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Learning Virtual Community Loyalty Behavior From a Perspective of Social Cognitive Theory

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Drawing upon social cognitive theory (SCT), this research postulates several personal and environmental factors as key drivers of virtual community loyalty behavior in online settings. An empirical testing of this model, by investigating undergraduate students' participation in communities of online games, reveals the applicability of SCT in virtual communities. The study's test results show that the influences of both affective commitment and social norms on community loyalty behavior are significant, whereas the influences of both exchange ideology and social support on community loyalty behavior are insignificant. This research contributes to the online community literature by assessing critical antecedent factors to the unexplored area of community loyalty behavior, by validating idiosyncratic drivers of community loyalty behavior and by performing an operationalization of affective commitment and social norms in a virtual world. Last, managerial implications and limitations of this research are provided.

1. INTRODUCTION

Although a sustainable social relationship between individuals and their organizations or groups has been traditionally emphasized in offline contexts of a real world, increasing evidences suggest that people's sustainable participation in particular online communities via information technology (IT; i.e., online community loyalty behavior) is comparable to that of face-to-face settings in the real world. In fact, online communities' sustainability counts heavily on the continuous participation of their members (Wasko & Faraj, 2000), indicating the significance of community loyalty behavior. For example, Internet-based IT such as Usenet news, discussion boards, interactive online games, and Listservs is popularly applied to help retain users of online communities (also called "virtual communities"), suggesting the importance of community loyalty behavior in the IT context.

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Whereas the IT network has been recognized as a critical social medium that links people through online communities, little is known about how people form a strong attachment for an online community and why they keep visiting the community repeatedly. Contemporary models of IT usage, such as the technology acceptance model (Davis, Bagozzi, & Warshaw, 1989), the motivational model (Davis, Bagozzi, & Warshaw, 1992), and the unified theory of acceptance and use of technology (Venkatesh, Morris, Davis, & Davis, 2003), have examined the role of IT in deriving utilitarian and/or hedonic outcomes, but they remain silent on its potential role for deriving online community loyalty behavior despite their applicability in loyalty (Cyr, Head, & Ivanov, 2006; Flavián, Guinalíu, & Gurrea, 2006). This study attempts to fill this gap in the literature by postulating a research model of community loyalty behavior and then empirically testing this model via a questionnaire survey in Taiwan regarding communities of interactive online games.

It is important to note that the major contribution of this study is not to weigh against other studies but to complement them so as to extend our understanding about individuals' behavior toward online communities. More specifically, owing to the insufficiency in previous literature about loyalty behavior (e.g., Payne & Webber, 2006), two research questions in this study are derived: (a) What theory can be used for understanding community loyalty behavior appropriately in an online world? (b) What exogenous factors motivate individuals' community loyalty behavior in online communities and how do they do it? Discussing these research questions is important for both practical and theoretical justifications. From a practical aspect, an improved understanding of the crucial antecedents of community loyalty behavior helps community marketers and administrators design appropriate community features, interfaces, and services that are efficiently suitable for meeting the needs of the target user population. Theoretically, the rapid growth of computer networks offers us a unique opportunity for establishing theories of IT-mediated community loyalty behavior, which is a substantially relevant yet underevaluated field of research. Such theories may bridge the literature gap between traditional consumer loyalty and users' community loyalty.

2. SOCIAL COGNITIVE THEORY AND RESEARCH MODEL

To build a model of online community loyalty behavior, this study draws from key postulates and findings in social cognitive theory (SCT; Bandura, 2001). Bandura's (1986) SCT is a widely accepted theory that provides a critical perspective in depth for examining the reasons why individuals adopt certain behaviors. Particularly, SCT explains psychological functioning in terms of triadic reciprocal causation in which behavior, personal, and environmental factors operate as interacting determinants to individuals' behavior (Wood & Bandura, 1989).

SCT has proven advantageous for understanding individuals' behavior in IT contexts (Compeau, Higgins, & Huff, 1999), and given its focus on social and cognitive processes that govern human behavior, it is useful for learning loyalty behavior in contexts of online communities. Nevertheless, to the best of our understanding, this theory has not been applied to study community loyalty

behavior in online communities based on, for instance, Usenet news, instant messaging, or interactive online games. SCT is superior to other theories in examining community loyalty behavior owing to its emphasis on individuals' behavioral formation from personal and environmental perspectives. For instance, the technology acceptance model (Davis et al., 1989) does not assess IT users' behavior from a social aspect (e.g., social norms), which is indispensable in online communities.

Loyalty behavior (i.e., Payne & Webber, 2006) has been traditionally evaluated from different behavioral perspectives such as continuous patronage, the proportion of total purchases made at a given vendor, and purchase probability. Loyalty behavior has been further conceptualized as the relationship between relative attitude toward an entity (brand/service/store/vendor) and continuous patronage (Dick & Basu, 1994). This study conceptualizes online community loyalty in terms of sustainable participation and word-of-mouth recommendations for the participative behavior. In comparison with loyalty behavior, affective commitment often reflects individuals' attitudinal perception rather than their behavioral intent (Commerias & Fournier, 2001), and it thus refers to the strength of a member's attachment to and identification with a particular online community (e.g., Porter, Steers, Mowday, & Boulian, 1974). Note that previous research supports the view that affective commitment and loyalty are essentially independent (e.g., Chen, Tsui, & Farh, 2002).

Given that the association between individuals' IT commitment and loyalty behavior to the IT has received significant empirical support in numerous IT usage studies (e.g., Thatcher & George, 2004), the analogous association between affective commitment and community loyalty behavior is expected to be no difference in contexts of online communities. Members who have a strong identification with and who are deeply involved in their online community are likely to reveal their continuance to be a member in the community, revealing prominent loyalty behavior. Consequently, the first hypothesis is derived as follows:

H1: Affective commitment is positively associated with community loyalty behavior.

Exchange ideology is considered a dispositional orientation that refers to the relationship between what individuals receive from a community and what they give the community in return (Witt & Wilson, 1990). Although social exchange is the association between individuals and a community, exchange ideology refers to a preexisting general belief system that the individuals bring to the exchange relationship with the entire community organization (Sinclair & Tetrick, 1995).

Individuals can be sensitive with the exchange ideology and reveal their loyalty behavior only after mutual benefits are obtained between them and their community (Witt, 1991), implying the important influence of exchange ideology on community loyalty behavior. Despite there being no empirical confirmation in previous research concerning the effect of exchange ideology on community loyalty behavior, the potential effect is worth examining in this study given the evidence that an individual's increase in work effort and the favorable attitudes that come from a greater effort–outcome expectancy rely heavily on an exchange

ideology favoring the trade-off of work effort for material and symbolic benefits (Eisenberger, Huntington, Hutchinson, & Sowa, 1986). Hence, the second hypothesis is introduced:

H2: Exchange ideology is positively associated with community loyalty behavior.

Social support plays a powerful role in human lives and is defined as the sharing of verbal and nonverbal messages conveying emotion, information, or referral, so as to help reduce one's uncertainty or stress (Walther & Boyd, 2002). Although social support in previous research has been discussed within the context of personal, face-to-face relationships or networks, there are evidences suggesting that people use IT (or the Internet) to derive social support, which is comparable to that in face-to-face settings (Walther & Boyd, 2002).

Unidentified users often aggregate in virtual communities to share valuable information, experiences, or empathy about a common cause, such as coping with terminal illnesses like cancer or trauma, overcoming personal crises like drug or alcohol addiction, or sharing profit-making opportunities like stock tips or business information. This kind of social support helps strengthen strong loyalty toward virtual communities. For example, the "Systers" mailing list, intended originally for female IT scientists to share information, evolved into a forum for social support and to strengthen community loyalty (Sproull & Faraj, 1995). Previous research implies that these virtual networks are indeed effective in providing social support and consequently retaining loyal IT users, even when the networks comprise virtual strangers (Wellman & Gulia, 1999). Hence, the third hypothesis is as follows:

H3: Social support is positively associated with community loyalty behavior.

Social influence is presented by two different types: social norms and social information. Although social norms refer to the pressure and stress to comply with the anticipations of salient others (Rice & Aydin, 1991), social information is caused by the acceptance of information from others as evidence about reality (Kaplan & Miller, 1987). Although few previous studies favor an informational mechanism in accounting for behavioral shifts, it may be too hasty to just dismiss accounts based on the influence of social norms (Kaplan & Miller, 1987). In fact, a majority of previous studies confirm that social norms are more important than the influence of social information (e.g., Venkatesh et al., 2003).

Social norms arise from the desire to conform to the anticipations of significant others, and their demonstration in simple situations (i.e., those involving minimal information) has a long history (Kaplan & Miller, 1987). Although different labels for the construct of social norms have been used, such as subjective norm by Ajzen (1991); image by Moore and Benbasat (1991); and social factors by Thompson, Higgins, and Howell (1994), they all acknowledge their similarities to social norms. This is understandable, because each of these constructs includes the explicit or implicit notion that individuals' loyalty behavior toward their community is influenced by the way in which they believe it important that others will view them as a result of revealing their community loyalty behavior. Consequently, the hypothesis is derived as follows:

H4: Social norms are positively associated with community loyalty behavior.

In summary, the preceding four hypotheses are effectively established through SCT because the SCT suggests that individuals possess a system of self-beliefs that enables them to exercise control over their thoughts, feelings, and actions (Mills, Pajares, & Herron, 2006) such as commitment, exchange ideology, and so on, stressed in the four hypotheses. That is, how people behave is affected by what they think, believe, and feel (Bandura, 1986).

3. METHOD

3.1. Participants and Procedures

This study's proposed hypotheses were empirically tested using a pre-/postusage survey of interactive online games among undergraduate student subjects in Taiwan. Participants were drawn from the population of a large private technology university in Taiwan. Undergraduate students were recruited by this study, because this population represents a sizable proportion of the interactive online game market (Global Chinese Marketing Knowledge Base, 2005). For example, industry surveys in the U.S. reveal approximately 60% of college students play online games as their primary means of leisure when friends are unavailable and 20% play the games as a way to meet new friends (Pew Internet & American Life Project, 2003). A random set of classes from the management college at the university was chosen for data collection purposes, with the requirement that the participants for this survey must have had direct experience with playing at least one kind of interactive online game.

Interactive online games were chosen for this study, as this group of IT is a dominant means of establishing online communities among the younger population (Baron, 2005). More specifically, interactive online games were chosen, because they are a network IT that is well suited for building online communities and showing community loyalty behavior. Note that hedonic IT can be noninteractive (e.g., content Web sites for browsers or single-user games) or interactive (e.g., online chatrooms or multiplayer video games). Whereas van der Heijden (2004) stressed the former, this study emphasizes the latter in light of the dearth of research in this area.

Two questionnaires were distributed to the same participants for data collection by Joe and Lin (2008). The first questionnaire was distributed at time T_1, and the second questionnaire was distributed at time T_2, 1 month later. In other words, data were collected at two points in time, 1 month apart. The first and the second questionnaires were both matched by a unique identifying code. Of the 700 questionnaires distributed to the participants each time, 303 matched questionnaires were collected across both periods for an effective response rate of 43.29%. Our respondents consisted of 64% male and 36% female participants. This slightly uneven distribution was not entirely unexpected, given that males as a group spend significantly more time playing interactive online games than females. Of these respondents, 35% have experience at interactive online games

for less than 1 year, 11% have experience on them for 1 to 2 years, and 54% have experience on them for more than 2 years. In addition, the sample also reveals that 18% play the games for 2 hr or less daily, 62% play them for 3 to 6 hr daily, and 20% play them for 7 hr or more daily.

Empirical data were collected via a Chinese language questionnaire survey. The survey was designed by drawing questionnaire items from prevalidated scales in previous studies (Clark & Goldsmith, 2006; Eastin & LaRose, 2005; Eisenberger et al., 1986; Lin, 2007; Lin & Ding, 2005; Mowday, Steers, & Porter, 1979) and modified to fit the context of interactive online games (please see Appendix A). Four steps are employed to refine the scale items for survey. First, the items from the existing literature were translated into Chinese. Second, a focus group consisting of some graduate students who play online video games regularly was invited to check individual items for the research constructs of this study on their readability and understandability, and then the group recommended any changes that could improve those items. Third, the scale items were examined via three pilot tests with exploratory factor analysis, and improper ones were reviewed and refined repeatedly before the actual survey. Pilot test respondents were excluded in the subsequent survey. This process of instrument refinement led to considerable improvement in content validity and scale reliability.

Based on participants' suggestions on the first pilot, a few items were slightly reworded. Data from the second and third pilots were analyzed using exploratory factor analysis, using the principal components technique with varimax rotation. Appendices B and C provide the test results for the second and third pilot tests, respectively. Despite much refinement after the first pilot test, the second pilot test results in Appendix B still show that the factor scores of social norms do not load on the right factor axis (please see the parenthetical values in Appendix B). Few inappropriate items were reworded herein after the second pilot. Fortunately, the problem is further improved in the third pilot test results as shown in Appendix C, suggesting that the validity of scale items based on exploratory factor analysis is reasonably improved during the process of three pilot tests. Five factors emerged from the analysis with eigenvalues greater than 1.0, corresponding to the hypothesized factor structure, as shown in the factor matrix in Appendix C. Particularly, all same-factor loadings (except one in parentheses) in Appendix C were greater than 0.60, meeting the standard acceptance criterion for convergent validity (Hatcher, 1984).

Tips of back-translation as suggested by Reynolds, Diamantopoulos, and Schlegelmilch (1993) were finally applied in composing an English version questionnaire as well as a Chinese one. A high degree of correspondence between the two questionnaires assures this research that the translation process did not substantially introduce artificial translation biases in the Chinese version of our questionnaire. Note that interactive online games are considered games that involve online interaction with user interfaces to generate instant and visual feedback on devices of information technology. Accordingly, all the constructs' measures in this study were derived from prior research after our further adjusting the wording for interactive online games (please see Appendix A).

3.2. Survey and Construct Operationalization

With regard to the survey of this study, four of the five constructs in this study—affective commitment, exchange ideology, social support, and social norms—were measured at time T_1, and the remaining one construct, community loyalty behavior, was then measured 1 month later at time T_2. It is important to measure different constructs in two different time points, because of the following reasons. First, if two surveys at times T_1 and T_2 contain exactly the same questionnaire items, then it is obvious that the carryover effect will likely yield, decreasing the validity of the questionnaire survey. Second, because the outcome (e.g., loyalty) is generally affected by its antecedents (e.g., commitment) that happen earlier, surveying the antecedents in time T_1 and their outcome in time T_2 help improve the theoretical validity. Appendix A lists all the scale items that were measured using 5-point Likert scales anchored between *strongly disagree* (1) and *strongly agree* (5).

Affective commitment with four items is modified from Lin (2007), who drew the items originally from Mowday et al. (1979). The reliability of the construct in this study is 0.88. Exchange ideology with four items is drawn and modified from Eisenberger et al. (1986), and its reliability in this study is 0.85. Social support with four items is modified from Cohen and Wills (1985) and Eastin and LaRose (2005), and its reliability is 0.92. Social norms with four items are originally modified from Clark and Goldsmith (2006) by Joe and Lin (2008), and the reliability for this construct herein is 0.79. Finally, community loyalty behavior with six items is modified from Lin and Ding (2005) and its reliability is 0.91. In summary, these constructs modified from previous studies were embedded with the features linked to interactive online games.

4. DATA ANALYSIS AND TEST RESULTS

The final survey data, with a sample size of 303 matched responses from two surveys, were analyzed with a two-step structural equation modeling approach proposed by Anderson and Gerbing (1988) by using the CALIS procedural of SAS software. The first step conducted confirmatory factor analysis (CFA), whereas the second step tested the path effects and significances. Analytical and test results in each step are presented next.

4.1. Measurement Model Testing

In the CFA of this study, the goodness-of-fit was assessed using a variety of fit metrics, as shown in Table 1. The normalized chi-square (chi-square/degrees of freedom) of the CFA model was smaller than the recommended value of 3.0. The goodness-of-fit index and the normed fit index were slightly lower than the recommended value of 0.9, while the root mean square residual was smaller than 0.05, the root mean square error of approximation was equal to 0.08, and both the comparative fit index and the non-normed fit index exceeded 0.90. These figures indicate that the CFA model in this study fits well with the empirical data (Bentler & Bonett, 1980).

Table 1: Standardized Loadings and Reliabilities

Construct	*Indicators*[a]	*Standardized Loading*	*AVE*	*Cronbach's α*
Affective commitment	AC1	0.82 (t = 15.75)	0.64	0.88
	AC2	0.87 (t = 15.75)		
	AC3	0.75 (t = 12.11)		
	AC4	0.76 (t = 12.58)		
Exchange ideology	EI1	0.78 (t = 14.45)	0.64	0.85
	EI2	0.83 (t = 13.38)		
	EI3	0.80 (t = 11.64)		
Social support	SS1	0.87 (t = 14.70)	0.79	0.92
	SS2	0.94 (t = 13.50)		
	SS3	0.87 (t = 13.06)		
Social norms	SN1	0.65 (t = 20.69)	0.55	0.79
	SN2	0.74 (t = 18.19)		
	SN3	0.84 (t = 11.00)		
Community loyalty behavior	L1	0.77 (t = 13.45)	0.62	0.91
	L2	0.82 (t = 12.93)		
	L3	0.79 (t = 13.68)		
	L4	0.82 (t = 15.85)		
	L5	0.79 (t = 13.78)		
	L6	0.77 (t = 12.81)		

Note. Goodness-of-fit indices (N = 303): $\chi^2(142) = 412.96$ ($p < .001$). Non-normed fit index = 0.91; normed fit index = 0.89; comparative fit index = 0.92; goodness-of-fit index = 0.87; root mean square residual = 0.03; root mean square error of approximation = 0.08. AVE = average variance extracted. [a]Indicators remained after confirmatory factor analysis purification. A few indicators are excluded from this measurement model due to their insignificance.

Convergent validity was tested using three criteria proposed by Fornell and Larcker (1981). First, as evident from the t statistics listed in Table 1, all factor loadings were significant at $p < .001$ (Anderson & Gerbing, 1998). Second, the average variance extracted for all the constructs in this study exceeded 0.50, implying that the overall measurement items capture sufficient variance in the underlying construct than that attributable to measurement error (Fornell & Larcker, 1981). Third, the reliabilities for each construct exceeded 0.70 (see Table 1), achieving the general requirement of reliability for research instruments. Collectively, the empirical data of this study meet all three criteria required to assure convergent validity.

Discriminant validity was tested by examining chi-square differences between an unconstrained model and constrained models (Hatcher, 1994). An important advantage of this technique is its simultaneous pairwise comparisons for the constructs based on the Bonferroni method. Controlling for the experiment-wise error rate by setting the overall significance level to 0.01, the Bonferroni method indicates that the critical value of the chi-square difference should be 10.83. As chi-square difference statistics for all pairs of constructs in this study exceed 10.83 (Table 2), discriminant validity is thus achieved. Collectively, the aforementioned test results reveal that instruments used for measuring the constructs of interest in this study were statistically appropriate.

Table 2: Chi-Square Difference Tests for Examining Discriminant Validity

	$\chi^2(142) = 412.96$ (Unconstrained Model)	
Construct Pair	$\chi^2(143)$ *(Constrained Model)*	χ^2 *Difference*
(Affective commitment, Exchange ideology)	728.83	315.87*
(Affective commitment, Social support)	845.43	432.47*
(Affective commitment, Social norms)	565.73	152.77*
(Affective commitment, Community loyalty behavior)	947.13	534.17*
(Exchange ideology, Social support)	756.59	343.63*
(Exchange ideology, Social norms)	659.32	246.36*
(Exchange ideology, Community loyalty behavior)	775.58	362.62*
(Social support, Social norms)	613.19	200.23*
(Social support, Community loyalty behavior)	1082.71	669.75*
(Social norms, Community loyalty behavior)	647.12	234.16*

*Significant at the .01 overall significance level by using the Bonferroni method.

4.2. Structural Model Testing

Structural model testing is performed herein after the aforementioned measurement model testing is completed. To avoid making improper inferences, gender and usage experience are included in the structural model as two critical control variables that help reduce experimental errors. Figure 1 presents the test results of this analysis.

Two out of the four model paths in this study were validated at the $p < .05$ significance level. More specifically, the relationship between affective commitment is significant (H1 is supported), whereas the relationship between exchange ideology and community loyalty behavior is insignificant (H2 is not supported). In addition, the relationship between social support and community loyalty behavior is insignificant (H3 is not supported), whereas the relationship between social norms and community loyalty behavior is significant (H4 is supported).

The unsupported test results for H2 and H3 suggest that not all social cognitive variables significantly influence loyalty behavior. Exchange ideology and social support are both important and affect individuals' behavior in organizations of the real world, but they may be less important in virtual communities. This phenomenon exists perhaps because exchange ideology and social support are more likely reflected during face-to-face social interactions with friends or relatives rather than virtual interactions with online strangers. However, the unexpected empirical results for the unsupported hypotheses may warrant further study so that the reasons behind the unsupported hypotheses are not misinterpreted.

5. DISCUSSION

This research provides an illustrative and practical instance of how SCT can be further expanded to studying community loyalty behavior in IT contexts. Most

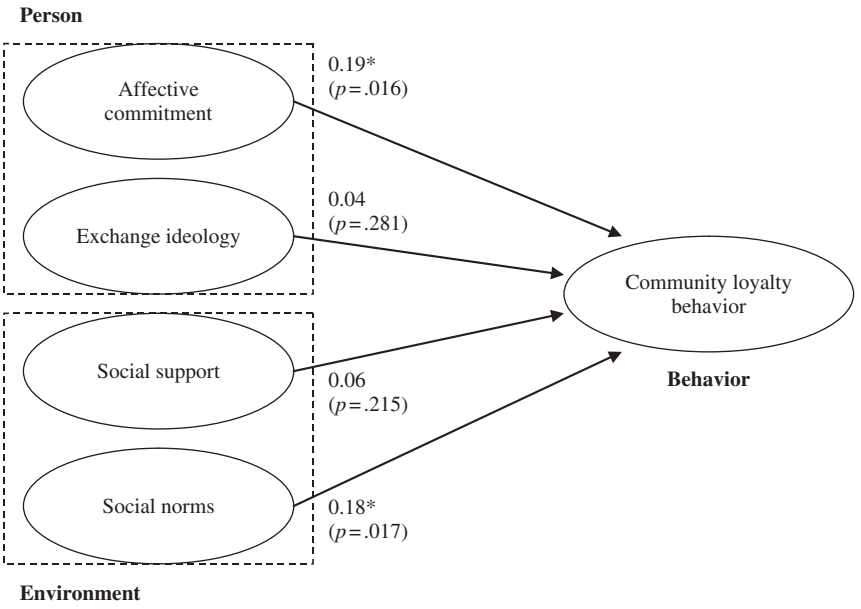

FIGURE 1 Test results of the research model.
Note. *$p < .025$ for one-sided hypothesis. The effects of gender and usage experience (control variables) are insignificant.

previous IT models that were based on SCT focus only on usage behavior (e.g., Davis et al., 1989) without extending the role of SCT to community loyalty behavior in a cyberworld. This study presents that personal and environmental factors can be used to learn about community loyalty behavior in depth. The test results provide preliminary evidence of IT-mediated community loyalty behavior, which is a nascent yet emerging field that bears tremendous potential for future research.

Given the rising prevalence of interactive online games in everyone's lives and hedonic technology choice decisions, IT designers and administrators should know what factors drive users' community loyalty behavior, if they are to financially profit from successfully establishing popular online communities. This study examines a class of IT (i.e., interactive online games) that is substantially different from traditional IT such as productivity software or decision support tools that are extensively investigated in previous studies.

Of the four determinants in this study, affective commitment and social norms seem to be the primary influence motivating community loyalty behavior given their significant effect. This phenomenon suggests that if online game marketers face resource constraints and have to prioritize their limited business activities, then online social events promoting community conscience and obligation geared at strengthening users' affective commitment and social norms should come before other marketing programs (e.g., commercials and advertisings). IT vendors or community marketers should reexamine their community spirits, because the spirits that arouse members' affective commitment are most likely to increase

their loyalty behavior toward the community. This finding is specifically important when managing communities, which requires an involved collaborative posture within small windows of time (e.g., online game contests based on community teams). The teamwork in online communities that needs significant collaborative effort is likely to fail if the affective commitment is not considered carefully. IT developers and online community marketers should take proactive steps to enlarge users' influence of social norms on online others by expressing their preference and favorite toward their community.

This study demonstrates that SCT is applicable to understanding community loyalty behavior, just as it demonstrates an understanding of IT usage behavior in general. Given that SCT has received lesser interest among loyalty behavior research compared to more popular theories such as the theory of reasoned action (TRA) and the theory of planned behavior (TPB), this study provides an additional validation of this SCT theory as a parsimonious and powerful model of community loyalty behavior and recommends that it can be generalized across different types of IT community members such as engineers who use instant messaging. SCT is more appropriate than other theories, such as TRA and TPB, to describe loyalty behavior in online communities due to its broadened views in proposing critical factors. For example, despite social support culture in the Internet being an important value of social psychology that holds the key to the survival of online communities (Turner, Grube, & Meyers, 2001), it remains absent from the research based on TRA and TPB. Thus, this study complements TRA and TPB well through its attempt to examine the potential influence of such social support on community loyalty behavior.

The results of this study should be interpreted in light of their limitations. The first limitation is the potentiality of common method bias given that the constructs of this study were measured via a single set of questionnaires. In Harmon's single factor test (Podsakoff & Organ, 1986), if a substantial amount of common method variance is present in the empirical data, then either a single factor will emerge from the factor analysis or one general factor will account for the majority of the covariance in the independent and dependent variables. Based on Harmon's single factor test, this study performed an exploratory factor analysis for the five constructs of this study and revealed five factors explaining 29.65%, 20.92%, 18.29%, 16.49%, and 14.65% of the total variance, respectively. These figures reveal that the variances are adequately distributed across different factors, indicating that the common method bias was unlikely a threatening problem in the data of this study.

Second, as the respondents of this study are students, the findings herein may not be precisely generalizable across working professional groups that play interactive online games. The restricted nature of our sample suggests that any generalization of our findings across different occupations should be made with caution. Nevertheless, because of the prevalence of interactive online games among young people and college students, the findings of this study may be fairly reflective of the gamer population.

In summary, given the theoretical focus of this study on SCT, this study has limited our attention of behavioral predictors to those related to SCT. It is possible that, for example, one of the exogenous factors in this study may play a moderating

or mediating role in the formation of community loyalty behavior. Unfortunately, this is out of the scope of SCT based on the existing literature at present. However, we believe that this issue can be an interesting topic from different theoretical point of views for future researchers. Furthermore, future researchers are encouraged to include more determinants and compare their explanatory ability to those tested in this study. Specifically, there may be some other determinants of community loyalty behavior beyond affective commitment and social norms that can be tested in this study. Particularly, the motivational model of Davis et al. (1992) suggests intrinsic motivation as a possible predictor, such as enjoyment and perceived usefulness.

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APPENDIX A

Table A1: Measurement Items

Construct		*Sources*
Affective commitment	AC1. I have a real emotional attachment to my group (community). AC2. My group (community) has a great deal of personal meaning for me. AC3. I am proud to tell others that I am part of this group (community). AC4. I am extremely glad that I chose this group (community) to participate in over the one I was considering at the time I joined.	Lin (2007)
Exchange ideology	EI1. A gamer's work effort should not depend on how well the group (community) deals with his or her desires and concern. EI2. The failure of the group (community) to appreciate a gamer's contribution should not affect how hard he or she works. EI3. A gamer's work effort should have nothing to do with the fair treatment the group (community) gives him or her. EI4. A gamer who is treated badly by the group (community) should lower his or her work effort.	Eisenberger et al. (1986)
Social support	SS1. Over the last one month, I received numerous personal advices from online people using IM. SS2. Over the last one month, I acquired a variety of information from online people using IM. SS3. Over the last one month, I obtained sufficient assistance from online people using IM. SS4. Over the last one month, I consulted online people using IM for practical issues and matters.	Cohen et al. (1985); Eastin & LaRose (2005)
Social norms	SN1. I often join my friends' group (community). SN2. I identify with my friends by joining in their group (community). SN3. I achieve a sense of belonging by joining the group (community) of my friends. SN4. I do not join the group (community) that my friends approve of. (Reverse coded)	Clark & Goldsmith (2006)
Community loyalty behavior	CLB1. I would continue participating in the activities of my group (community). CLB2. I would continue maintaining the membership of my group (community) in the near future. CLB3. I would continue collaborating closely with others in my group (community). CLB4. I will encourage friends and relatives to join my group (community). CLB5. I say positive things about my group (community) to others. CLB6. I recommend my group (community) to others.	Lin & Ding (2005)

APPENDIX B

Table B1: Factor Matrix From the Second Pilot Test

Items	*Factor 1*	*Factor 2*	*Factor 3*	*Factor 4*	*Factor 5*
SN1	–0.134	0.414	(0.479)	–0.089	0.155
SN2	–0.244	(0.607)	0.448	0.065	0.263
SN3	0.052	(0.623)	0.425	–0.055	0.444
SN4	–0.018	–0.021	(0.533)	0.044	–0.221
AC1	0.092	**0.886**	0.123	0.128	–0.051
AC2	0.112	**0.810**	0.289	0.253	–0.137
AC3	0.288	**0.784**	0.207	–0.045	–0.023
AC4	0.396	**0.624**	0.314	–0.127	–0.264
EI1	0.105	0.088	0.067	**0.950**	–0.031
EI2	–0.028	0.037	0.040	**0.951**	0.124
EI3	0.079	0.045	0.077	**0.921**	0.044
EI4	0.105	–0.147	–0.070	0.144	(0.722)
SS1	0.212	0.311	**0.744**	0.117	–0.022
SS2	0.198	0.338	**0.801**	0.033	0.021
SS3	0.182	0.415	**0.754**	0.090	–0.071
SS4	0.123	0.149	**0.765**	0.051	0.169
CLB1	**0.796**	0.031	0.043	0.011	–0.132
CLB2	**0.852**	0.095	0.092	0.051	–0.028
CLB3	**0.764**	–0.069	0.166	0.262	–0.072
CLB4	**0.844**	0.171	0.062	–0.014	0.213
CLB5	**0.702**	0.170	0.041	–0.095	0.537
CLB6	**0.728**	0.216	0.082	0.003	0.413

Note. Based on principal components technique with varimax rotation (exploratory factor analysis). The value in parentheses stands for an improper loading.

APPENDIX C

Table C1: Factor Matrix From the Third Pilot Test

Items	*Factor 1*	*Factor 2*	*Factor 3*	*Factor 4*	*Factor 5*
SN1	–0.061	0.129	0.040	**0.809**	–0.008
SN2	–0.021	–0.100	0.388	**0.676**	–0.039
SN3	0.064	0.345	0.209	**0.713**	–0.070
SN4	0.037	0.106	–0.053	**0.712**	0.129
AC1	0.111	**0.797**	0.170	0.402	–0.048
AC2	0.030	**0.834**	0.219	0.225	0.097
AC3	0.176	**0.783**	0.312	0.153	0.035
AC4	0.200	**0.795**	0.231	0.154	–0.013
EI1	–0.007	–0.045	0.243	–0.008	**0.890**
EI2	0.018	–0.027	0.033	0.257	**0.866**
EI3	–0.001	0.083	0.043	–0.166	**0.852**
EI4	0.076	(–0.470)	0.061	0.177	0.031
SS1	–0.001	0.417	**0.666**	0.004	0.054
SS2	–0.005	0.257	**0.858**	0.052	0.120
SS3	0.030	0.206	**0.874**	0.134	0.079
SS4	0.094	–0.009	**0.756**	0.162	0.101
CLB1	**0.839**	0.105	–0.111	0.071	0.087
CLB2	**0.872**	0.065	–0.033	0.125	0.112
CLB3	**0.815**	0.049	–0.002	0.001	–0.065
CLB4	**0.843**	–0.003	0.183	0.028	–0.095
CLB5	**0.782**	–0.015	0.116	0.031	0.028
CLB6	**0.765**	0.139	0.005	–0.297	–0.055

Note. Based on principal components technique with varimax rotation (exploratory factor analysis). The value in parentheses stands for an improper loading.