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Social integration and post-adoption usage of Social Network Sites An analysis of effects on learning performance

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Abstract

This study calls for an expansion of the scope of educational research from superficial commitment and usage behaviour to more sophisticated levels of Social Network Sites by undergraduate students, and their influences on learning performance. The research model is validated empirically using data from a field survey of the most popular Social Network Site, *Facebook*. Partial Least Square (PLS) is proposed to assess the relationships between the constructs together with the predictive power of the research model. Overall, our results conclude that mutual exchange and social integration are conceived as appropriate drivers of students' post-adoption usage and, subsequently, learning performance.

Keywords: Social integration; post-adoption usage; social network sites; learning performance.

1. Introduction

Universities invest in online environments and the learning benefits that can be gained from them partly depend on their social integration and post-adoption usage. In particular, Social Network Sites (SNS) are online settings that allow users to register and connect to each other in order to communicate or share resources, and have a primary focus on social interpersonal communication. SNSs are thus associated with virtual settings that foster perceived community support (hereinafter, PCS; *cf.* Herrero and Gracia, 2007); *i.e.*, involvement and participation in community activities, and, consequently, the individual's feelings of identity and attachment with them (Sánchez-Franco and Roldán, 2010). Likewise, Saga and Zmud (1994) concluded the importance of extended usages (or a higher level of usage) over initial acceptance (*cf.* also active continuance, Bhattacherjee, 2001). Compared to the established research stream of SNS adoption and initial usage, the study of SNSs as a relevant source of extended usage (or post-adoption usage) has, however, been comparatively lacking. A higher level of use behaviour will here be conceptualised as routinisation and infusion.

Accordingly, community organisation and participation will increase the students' feelings of attachment to their SNS, and expectations of continuity, developing (a) community integration as well as extended usage by students,

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and consequently, (b) learning performance. SNSs will, for instance, provide a means for students to support both learning and performance by others. Precisely issues on assessment and learning performance are receiving more attention from Universities. However, it is still uncertain how PCS and post-adoption usage influence on learning productivity.

The aim of this paper will, therefore, be to explore the impact—from the perspectives of PCS —of SNSs' post-adoption usage on learning performance in education. Indeed, this study calls for an expansion of the scope of research from simple and social usage behaviour to more sophisticated and deeper levels.

2. Theory and research hypotheses

Greater levels of participation in an SNS help to share knowledge and ideas related to mutual interest (Koh and Kim, 2004), predicting stronger feelings of being supported by the SNS (*i.e.*, perceived support and resources available to a student in an SNS), and fostering their identity, belonging, and attachment to it (*cf.* Casaló *et al.*, 2007; Sánchez-Franco and Roldán, 2010). Firstly, students could help to determine the creation, development and extent of social bonding via SNSs. They could, on the one hand, seek out media in a task-oriented behaviour to fulfill a set of objectives defined prior to participation, such as solving a problem or generating an idea through online interactions –as instrumental benefits- or for fun and relaxation –as hedonic benefits- among others (*cf.* Bagozzi and Dholakia, 1999; Dholakia *et al.*, 2004). Students will thus be more highly motivated to contribute to an online community if they subsequently receive instrumental and/or hedonic help (*i.e.*, community organisation). On the other hand, greater levels of community organisation will lead students to feel that they are being supported by a whole portion of their community. In particular, community integration will imply a sense of emotional involvement with the group -characterised as affective commitment or students' desire to maintain a valued relationship with others. Community organisation will thus increase feelings of attachment to their SNS, and expectations of continuity so that students will continue developing and strengthening relationships with others, and obtaining affective benefits from mutual relationships (*cf.* Casaló *et al.*, 2007). Likewise, community participation will be associated with an increase in the opportunity for the students to become involved in a community (*i.e.*, community integration). As LaContora and Mendonça (2003, p.395) note, "members may continue to participate in a virtual community not solely to search for information about a particular topic area but also to maintain long-term relationships". Therefore, mutual exchange in virtual communities will be a key element in fostering the higher level of integration (or affective commitment or identification with virtual communities). Based on the previous arguments, this research proposes the following hypotheses: H1. Community organisation positively influences community participation; H2. Community participation positively influences community integration; and H3. Community organisation positively influences community integration.

Secondly, post-adoption IS usage (or the level at which students have incorporated an SNS into their learning structure) will here be conceptualised as a broad concept that includes routinisation and infusion. On the one hand, as users routinely use an SNS, they simplify relationships with others by generating a knowledge structure (*cf.* Flavián *et al.*, 2006). In particular, routinisation will be associated with "habitual usage–that is, to integrate the technology into daily routines" (Schwarz and Chin, 2007, p. 240; *cf.* also Cooper and Zmud, 1990; Saga and Zmud, 1994). On the other hand, infusion refers to the process of embedding an Information Technology application deeply and comprehensively within an individual's or an organisation's work systems; *i.e.*, students will develop abilities to use the SNS to its fullest potential. According to previous arguments, students who are socially committed to their community relationships are more likely to continue routinely using the social services and maximising their potential of them. Based on the previous arguments, this research proposes the following hypothesis: H4. Community integration positively influences post-adoption usage (*i.e.*, routinisation and infusion).

Thirdly, PCS and consequently, post-adoption usage imply daily/high level of SNS usage -as "a sequential process from attitudes to behaviours to performance outcomes" (Sundaram *et al.*, 2007, p. 103; *cf.* also Kwon and Zmud, 1987). The more students participate socially in an SNS, the more likely it is that they will be supported by the online community. This will in turn foster their belonging and attachment to it, which will result in their post-adoption use of the SNS to enhance their own learning and productivity. Based on the previous arguments, this

research proposes the following hypothesis: H5. Post-adoption usage (*i.e.*, routinisation and infusion) positively influences learning performance. See Figure 1.

3. Methods

3.1. Participants

The data are collected from a sample of questionnaires voluntarily filled out by undergraduate students from a field survey of the popular computer-mediated SNS, *Facebook*. In particular, one hundred and sixteen undergraduate students from two social communication classes at a public university in a metropolitan area participated in this study for extra credit. The exclusion of invalid questionnaires due to duplicate submissions or extensive empty data fields resulted in a final sample of 99 users. 83% were female respondents. The average age was 20.14 (SD: 3.900).

3.2. Measures

The instrument development first consisted of reviewing the literature so as to identify measures for each construct -satisfying content validity. Thirteen items were used to assess PCS - taken from Herrero and Gracia (2007), Geyskens *et al.* (1996), Loewenfeld (2006), and Sánchez-Franco (2009). Likewise, the instrument for measuring the degree of routinised behaviour and infusion has been operationalised by Sundaram *et al.* (2007). Three items were used to assess the degree of learning performance –taken from Premkumar and Bhattacherjee (2008). All items are seven-point Likert-type, ranging from «strongly disagree», 1, to «strongly agree», 7.

3.3. Data analysis

The testing of the hypotheses was conducted using Partial Least Squares (PLS), specifically, SmartPLS 2.0.M3 software (Ringle *et al.*, 2008). PLS allows both the specifying of the relationships among the conceptual factors of interest and the measures underlying each construct. This result is a simultaneous analysis of (a) how well the measures relate to each construct, and (b) whether the hypothesised relationships are empirically true at the theoretical level. Furthermore, in our study the post-adoption construct has been measured with formative indicators (*i.e.*, routinisation and infusion). In particular, a construct should be modelled as having formative indicators if the indicators are the defining characteristics of the construct and changes in them would cause alterations in the construct. That is, dropping an indicator from the measurement model may alter the conceptual meaning of the underlying variable. In this regard, PLS is appropriate for the analysis of measurement models with both formative and reflective items (*cf.* Diamantopoulos and Winklhofer, 2001). Being a formative construct, they cannot be easily modelled using LISREL and other covariance-based approaches; *i.e.*, these implicitly assume all indicators to be reflective. This general advantage is highly relevant for this research.

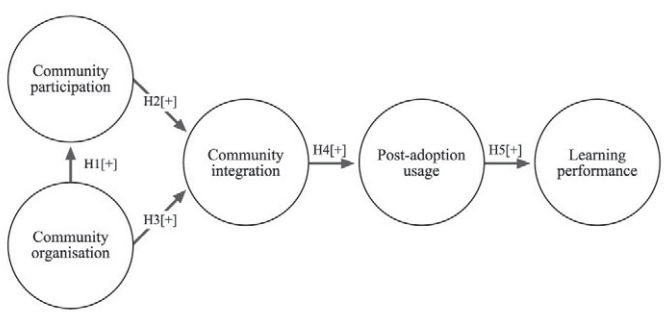


Figure 1. Hypotheses

4. Findings and results

4.1. Measurement model

Individual reflective-item reliability was assessed by examining the loadings of the items with their respective construct. Individual reflective-item reliabilities –in terms of standardised loadings– were over the recommended acceptable cut-off level of .7, excepting CP3 (< .700). Construct reliability was assessed using the composite reliability (ρ_c). The composite reliabilities for the multiple reflective indicators were well over the recommended acceptable .7 level, demonstrating high internal consistency. Moreover, we checked the significance of the loadings with a bootstrap procedure (500 sub-samples) for obtaining t-statistic values. They are all significant. Convergent and discriminant validities were assessed by stipulating that the square root of the average variance extracted (AVE) by a construct from its indicators should be at least .7 (*i.e.*, AVE > .5) and should be greater than that construct's correlation with other constructs. All latent constructs satisfied these conditions. See Table 1a.1 and 2.a.

Table 1. Measurement model

Individual item reliability-individual item loadings and weights. Construct reliability and convergent validity						
Latent Dimension	**a.1.** Reflective			**a.2.** Reflective + formative		
	Loadings[a]	ρ_c	AVE	Loadings[a]	ρ_c	AVE
CO. Community organization		.927	.718		.927	.718
CO1. I could find people who would help me feel better	.806			.806		
CO2. I could find someone to listen to me when I feel down	.820			.820		
CO3. I could find a source of satisfaction for myself	.920			.920		
CO4. I could be able to cheer up and get into a better mood	.836			.836		
CO5. I could relax and easily forget my problems	.850			.850		
CI. Identification with my *Facebook* community (*i.e.*, community integration)		.914	.726		.914	.726
CI1. My affective bonds with my *Facebook* community are the main reason why I continue to use its service	.813			.811		
CI2. I enjoy being a member of my *Facebook* community	.864			.862		
CI3. I have strong feelings for my *Facebook* community	.883			.885		
CI4. In general, I relate very well to the members of my *Facebook* community	.848			.850		
CP. Community participation		.956	.844		.956	.844
CP1. I participate in order to stimulate my *Facebook* community	.919			.919		
CP2. I take part actively in activities in my *Facebook* community	.929			.929		
CP4. I respond to calls to support my *Facebook* community	.884			.806		
CP5. I take part actively in socio-recreational activities in my *Facebook* community	.942			.820		
LP. Learning performance		.966	.903		.966	.903
LP1. I can learn new skills and competences if I use my *Facebook* community	.957			.957		
LP2. My *Facebook* community helps me improve my results	.956			.956		
LP3. The learning periods are more flexible if I use my *Facebook*	.938			.938		
ROU. Routinisation		.955	.876	Weights[a]		
ROU1. In general terms, I am satisfied with my experience in my *Facebook* community	.922					
ROU2. I have obtained several benefits derived from my participation in my *Facebook* community	.936			.555		
ROU3. I think that I made the correct decision to use my *Facebook* community	.951					
INF. Infusion		.942	.802			
INF1. I am using my *Facebook* community to its fullest potential for supporting my own learning process	.884					
INF2. I am using all capabilities of my *Facebook* community in the best fashion to help me on my learning process	.908			.553		
INF3. I doubt that there are any better ways for me to use my *Facebook* community to support my learning process	.902					
INF4. My use of my *Facebook* community in the learning process has been integrated and incorporated at the highest level	.888					

[a] All loadings are significant at p<.001- (based on $t_{(499)}$, two-tailed test)

Table 2 Measurement model

a. Discriminant validity coefficients*						
	CO	CI	CP	ROUT	INF	LP
CO	.847					
CI	.696	.852				
CP	.700	.720	.919			
ROUT	.492	.519	.608	.936		
INF	.462	.562	.666	.627	.896	
LP	.541	.606	.610	.729	.690	.950
b. Discriminant validity coefficients*						
			CO	CI	CP	LP
CO			.847			
CI			.696	.852		
CP			.700	.720	.919	
LP			.541	.606	.610	.950

*Diagonal elements are the square root of the average variance extracted (AVE) between the constructs and their measures

Secondly, based on the previous definition of post-adoption usage, this construct was designed as a second-order factor. The two-dimensionality of the post-adoption-based scale proposes that this higher-order emergent construct will be modelled by a number of first-order latent dimensions (*i.e.*, routinisation and infusion). Routinisation and infusion are related to different facets of post-adoption usage (*cf.* Cooper and Zmud, 1990; Saga and Zmud, 1994; Schwarz and Chin, 2007). The items for the post-adoption usage's dimensions will optimally be weighted and combined using the PLS algorithm to create latent variables scores. The dimensions, or first-order factors, will thus become the observed indicators of the second-order factor. The resulting scores reflect the underlying dimensions more accurately than any of the individual items by accounting for the unique factors and error measurements that may also affect each item. Moreover, for constructs using formative measures (*i.e.*, post-adoption usage), the weights provide information about the makeup and relative importance for each indicator in the formation of the component. Likewise, it is necessary to bear in mind that no interdependencies among the formative dimensions can be assumed, since the construct is viewed as an effect rather than a cause of the item responses. Therefore, indicators are not necessarily correlated and, consequently, reliability and validity assessment have been considered as inappropriate.

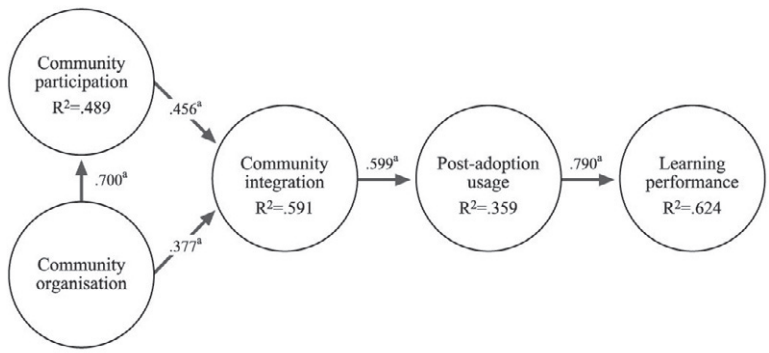
For those constructs with reflective measures, all the individual item loadings in our final model are above .7. They all are significant. In our research, all of the latent constructs are reliable. They all have measures of internal consistency that exceed .7 (ρ_c). See Table 1.a.2. Likewise, the square root of the average variance extracted (AVE) by a construct from its indicators is at least .7 (*i.e.*, AVE > .5) and is greater than that construct's correlation with other constructs. All latent constructs satisfied these conditions. For this reason, the convergent and discriminant validities of the latent constructs of the model are sustained. See Table 1a.2 and 2.b.

4.2. Structural model

Our findings established the link among social relationships, post-adoption usage and learning performance. The results showed that PCS positively influenced students' post-adoption usage, which further influenced the learning performance. In particular, the bootstrap re-sampling procedure (500 sub-samples) was used to generate the standard errors and the t-values. Firstly, the research model appears to have an appropriate predictive power for endogenous constructs to exceed the required amount of .10 –R-square values. A measure of the predictive relevance of dependent variables in the model proposed is the Q^2 test. A Q^2 value (*i.e.*, only applicable in dependent and reflective constructs) greater than 0 implies that the model offers predictive relevance. The results of our study confirm that the main model offers very satisfactory predictive relevance: community integration (Q2= .322 > 0), community participation (Q^2= .420 > 0), and learning performance (Q^2= .585 > 0). See Figure 2.

The data fully supported the model and all hypotheses are supported on the basis of empirical data. As indicated in the main effects model, community participation and organisation have a significant impact on integration, with path coefficients of .456 (t=5.573, p<.001) and .377 (t=4.668, p<.001) respectively. Community organisation also

has a significant effect on community participation (β=.700; t=11.688, p<.001). Furthermore, community integration shows a relevant impact on post-adoption usage (β=.599; t=7.686, p<.001). Finally, post-adoption usage has a significant impact on learning performance (β=.790; t=18.425, p<.001).



[a] p <.001 (based on t(499), one-tailed test)

Figure 2. Results

5. Discussion

University professors and students are increasingly encouraged to use electronic technologies to enrich the educational experience. However, it is needed to understand more comprehensively how students can be engendered in online settings. In our study, the impact of *Facebook* on learning performance was real and it should, therefore, receiving growing attention from practitioners and information system researchers. The research results on the students' social integration provide strong support for the professors to adopt or continue using SNSs in learning processes. Moreover, PCS and the post-adoption usage of SNSs by students should be used as indicators for their success within the academic institution -expanding previous research of what contributes to performance to reduce school failure. The model and results can, therefore, be used to assess different strategic proposals related to social integration during the acceptation and post-adoption process.

The authors recognise some limitations in this research. The model clearly did not include all the relevant variables. Firstly, measurements of global service quality and perception of value, satisfaction or trust are necessary to analyse social integration and post-adoption usage. Secondly, future research should not overlook calculative integration (or commitment); that is, "the state of attachment to a partner cognitively experienced as a realization of the benefits sacrificed and losses incurred if the relationship were to end" (Gilliland and Bello, 2002, p.28). Thirdly, the sample selection process was non-random. The possible bias of our self-selection process of the respondents is a limitation of our empirical research. Our respondents showed a bias on gender. Previous research tends to indicate that female, older, and better-educated customers participate more in surveys.

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