social presence on student learning achievement would be stronger in online learning than in FTF learning was supported. This finding is in agreement with Picciano (2002)’s findings which showed a high correlation between social presence and cognitive learning, especially in online environment. The reason might lie in the fact that in FTF learning environment, students could increase their social presence by informal ways such as chatting or participating in games, which is not very instructional and thus could only limitedly increase students’ learning achievement. However, in online learning, the topics were usually designed by instructors, in this sense, the more the students present themselves online, the more likely they learn more.

The sixth hypothesis that the effect of social presence on student satisfaction would be stronger in online learning than in FTF learning was supported. This finding was consistent with Garrison et al. (2000) and Richardson (2003)’s research, who found social presence is strong predictor of learner attitudes. The possible reason may be that students could perceive higher social presence much more easily in FTF learning environment than in online environment. Social presence is not in great need to FTF students, thus the enhancement of social presence might not be able to significantly increase FTF students’ satisfaction. In contrast, online students might easily feel isolated and helpless because of the distance from instructors and classmates. As a result, social presence should play a much more important role in the online environment. Therefore, compared to FTF students, social presence has a stronger effect to online students’ satisfaction.

6. Limitations and future research

Future research could be considered in the following directions: First of all, students’ academic self-concept, social presence, learning achievement and satisfaction in FTF and online learning are affected by a wide variety of factors, such as the instructional strategies employed, the students’ personalities and learning styles, the course contents, etc. Although the course contents and instructional strategies employed in the FTF and online courses in this study were intended to be close to identical, the other factors like student’s learning styles was not taken into consideration. In future studies, it might be interesting to examine these factors from a qualitative perspective to see how academic self-concept and social presence affects FTF and online students learning and attitudes, and why significant differences in students’ learning achievement and satisfaction did or did not occur in this study.

Besides, social presence could be greatly enhanced in online courses that include social media components, such as micro-blog, wiki, forum, social network, instance chatting software and video conference. In our study, social media has not been offered to both groups of participants; however, it would be helpful to study the effects of social media on students’ self-concept, social presence, learning achievement and satisfaction across different learning environments in the follow-up studies.
In addition to employing qualitative, as well as quantitative methods in future studies, longitudinal time-series studies are suggested for the future. Students’ performances and attitudes might change along the timeline. Longitudinal research might be able to provide more details and a clearer picture of FTF and online students’ academic self-concept and social presence.

7. Implications and conclusion

As indicated earlier, the results of academic self-concept and social presence on students’ learning and satisfaction are controversial in previous studies and little research has been conducted on comparing academic self-concept and social presence as well as their effects between FTF and online learning. The present study provides evidence and support to the notion that academic self-concept and social presence are both important factors that influence students’ learning performance and attitudes, however, they are not equally important in FTF and online environment. Three major findings were proposed as below.

First, the results show that FTF students perceived significantly higher social presence than online students. This result provides additional evidence to the notion that students need more guidance and encouragements on social presence in online learning than in the traditional FTF learning. According to this result, social hints such as using real personal photos rather than cartoon photos, video meeting discussion rather than text-based discussion may help to enhance online students’ social presence, so as to increase their performance and attitudes.

Second, the baseline model proved that academic self-concept and social presence are both strong predictors of students’ learning achievement and course attitudes, however, there is significant difference between FTF and online students on the effect of social presence on learning achievement and satisfaction, while no significant difference was found with respect to academic self-concept. According to this, we might deduce that the effect of academic self-concept is not affected by learning environments; however, the effect of social presence was significantly affected by environment. Therefore, compared to FTF students, online students might need more supports on social interaction rather than self-reflection. In another word, online students’ perception of the relationship with others could be more important than the perception of themselves.

The third important finding to emerge from the study is that the effect of social presence on students’ learning achievement and satisfaction were stronger in online learning environment than in FTF learning environment. This result indicates the importance of increasing students’ social presence in the online learning environment, since it will greatly enhance students’ learning and attitudes. Therefore, it should be necessary to create a community atmosphere and provide more social hints for online students, to help them achieve higher social presence and finally lead to better learning achievement and higher degree of satisfaction.

In light of these findings, educators and instructional designers may need to take careful consideration on academic self-concept and social presence when planning a course, no matter in FTF or online environment. Beyond this, social presence could be especially important for online students, since it would greatly improve their performance and attitudes. Motivational strategies, such as creating an online learning community, providing sufficient social hints and authentic scenarios, might be effective supports to help student project socially online.

Acknowledgment

This study was supported by the Natural Science Funds Organization in Guangdong Province for PhD talents (Grant #S2011040001730), Social Science Planning Project in Guangzhou (Grant #10Y16), Excellent PhD Dissertation Author Fund in Guangdong Province (SYBZZXM2012126), the Social Science Planning Project in Guangzhou (Grant #13Q18), and MOE (Ministry of Education in China) Project of Humanities and Social Sciences (Grant #13YJ880105). We want to thank all the participants in this study for their cooperation.

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