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Exploring the Antecedents of Organizational Citizenship Behavior
in Knowledge-based Virtual Communities

by
Luman Yong

A Thesis Submitted in Partial Fulfillment
of the Requirements for the Degree of Master of Arts
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Date _____

This thesis paper has been examined and approved.

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Running Head: VIRTUAL COMMUNITY CITIZENSHIP BEHAVIORS

Exploring the Antecedents of Organizational Citizenship Behavior
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ABSTRACT

This study aims to examine what kinds of behaviors constitute virtual community citizenship behaviors (VCCB) and what factors influence community members' willingness to engage in VCCB. In this paper, I propose a theoretical framework consisting of the main antecedents of VCCB (affective commitment, structural embeddedness and membership tenure) and a multi-dimensional VCCB construct (altruism, civic virtue, consciousness, courtesy and loyalty). Additionally, I develop a measure for assessing VCCB. Data are collected from an online discussion forum (The Grad Cafe) to address the research questions of this study. Results indicate that only affective commitment is found to be significantly predictive of the virtual community citizenship behaviors. Finally, implications and recommendations for practitioners in terms of improving the effective functioning of virtual community through the lens of VCCB are described.

Key words: virtual community; citizenship behaviors; measure development

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Exploring the Antecedents of Organizational Citizenship Behavior
in Knowledge-based Virtual Communities

An online or virtual community is the gathering of people in an online "space" where they communicate, connect, and get to know each other better over time (Boetcher, Duggan & White, 2002). The origin of this term is attributed to Howard Rheingold. He defined a virtual community in his book *The Virtual Community* (1993) as a social aggregation that emerges from the Net when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace (Rheingold, 1993). This definition highlights the importance of social interactions among community members for an online space to function as a virtual community.

The majority of previous studies on virtual community have focused on knowledge sharing behaviors. For a virtual community to sustain over time, it is important to ensure the willingness of community members to share knowledge and exchange information. However, the source of motivation for people to join and stay in a virtual community not only arises from the desire to exchange information, but from the need for affiliation, social support and affirmation (Stefania, 1996). Hence, in addition to knowledge sharing behaviors, the sustainability of a virtual community is contingent upon how well the socio-emotional needs of community members are fulfilled in the community.

For this reason, such interactive behaviors as addressing other community members' issues, showing social support for others who are in need, and trying to fulfill others' needs by providing positive affirmation are integral to the sustainability of a

virtual community. These efforts serve as “glue which holds collective endeavors together” (Brief & Motowidlo, 1986, p. 712). Along with knowledge sharing, these behaviors are spontaneous in nature and in the aggregate benefit the successful functioning of a virtual community. Therefore, they can be viewed as organizational citizenship behaviors in a virtual community setting, which is referred to as virtual community citizenship behavior.

Despite the importance of virtual community citizenship behavior, little empirical research has been conducted to investigate what behaviors constitute virtual community citizenship behaviors and what factors influence community members’ willingness to engage in participatory involvement and social interactions other than knowledge sharing. Therefore, a research focus shift from knowledge sharing to virtual community citizenship behavior is necessary for a better understanding of the sustainability of virtual communities. To fill this gap, this study aims at identifying the main antecedents of virtual community citizenship behavior (VCCB) and attempts to create a psychometrically sound measure for assessing VCCB.

This paper begins with literature review of organizational citizenship behaviors in virtual community in order to conceptualize the construct of VCCB. Second, I propose three hypotheses regarding the predictors of community members’ VCCB (affective commitment, structural embeddedness and membership tenure). The third section deals with the theoretical framework, followed by methodology section composed of VCCB measure development, method and procedures for data analysis. A discussion of the implications of the findings is offered in the last section.

Definitions of VCCB-like constructs

There is a large body of literature on organizational citizenship behavior (OCB). The origin of this construct can be traced back to Barnard (1938). According to Barnard(1938), the effective functioning of an organization does not only depend on formal structure or control, but also relies on the “willingness of persons to contribute efforts to the cooperative system” (p. 83).

The theoretical and practical importance of this kind of discretionary behavior continued to be developed by Katz five decades ago. He emphasized the importance of those spontaneous behaviors that exceed the role requirements for the organizational effectiveness, including cooperative gestures, actions protective of system and behavior that enhances the external image of the organization (Katz, 1964).

The most prevailing definition of OCB is attributed to Dennis Organ. Organ (1988) defines OCB as “individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and that in aggregate promotes the effective functioning of the organization” (p. 4). According to Organ, there are three critical components that are essential to this construct. First, OCB is thought of as discretionary and essentially it is a matter of personal choice. Therefore, its omission is not generally understood as punishable. Second, OCB is viewed as contributions that do not necessarily result in future recompense, which means the rewards associated with OCB are indirect and uncertain as opposed to the formal reward system. Finally, OCB are those behaviors that contribute to the overall organizational effectiveness over time and situations. Hence, even though not every single OCB will make a difference in organizational outcomes, the overall effect would be positive. For instance, people who

frequently offer help to their co-workers will contribute to the effective functioning of their organization in the long term (Organ, 1997).

In traditional organizations, OCBs include offering support or help for coworkers, attending meetings on behalf of the organization, and volunteering for activities to create a positive image of the organization. Similarly, there is a class of cooperative and helping behaviors in virtual community that resembles organizational citizenship behaviors, such as addressing others' issues posted online, participating in community building activities and being considerate about one's action toward other community members. As with OCB, the focus of these spontaneous behaviors is on the collective rather than the individual self. Hence, such behaviors that foster the effective functioning of a virtual community can be viewed as analogous to organizational citizenship behavior.

Organizational citizenship behaviors in the virtual community has been conceptualized in slightly different ways depending on the type of virtual community; however, all definitions involve the core values of OCB - discretionary behavior that has a positive effect on the organization functioning and is performed without the intent of gaining formal rewards Chiu, Wang & Yu, 2009; Yu & Chu, 2007; Bateman Gray & Butler, 2006; Kang, Lee & Choi, 2007).

For instance, researchers studying an online professional community defined a member's beneficial behaviors that taken together promote the effective functioning of the virtual community as virtual community citizenship behavior (Chiu et al., 2009). In an online gaming community, Yu et al. (2007) reviewed community behaviors from OCB perspective and maintained that online gamers are acting conscientiously as a team member, tolerating the risk of no return, and providing useful information to prevent

problems from arising for other team members, which can be viewed as reflecting organizational citizenship behaviors characterized by altruism, consciousness, sportsmanship, civic virtue and courtesy.

In a research article by Bateman et al. (2006), community citizenship behaviors refer to those activities that are essential to community functioning, including welcoming new members and orientating them to get familiarized, being involved in community building activities, recognizing other community members who contribute informative messages and discouraging inappropriate behaviors, as well as preventing exploitation of members.

Consistent with these studies, Kang et al. (2007) introduces the concept of online community voluntary behavior (OCVB). According to this research, OCVB refers to all positive community-relevant behaviors of individual members. Specifically, OCVB contains various citizenship behaviors as suggested by Van Dyne, Graham & Dienesch (1994). Thus, it seems that describing such behaviors that foster the effective community functioning as virtual community citizenship behaviors would be more appropriate than general OCB in online community settings.

Drawing upon the concept of OCB and the relevant literature, I define virtual community citizenship behavior (VCCB) as the spontaneous behaviors with positive impact on the effective functioning of virtual community.

Dimensions of VCCB-like constructs

OCB in online or virtual communities has been conceptualized as consisting of different dimensions from study to study. In a research by Wiertz, Ruyter & Streukens (2003), commercial virtual community citizenship behavior is proposed as an aggregate

construct composed of three underlying dimensions: *helping* refers to those voluntary actions that help another member with a problem, *civic virtue* deals with a class of behaviors that shows a person's active involvement in community building activities driven by concerns about the life of the community and *sportsmanship* indicates the willingness to tolerate less than ideal circumstance without complaining. Inwon Kang et al. (2007) offer a different three dimensional online community voluntary behavior (OCVB) construct composed of *community commitment*, *loyalty* and *social participation*.

In contrast with these multi-dimensional construct, Yu et al. (2007) conceived virtual community citizenship behaviors as a unidimensional construct. The items used to operationalize this construct include “help members to resolve conflicts and misunderstandings to maintain a harmonious community”, “I put forward good suggestions voluntarily to the members of my community” and so on.

Among those VCCB-like constructs, most of the dimensions are adapted from the five-dimension OCB construct developed by Organ (1988), which encompasses *altruism* (discretionary behaviors aimed at helping a co-worker with work-related problems), *conscientiousness* (consists of behaviors that go beyond the minimum role requirements of the organization), *sportsmanship* (refers to the willingness to tolerate the inevitable inconveniences and impositions of work without complaining), *courtesy* (deals with consulting with others before taking action), and *civic virtue* (is concerned with keeping up with matters that affect the organization). A meta-analysis study shows that this taxonomy of OCB was established as stable across studies (LePine, Erez & Johnson, 2002).

The development of dimensions of VCCB in this study is based on the five-dimension OCB construct proposed by Organ. However, virtual community does not involve a lot of sportsmanship behaviors. Instead, a new dimension *loyalty* is added to the VCCB model. Organizational loyalty describes the willingness of employees to subordinate their personal interests for the benefit of the organization and to promote the organization (Van Dyne et al., 1994). In a virtual community, loyalty involves promoting the virtual community to outsiders, defending it against external threats, and remaining committed to it regardless of the circumstance.

Thus, the VCCB construct in this study is proposed as a multi-dimensional construct, including 1) *altruism* (voluntary behaviors aimed at helping other community members with their problems), 2) *conscientiousness* (discretionary actions beyond the minimum requirements of the virtual community), 3) *civic virtue* (responsible, constructive participation, and involvement in the community building activities), 4) *courtesy* (being considerate of others and prevent problems from arising) and 5) *loyalty* (allegiance to and promotion of the virtual community). These dimensions serve as manifest indicators of VCCB.

Antecedents of sharing behaviors

The majority of previous studies on virtual community have focused on identifying the factors that influence members' willingness to share knowledge. As mentioned, OCB in virtual community is mainly built around knowledge sharing behaviors and most researchers reached consensus on the importance of knowledge sharing as a typical altruistic behavior that benefits the effective functioning of a virtual community (Yu et al., 2007; Chiu et al., 2009; Bateman et al., 2006).

For example, Yu et al. (2007) contend that the virtual community composed of individuals who interact voluntarily is generally self-organizing in the sense that community members are geographically distributed individuals who may not know each other. Thus, in a virtual setting, there is no guarantee that sharing knowledge with other community members will lead to direct return. From an OCB perspective, this kind of spontaneous knowledge sharing without expectation of return is a typical altruistic behavior. Considering the special background of an online gaming community, Yu et al. (2007) adopt three antecedents to explain this altruistic behavior through the lens of OCB, including cohesiveness, affection similarity and leader-member exchange. The degree of cohesiveness influence group members' desire to contribute to the team; affection similarity influence to what extent members are committed to a group; and leader-member exchange determined the level of members' willingness to reciprocate the help they obtained from the team. As this study is conducted in an online gaming community, the factors that influence community members' willingness to engage in helping behaviors are more focused on team building dynamics.

A study by Oded Nov and Chen Ye (2008) on Flickr attempts to identify factors that are associated with users' photo sharing in a social computing community. Their research drew upon motivation theories as well as network analysis and found users' who are more committed to the community and highly embedded in the community tend to share more.

According to the study by Chiu et al. (2009) in open professional virtual communities, job satisfaction is a robust attitudinal predictor of OCB. In a virtual community, the feeling of satisfaction resulting from interacting with other members

within the virtual community enhances members' desire to participate in community-oriented behaviors. In addition, this study considers perceived values from the benefit perspective and defines them as the perceived benefits of knowledge sharing experience, which can be classified to either hedonic or utilitarian. Utilitarian value is concerned with the functional, instrumental and practical values derived from the knowledge sharing experience, including reputation, reciprocity, career advancement, and reflective learning. Hedonic value focuses on the multisensory, fantasy, emotive and enjoyment-related values derived from the knowledge sharing experience, consisting of playfulness, social interaction, self-worth, challenge, and community attachment. These perceived value serve as component in forming the antecedents of citizenship behaviors in the professional virtual community.

These studies provide insights into what factors influence online or virtual community members' altruistic sharing behaviors that are mainly focused on knowledge sharing behaviors. In next section, three hypotheses are developed in order to further previous research by shifting the focus from knowledge sharing to a broader view towards a multi-dimensional VCCB construct.

Hypotheses

In a virtual community, there is a small proportion of stable community members who are highly involved in those spontaneous community-oriented behaviors. To some extent, they are the key contributors who influence the effective functioning of a virtual community. Hence, it would be worthwhile to identify those common characteristics associated with top contributors who tend to engage in virtual community citizenship behaviors so that practitioners or organizers of a virtual community can adopt

corresponding strategies to enlarge this group for the benefit of the sustainment of a virtual community.

While there is consensus on the existence of VCCB-like behaviors, there is much less convergence on the theoretical underpinnings of these behaviors. In this study, I will take a closer look at what factors influence members' willingness to engage in those spontaneous behaviors that result in beneficial effects on the effective functioning of a virtual community.

Affective Commitment

First, I hypothesize that members' affective commitment will positively influence their willingness to engage in virtual community citizenship behaviors. Affective commitment is a highly cited factor as an antecedent of OCB across research (Organ & Ryan, 1995; Schappe 1998; Wasko & Faraj 2005).

According to Meyer and Allen (1997), affective commitment refers to the employee's emotional attachment to the organization. Employees who are affectively committed to an organization are more likely to identify themselves with the organization and enjoy the membership. In other words, the employee remains a part of the organization because he/she wants to. In virtual communities, organizational commitment has been found to be positively related to sharing behaviors and other cooperative behaviors.

Previous studies suggest that commitment was found to be positively related to the amount of time members spent at a website over a given time period (Li, Browne & Wetherbe, 2006). Moreover, community members' tend to feel a sense of responsibility to engage in helping behaviors (e.g. knowledge sharing) as their commitment to the

community increases (Wasko et al., 2005). Another study conducted by Kang et al., (2007) show that members with strong commitment to the community tend to be more concerned about the fate of their community and engage in community-relevant behaviors. Hence, it is theorized that affective commitment that emphasizes the strength of bonds with the company as a whole influences the extent to which community members are willing to engage in spontaneous behaviors favorable to the community.

Thus, it seems to be logical to expect that the level of community members' affective commitment will positively influence their willingness to engage in virtual community citizenship behaviors.

Hypothesis 1: The higher a member's level of affective commitment, the higher the member's willingness to engage in virtual community citizenship behaviors will be.

Structural Embeddedness

In addition to affective commitment, I hypothesize that community members' level of structural embeddedness will positively influence their willingness to engage in virtual community citizenship behavior. Structural embeddedness describes the impersonal configuration of linkages between people and can be operationalized as the number of ties a user has to others in a network (Nahapiet and Ghoshal, 1998; Wasko et al., 2005). In other words, this construct reflects the extent to which a person is connected to others within a social network. A member who is highly embedded in a virtual community implies that he or she has more connections obtained from interactions with others. In a virtual community, it is the interactions among community members that knit the social fabric.

Previous study suggests that individuals who are highly structurally embedded in a social network are more likely to comply with norms and engage in pro-social behaviors than members who are not embedded (Rogers & Kincaid, 1981). Based on the insights gained from previous study, the present study attempts to link the level of structural embeddedness with community members' willingness to engage in virtual community citizenship behaviors.

Hypothesis 2: The higher a member's level of structural embeddedness, the higher the member's willingness to engage in virtual community citizenship behaviors will be.

Membership Tenure

Membership tenure is theorized as an antecedent of virtual community citizenship behaviors. Previous studies suggest that socialization in a particular setting involves learning those social behaviors considered appropriate in a certain norm, and therefore a period of time of lurking in an online community can be a phase needed for a member to observe and internalize those behaviors (Yeow, Johnson & Faraj, 2006). In other words, it takes time for a community member to start to actively participate in those community-oriented behaviors. In addition, a study by Wasko et al. (2005) suggests that members with longer membership tenure in online community of practice are more likely to know what area and how their expertise can be useful and are better able to share knowledge with others.

Another study by Pettit, Donohue & Cieri (2004) offer a fresh perspective as to how career stage relates to people's willingness to engage in organizational citizenship behaviors. More specifically, the later stages of an individual's career tend to be associated with the feeling of being needed and of reciprocating what they obtained from

the community. In this stage, satisfaction may result from helping others, a sense of being useful and serving the community. Similarly, there are a series of sequential stages that a member may go through from an outsider to an insider in a virtual community. A model proposed by Lave and Wenger (1991) suggest that there are five stages in a learning community, including peripheral (i.e. Lurker), inbound (i.e. Novice), insider (i.e. Regular), boundary (i.e. Leader) and outbound (i.e. Elder). The trajectories require time to go through, and thus there is a possibility that longer membership tenure is associated with a tendency to give back to that virtual community by engaging in virtual community citizenship behaviors.

Therefore, it is possible to see membership tenure positively influence members' willingness to engage in virtual community citizenship behaviors.

Hypothesis 3: The longer a member's membership tenure, the higher the member's willingness to engage in virtual community citizenship behaviors will be.

Theoretical framework

To identify the main antecedents of virtual community citizenship behavior, I develop a theoretical framework based on the insights gained from the literature. In this theoretical framework, three constructs (affective commitment, structural embeddedness, and membership tenure) are included as antecedents of VCCB. In addition, a multi-dimensional construct of VCCB (altruism, civic virtue, consciousness, courtesy and loyalty), which is derived from the review of OCB in virtual community literature, are added in this theoretical framework.

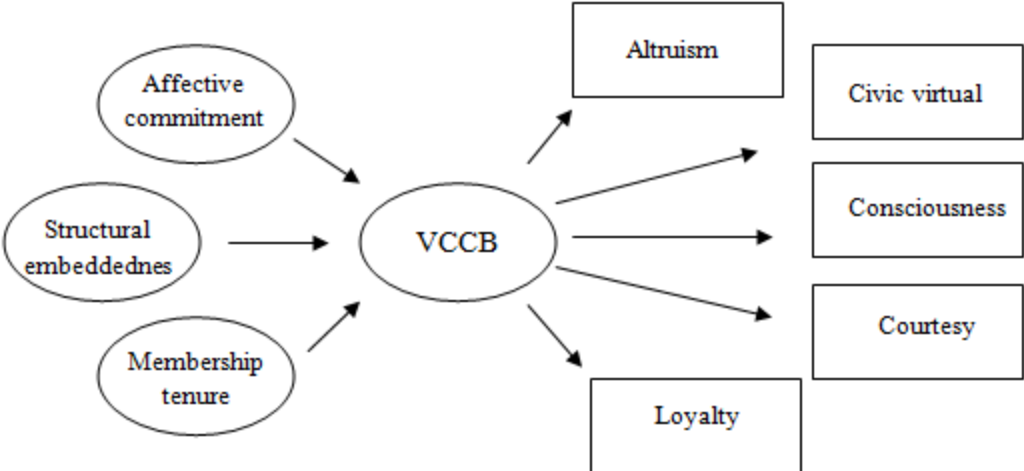


Figure 1. Proposed theoretical framework of virtual community citizenship behavior

METHOD

VCCB measure development

Because there is no study on virtual community that has addressed VCCB based on the proposed multi-dimensional construct, a new measure used to assess virtual community citizenship behaviors needs to be developed.

There are two main steps involved in this process. First, I administered a critical incidence survey to explore the behaviors that constitute VCCB. The survey was posted in a variety of online discussion forums. Participants were instructed to generate as many examples of VCCB behaviors as they could. Second, the behavioral examples collected using the first survey were reviewed by subject matter experts (SME). SMEs reviewed the incidents in order to avoid double negatives and ambiguity. Twenty-five items remained as a result of initial review and each proposed dimension of the VCCB construct comprises five items.

The following VCCB measure includes the 25 items distributed across the five dimensions. In this survey, survey participants are asked to estimate the extent to which they agree with each statement. The answers were scored on a seven-point Likert scale ranging from (1) *Strongly Disagree* to (7) *Strongly Agree*.

Please see Table 1 for the items and their hypothesized dimensions.

Table 1

*Subscales and Items for VCCB Measure**Altruism*

-
- 1: I orient new members to get acquainted with various features of the community.
 - 2: I offer honest and well-intentioned advice to other community members.
 - 3: I follow up on other members' questions to see if there is any information I can pass on as soon as I get it.
 - 4: I assist other members in finding solutions to their questions.
 - 5: I recommend useful links or reference information to others who are in need.

Civic virtual

- 1: I make efforts to maintain a positive image of the community.
- 2: I actively participate in activities organized by the community.
- 3: I keep abreast of changes in the community.
- 4: I keep myself updated with community announcements, posts, and so on.
- 5: I offer suggestions regarding how the community can improve.

Conscientiousness

- 1: I obey the community regulations.
- 2: I notify the community staff of potential problems.
- 3: I foster an open exchange of ideas in the forum.
- 4: I facilitate the discussion processes in order to keep the thread on track.
- 5: I give up my personal time for some community-related stuff.

Courtesy

- 1: I maintain a reasonable tone, even in unreasonable circumstances.
- 2: I appreciate any input that other community members' contribute when asking for advice.
- 3: I check with others before taking action.
- 4: I respect other members' views and beliefs even if I do not agree with them.
- 5: I consider the impact of my action on other community members.

Loyalty

- 1: I recommend this community to others outside the virtual community.
 - 2: I generally say good things about this community.
 - 3: I identify myself as a member of this community.
 - 4: I believe in the values embedded in this community.
 - 5: I rate this community as superior to other alternatives.
-

Data collection

The main method of data collection used in the current study was through a set of questionnaires. The items used to assess VCCB are listed above. In terms of the items employed to measure community members' affective commitment to the virtual community, they are adapted from the Affective Commitment Scale (Allen & Meyer, 1990). Structural embeddedness and membership tenure were investigated using two biodata items. More specifically, structural embeddedness was operationalized as how many friends participants have in the virtual community and tenure was operationalized as how long participants have been in the virtual community.

With these developed items for VCCB measure, a set of questionnaires consisting of the Affective Commitment Scale and Virtual Community Citizenship Behavior measure as well as items used to assess structural embeddedness and membership tenure was administered in The Grad Cafe (<http://forum.thegradcafe.com/>). The Grad Cafe forum is an online community for graduate and potential graduate students to help each other with the trials and tribulations of applying to grad school. In this forum, virtual community citizenship behaviors are prevalent among community members, including addressing others' concerns related to grad school application, offering suggestions when other forum users are in need of advice, and showing emotional support for others. The Grad Cafe users are highly involved in helping and prosocial behaviors, and therefore The Grad Cafe is a reasonable fit for data collection.

Procedures for data analysis

There are two main procedures involved in data analysis to evaluate the quality of the new measurement for VCCB. First, confirmatory factor analysis needs to be conducted to assess whether or not the items on each dimension conform to hypothesized set of factors. Second, there are five dimensions in the proposed VCCB construct, and therefore the reliability of each dimension needs to be evaluated to make sure the items on each scale actually measure the same thing. This involves using internal consistency analysis which assesses the extent to which a set of items measure a single unidimensional construct.

As for the positive relationships between the three proposed predictors and outcome variable, regression analysis needs to be conducted as an approach to testing the three hypotheses. As there are five scales contained in the VCCB construct, the predictive

relationships involved in the study can be analyzed separately based on each dimension in order to see the extent to which each predictor accounts for the variances in each dimension of VCCB. In other words, the outcome variables include Altruism, Civic virtue, Conscientiousness, Courtesy and Loyalty other than VCCB variable.

RESULTS

Descriptive information

The first table is concerned with the descriptive information of the means regarding the membership tenure and the structural embeddedness:

Table 2

Means of Membership Tenure and Structural Embeddedness

	<i>N</i>	<i>M</i>	<i>SD</i>
How long have you been in the forum? (years)	53	3.17	2.02
How many friends do you have in the forum?	52	1.63	1.30

In terms of the items used to assess the membership tenure and the structural embeddedness, the options for the answers of the two items are as follows:

The membership tenure item in the study involves the following options: less than half a year, 0.5-1.0 years, 1.0-1.5 years, 1.5-2.0 years, 2.0-2.5 years, more than 2.5 years. The structural embeddedness variable includes the following options: less than 10, 10-20, 20-30, 30-40, 40-50, more than 50.

Referring to the figures contained in Table 2, membership tenure of the majority of the members in The Grad Cafe falls into the “1.0-1.5 years” ($M = 3.17$, $SD = 2.02$). As for the structural embeddedness, the friends a member has within The Grad Cafe are around 10-20 ($M = 1.63$, $SD = 1.30$).

As there are five subscales (Altruism, Civic virtue, Conscientiousness, Courtesy and Loyalty) in the proposed multi-dimensional VCCB construct, I combined the scores for each subscale and then divided them by the number of the items on each dimension in order to make sure the answers are still scored on a seven-point Likert scale.

In the Affective Commitment scale, there are four negatively worded items: item 4, item 5, item 6 and item 8. Typically, negatively worded items are included to ensure that participants think carefully about each question rather than responding to questions in the same pattern. The negatively worded items were reversed prior to computing scale total. As answers for this measure were scored on a five-Likert scale, 1's were turned into 5's, 5's were turned into 1's and all the scores in between were turned into their appropriate opposite.

Table 3 shows the means of each subscale of VCCB scale and VCCB Scale as well as Affective Commitment scale:

Table 3

Means of Subscales of VCCB and Affective Commitment Scale

	<i>N</i>	<i>M</i>	<i>SD</i>
Altruism	53	5.51	1.04
Civic Virtue	52	4.60	1.20
Conscientiousness	52	5.02	0.97
Courtesy	52	5.53	0.92
Loyalty	52	5.69	1.02
VCCB	50	5.26	0.79
Affective Commitment	53	3.36	0.60

According to the figures in table 3, The Grad Cafe online forum users indeed exhibit prevalent virtual community citizenship behaviors, as the scores in each dimension of VCCB are around 5 on a seven-point Likert scale. Therefore, we can conclude members in The Grad Cafe are highly involved in community-oriented behaviors that promote the effective functioning of virtual community.

In terms of the affective commitment towards this online forum, it exceeds 3 on a five-point Likert scale ($M = 3.36$, $SD = 0.60$), which suggests that most of the members in The Grad Cafe are emotionally attached to this forum.

Reliability analysis

In terms of the reliability analysis, Cronbach's alpha is widely used to assess the internal consistency (reliability) of a multivariate measurement. Cronbach Alpha normally ranges from 0 to 1, with higher scores suggesting good internal consistency. George and Mallery (2003) provide the following rules of thumb: " $\geq .9$ – Excellent, $\geq .8$ – Good, $\geq .7$ – Acceptable, $\geq .6$ – Questionable, $\geq .5$ – Poor, and $\leq .5$ – Unacceptable" (p. 231).

The coefficient of reliability of the Affective Commitment scale is 0.78, which is acceptable. The Cronbach's α of VCCB scale is 0.91, which suggests a reliable scale for use in this study. On the other hand, the internal consistency among the items in VCCB scale is a little too high. High inter-correlations among the measures might indicate the items on a scale are "overly redundant and the construct measured too specific" (Briggs & Cheek, 1986, p. 115). As the reliability of a measure tends to increase when the length of the measure increases, this could be addressed by conducting factor analysis known as a statistical technique to replace a large collection of variables with a smaller number of

factors. For factor analysis, Hatcher recommended that the number of usable data should be at least 100 or 5 times the number of variables in order to obtain reliable results (Hatcher & Larry, 1994). For the time being, there are only 53 survey responses due to time constraints. Hence, the data are not ideally suitable for factor analysis because of the lack of sufficient participants.

There are five subscales in the VCCB scale including Altruism, Civic Virtue, Conscientiousness, Courtesy and Loyalty. The results of internal consistency analysis for each dimension are as follows: Altruism scale: Cronbach's $\alpha = 0.84$; Civic virtual scale: Cronbach's $\alpha = 0.82$; Conscientiousness scale: Cronbach's $\alpha = 0.61$; Courtesy scale: Cronbach's $\alpha = 0.78$; Loyalty scale: Cronbach's $\alpha = 0.85$.

Please refer to Table 4 for the statistics of Cronbach's α of each scale.

Table 4

Cronbach's Alpha Coefficients for Each Scale

	<i>Cronbach's α</i>
Altruism	0.84
Civic Virtue	0.82
Conscientiousness	0.61
Courtesy	0.78
Loyalty	0.85
VCCB	0.91
Affective commitment	0.78

The values 0.7 or 0.75 are widely-accepted cutoff value for Cronbach's α . In review of the Cronbach's α of each dimension, all the scales reach the acceptable value except for the Conscientiousness scale, indicating this scale is not highly reliable. To examine which items contribute to the unreliability of this scale, I referred to Cronbach's α if item deleted. The value of Cronbach's α if item deleted represents the increase or decrease of α that results from dispensing with a scale component. Therefore, if the value of Cronbach's α if item deleted associated with an item is higher than the value of Cronbach's α for a given scale, this item is subject to reconsideration as to whether or not include it as a component of this scale in the final measure.

A closer examination of the items within Conscientiousness scale reveals that the item "I obey the form policies" seems off what is expected to measure under this dimension, as the "Cronbach's α if item deleted" for this item is 0.66, which suggests removing this item from this dimension can improve the internal consistency of this scale. In other words, if this item were to be deleted then the value of raw alpha will increase from the current 0.61 to 0.66.

For the same reason, the following items in Table 5 must be reexamined and modified or completely changed as needed:

Table 5

Items that Need to be Reexamined

<i>Subscale</i>	<i>Items</i>	α	<i>Cronbach's α if item deleted</i>
Altruism	I orient new members to get acquainted with various features of the community.	0.84	0.89
Civic virtue	I make efforts to maintain a positive image of the community.	0.82	0.84
Conscientiousness	I obey the community regulations.	0.61	0.66
Courtesy	I check with others before taking action.	0.78	0.85

Correlation analysis

To get an understanding of how the variables involved in the study are correlated, I conducted correlation analysis. The most widely used type of correlation coefficient is Person's correlation coefficient (or r). It can range from -1 to +1. A value of zero suggests the variables are not related. Values close to -1 or +1 indicate strong predictive relationships.

Please refer to Table 6 for the correlations coefficients between predictors and the five subscales of VCCB.

Table 6

Correlations between Predictors and Subscales of VCCB

Scale	1	2	3	4	5	6	7	8	9
Membership tenure	1	.47**	.15	.20	.23	.13	.20	.20	.26
Structural embeddedness	.47**	1	.24	.28*	.33*	.11	.20	.22	.30*
Affective commitment	.15	.24	1	.50**	.57**	.55**	.43**	.70**	.72**
Altruism	.20	.28*	.50**	1	.51**	.66**	.33*	.34*	.74**
Civic Virtue	.23	.33*	.57**	.51**	1	.57**	.34*	.52**	.79**
Conscientiousness	.13	.11	.55**	.66**	.57**	1	.44**	.51**	.84**
Courtesy	.20	.20	.43**	.33*	.34*	.44**	1	.61**	.67**
Loyalty	.20	.22	.70**	.34*	.52**	.51**	.61**	1	.77**
VCCB	.26	.30*	.72**	.74**	.79**	.84**	.67**	.77**	1

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

As indicated in Table 6, the membership tenure was significantly correlated with the number of friends a participant has in the virtual community ($r(52) = .47, p < .01$).

The number of friends a participant has in the virtual community was significantly related to Altruism ($r(52) = .28, p < .05$) and Civic Virtue ($r(51) = .33, p < .05$).

In addition, Affective commitment variable was significantly correlated with all the dependent variables, suggesting this variable may be significantly predictive of the outcome variables.

Moreover, all the subscale variables were significantly inter-correlated together, which confirmed the internal consistency of the VCCB scale is high.

Predicting VCCB

First, I completed a multiple regression where VCCB scale was treated as the dependent variable and structural embeddedness, affective commitment and membership tenure were treated as the predictor variables to test if the three variables significantly predicted participants' virtual community citizenship behaviors. As shown in Table 7, the results of this multiple regression indicated the regression model explained 55% of the variances in the virtual community citizenship behavior variable ($R^2 = .55$, $F(3, 45) = 18.18$, $p < .001$). It was found that only affective commitment significantly predicted virtual community citizenship behaviors ($\beta = .69$, $p < .001$). Hence, Hypothesis 1 was supported.

Table 7

Summary of Multiple Regression Analyses for Variables Predicting VCCB (N = 48)

Variable	<i>B</i>	<i>SE B</i>	β
Affective commitment	.90	.14	.69**
Membership tenure	.05	.04	.13
Structural embeddedness	.04	.07	.07
R^2		.55	
F		18.18**	

* $p < .05$. ** $p < .01$.

Next, I conducted similar regression analysis substituting each of the VCCB subscales as the dependent measure. The results for each dimension are as follows:

For Altruism scale, the results of the regression indicated the three predictors explained 28% of the variances ($R^2 = .28$, $F(3, 48) = 6.18$, $p < .01$). It was found that only affective commitment significantly predicted virtual community citizenship behaviors ($\beta = .46$, $p < .01$).

For Civic Virtue scale, the results of the regression indicated the three predictors explained 36% of the variances ($R^2 = .36$, $F(3, 47) = 8.98$, $p < .001$). It was found that only affective commitment significantly predicted virtual community citizenship behaviors ($\beta = .51$, $p < .001$).

For Conscientiousness scale, the results of the regression indicated the three predictors explained 30% of the variances ($R^2 = .30$, $F(3, 47) = 6.80$, $p < .01$). It was found that only affective commitment significantly predicted virtual community citizenship behaviors ($\beta = .55$, $p < .001$).

For Courtesy scale, the results of the regression indicated the three predictors explained 20% of the variances ($R^2 = .20$, $F(3, 47) = 3.98$, $p < .05$). It was found that only affective commitment significantly predicted virtual community citizenship behaviors ($\beta = .40$, $p < .05$).

For Loyalty scale, the results of the regression indicated the three predictors explained 49% of the variances ($R^2 = .49$, $F(3, 47) = 14.82$, $p < .001$). It was found that only affective commitment significantly predicted virtual community citizenship behaviors ($\beta = .68$, $p < .001$).

Based on the regression results with regard to each dimension of VCCB, almost half variances of Loyalty variable was explained by the regression model, followed by Civic Virtue scale, Conscientiousness scale, Altruism scale and Courtesy scale. The multiple regression analysis results for each subscale are presented in Table 8:

Table 8

Multiple Regression Analyses Results for Variables Predicting Each Dimension of VCCB

	Altruism	Civic Virtue	Conscientiousness	Courtesy	Loyalty
Affective commitment	.46**	.51**	.55**	.40**	.68**
Membership tenure	.07	.07	.07	.12	.09
Structural embeddedness	.14	.17	-.06	.04	.01
R^2	.28	.36	.30	.20	.49
F	6.18	8.98	6.80	3.98	14.82

* $p < .05$. ** $p < .01$.

DISCUSSION

Implication

The results regarding the regression analysis suggest that community members who are emotionally attached to the community are more likely to engage in virtual community citizenship behaviors, which is consistent with the previous studies. Additionally, affective commitment has proved to be the key driving force of community members' loyalty toward the virtual community, it is therefore important to find ways to strengthen the emotional ties between the community members and the community.

There are several features of The Grad Cafe that may contribute to the significant predictive relationship between affective commitment and the willingness to engage in virtual community citizenship behaviors. For instance, The Grad Cafe has a feature on the homepage that serves as a reminder regarding those who have birthday everyday in the forum so that every community members can see who are today's birthday girls or birthday boys. With this little forum gadget, the cohesiveness of the forum can be enhanced, the emotional ties can be fostered as well. In addition, The Grad Cafe has a feature that promotes the forum signature share by putting information on the homepage once members update their signatures, which makes it easier for the community members to respond to others emotional expression. The signatures in The Grad Cafe tend to serve as an outlet for community members to release the pressure and frustration they encountered when applying for graduate schools. Sometimes, community members use the signature to express their joyful moments after they are admitted to a grad school. Normally, the forum signatures only appear on the profile pages of a community member without popping up on the homepage. Therefore, the automatic signature update pop-up

on the homepage really makes a difference in terms of fostering the interaction among community members and accelerating the fulfillment of socio-emotional needs. Based on the analysis, the owners or managers of a virtual community should put more efforts on creating an environment where community members enjoy hanging out with each other.

Limitations

The results show that the means of virtual community citizenship behaviors are relatively high, which suggests the members in The Grad Cafe are highly involved in helping behaviors and prosocial behaviors. One of the reasons might be due to the fact that those who complete surveys will naturally score higher on VCCB because completing surveys for another member itself represents a form of virtual community citizenship behaviors. Therefore, it would be more desirable to collect more data and include more members who are less active in the forum.

The results regarding the VCCB measure suggest that most of the items within a given dimension are highly inter-correlated and they indeed measure the same underlying unidimensional construct. For this reason, it can be concluded that the majority of the items in the VCCB measure can be retained for further study. However, more data needs to be collected in order to see whether the items on each subscale conform to the hypothesized dimensions.

In this study, the results of the regression analysis fail to prove structural embeddedness and membership tenure positively influence the willingness to engage in virtual community citizenship behaviors, which may be due to the following reasons: the sample size of this study is relatively small which imposes constraints on the possible significant relationships between the predictors and the outcome variable. In addition, the

majority of The Grad Cafe users are students who need help to get through the trials and tribulations of applying to grad school and they tend to be actively involved in this forum when going through the application process. However, after they are done with their applications, their involvement in this forum tends to become less active. For this reason, it is hard to predict how likely they are willing to engage in virtual community citizenship behaviors based on their membership tenure. Hence, it would be more accurate to retest the hypothesized positive relationships between the predictors and the outcome variable when more participants are available.

Future direction

This study attempts to explore the main antecedents of virtual community citizenship behaviors and develop a measure assessing VCCB. For the new measure of VCCB, the majority of items are good ones in terms of the scale reliability and can be retained for the final VCCB measure. However, the factor analysis used to evaluate whether or not the items that are hypothesized to represent each dimension conform to the proposed multi-dimensional VCCB construct can be conducted by collecting more than 100 survey responses to meet the minimum requirement for factor analysis in the future study.

Since this study is conducted in an online forum focused on the students applying for graduate schools, the generalizability of the results of this study remains to be tested. There are a variety of online forums depending on the focus of the discussion topic. The attempt of future study can be placed on implementing similar studies in other online communities. It would be beneficial to see how well the proposed theoretical framework fit into other samples.

APPENDICES

APPENDIX A: Affective Commitment Scale for Virtual Community

Please rate how strongly you agree or disagree with each of the following statements by clicking on the button to indicate your choice.

Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
1	2	3	4	5

- 1: I would be very happy to spend my leisure time in this virtual community
- 2: I enjoy discussing my community with people outside it
- 3: I really feel as if this community's problems are my own
- 4: I think that I could easily become as attached to another virtual community as I am to this one (R)
- 5: I do not feel like 'part of the family' at my community (R)
- 6: I do not feel 'emotionally attached' to this community (R)
- 7: This virtual community has a great deal of personal meaning for me
- 8: I do not feel a *strong* sense of belonging to *my* community (R)

APPENDIX B: Virtual Community Citizenship Behavior Measure

Please rate how strongly you agree or disagree with each of the following statements by clicking on the button to indicate your choice.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

- 1: I orient new members to get acquainted with various features of the community.
- 2: I offer honest and well-intentioned advice to other community members.
- 3: I follow up on other members' questions to see if there is any information I can pass on as soon as I get it.
- 4: I assist other members in finding solutions to their questions.
- 5: I recommend useful links or reference information to others who are in need.
- 6: I make efforts to maintain a positive image of the community.
- 7: I actively participate in activities organized by the community.
- 8: I keep abreast of changes in the community.
- 9: I keep myself updated with community announcements, posts, and so on.
- 10: I offer suggestions regarding how the community can improve.
- 11: I obey the community regulations.
- 12: I notify the community staff of potential problems.
- 13: I foster an open exchange of ideas in the forum.
- 14: I facilitate the discussion processes in order to keep the thread on track.
- 15: I give up my personal time for some community-related stuff.

- 16: I maintain a reasonable tone, even in unreasonable circumstances.
- 17: I appreciate any input that other community members' contribute when asking for advice.
- 18: I check with others before taking action.
- 19: I respect other members' views and beliefs even if I do not agree with them.
- 20: I consider the impact of my action on other community members.
- 21: I recommend this community to others outside the virtual community.
- 22: I generally say good things about this community.
- 23: I identify myself as a member of this community.
- 24: I believe in the values embedded in this community.
- 25: I rate this community as superior to other alternatives.

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