



# Graduate students' creative professional virtual community behaviors and their creativity



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## ABSTRACT

With the development of internet technology, professional virtual community (PVC) is becoming the valuable external knowledge source for graduate students. Students search information and knowledge in specific domain, share research experiences and weave their social network in these professional virtual communities (PVCs). How to use PVC to increase graduate students' creativity should be an important researching issue. Although students' online behaviors have got researchers' attention, students' PVC behaviors and their impacts on creativity keeps less comprehensively understood. The empirically analysis of totally 930 graduate students in this study turns out that graduate students' PVC behaviors include 17 categories which then are clustered into three dimensions: Knowledge & Networking Behavior, Behave Manner and Interactivity. To test their impacts on graduate students' creativity, the regression results demonstrate that after controlling students' intrinsic motivation and creative self-efficacy, Knowledge & Network Behavior and Behavior Manner both significantly predict students' creativity. However Interactivity does not affect students' creativity. Implications and future research are discussed.

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## 1. Introduction

Internet is originally developed as a means by which dispersed academic researchers could collaborate and communicate outcomes (Naughton, 1999). Internet has been an easiest, fastest, and cheapest ways of accessing necessary information (Cloud, 1989), and has become an important knowledge source (Jeffres, Neuendorf, & Atkin, 2012; Lou, Shih, Tseng, Diez, & Tsai, 2010). It is becoming an important information or knowledge source and a widely used communication platform for college students. With the development of internet technology, virtual interactions among professional persons are being increased quickly and which leads to the emergence of virtual networked knowledge society (De Moor & Weigand, 2007). One special phenomenon is the birth of professional virtual communities (PVCs). People use PVCs to improve their expertise capabilities, absorb advanced insights, and resolve problems (Lin, Hung, & Chen, 2009). PVCs are dramatically changing students' learning and knowledge environment and becoming a second classroom for graduate students. PVCs assist students in course learning and doing research. Previous studies found students' PVCs behaviors include searching information

(Kirkwood, 2008; Ruzgar, 2005), sharing knowledge (Bock & Kim, 2002; Chen, 2007) and discussion (Wachter, Gupta, & Quaddus, 2000). Related studies have shown that receivers can integrate new knowledge gained from internet into their existing knowledge (Wijnhoven, 1998). PVCs play as a kind of external knowledge source and cannot be neglected in education researching field.

Improving creativity is especially important for graduate students' education. In China, there are two kinds of education program for graduate students. One is two-year program, which aims to improve students' ability to apply expertise skills or capabilities. The other is three-year program, which aims to improve student's academic research ability and help students prepare well for the potential Ph.D. degree studying. The graduate students in this study come from the latter, namely three-year program. These students are required to do creative dissertations. We have noticed that lots of graduate students join in PVCs in their learning and researching processes. PVCs have become a commonly used external knowledge source and platform to weave personal network. Graduate students' PVC behaviors might influence their creativity. However, update the categories of graduate students' PVC behaviors keep less comprehensively understood. Except that related studies on students' online behaviors, which are based on calculating the number of messages students post or the time they stay on the Internet (Yukelturk, 2010). We also learn

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fewer about what kind of PVC behavior might help graduate students' creativity, except few related studies about online behaviors and student academic work, such as information retrieval behaviors (Biddix, Chung, & Park, 2011; Currie, Devlin, Emde, & Graves, 2010).

Hence, the aim of this study is to figure out graduate students' PVC behaviors and their impact on creativity. In this study we will use method of implicit theories to explore students' PVC behaviors. Implicit theory believes that some constructions are resided in the minds of exporters as well as laypersons. These constructions need to be discovered rather than invented because they already exist, in people's heads in some forms (Sternberg, 1985). Scholars have used implicit theory to study intelligence, creativity, and wisdom. By simply asking people what they are, scholars can define some vague concepts. In this study, we use this method because we believe that graduate students are qualified to reflect their PVC behaviors, they will offer real information about their real PVC behaviors in detail. Based on this approach, it is possible to get what happened in the students' real behavior in the virtual world. Additionally, this study also exam whether these PVC behaviors will improve graduate students' creativity in order to give students some suggestions.

The rest of this paper will be organized as follows. Part 2 is the literature review. Then will be the empirical study. In study one, 86 graduate students participated in the investigation to collect the detail creative PVC behaviors of graduate students. In study two, 611 respondents were investigated. The data was used to analyze the dimensions of students' creative PVC behaviors. Study three used linear regression model to examine the correlation between PVC behaviors, intrinsic motivation, creative self-efficacy and creativity. The last part is the discussion, implications and further research is suggested.

## 2. Literature review

### 2.1. Virtual community and professional virtual community

Community means a group of people who share social interactions, social ties, and a common 'space' (Kozinets, 1992). It provides sociability support, information, and a sense of belonging (Wellman, 2001). It is the place where people interact socially for mutual benefit (Smith, 2002). Virtual community is the union between individuals or organizations to share common value, purpose, goal or interest (Koh, Kim, Butler, & Bock, 2007; Rothaermel & Sugiyama, 2001), do transactions or generate fantasies (Hagel, 1999) through electronic media.

PVC is virtual community relate to specific domain (Chen, 2007; Hagel & Armstrong, 1997; Wachter et al., 2000). With the development of professional classes, increased PVCs have been established. Such as: Take Tapped In (<http://www.tappedin.org>), TENet (<http://www.tenet.edu>), and SCTNet (<http://sctnet.edu.tw>), which are PVCs for teachers; AUTOSPEC (<http://www.cruzio.com/~autospec>) is the sample of PVC for professional people in medical field. Some PVCs are much integrative, such as XIAOMUCHONG (<http://emuch.net/>) which acrosses different domains and is open to students as well as employees.

### 2.2. Online behaviors and academic performance

Students were found to search information or knowledge on the Internet for their homework, assignments and studies (Kirkwood, 2008; Ruzgar, 2005). A few studies (e.g., Cho, Gay, Davidson, & Ingraffea, 2007; Lin, Lin, & Huang, 2007) have attempted to define online learning community styles or types, for instance, Lin et al. (2007) classified the products and processes of knowledge sharing

and creation in a professional virtual community into six types, which included listening, task performing, information/opinion seeking or providing, recording, evaluating, knowledge contributing, and knowledge/catalyst integrating. Another study by Cho et al. (2007) defined the styles of online learning communities, but it only focused on willingness to communicate in learning communities. Hung and Zhang (2008) did a research on online learning behaviors and activity patterns, and found that the basic statistics of major learning behavior variables were total frequency of logins, frequency of accessing course materials, number of messages posted, number of messages read, and frequency of synchronous discussion attended, and they tried to find daily learning patterns. A study showed that by asking the simple question "What are the positive aspects of the discussions carried out on the Internet?", the most frequently repeated positive aspects were clustered into the factor called "academic gains". After extracting similar related phrases from sentences students answered, results showed that among academic gains, protruding behaviors were ranked by following order: exchanging ideas, realizing different points of view, finding solution, consolidation of knowledge, research skills, seeking consensus, understanding the issue and gaining experience (Baran & Keles, 2011). Other researchers used several indices to show how students interact with each other on virtual communities, such as number of notes written, number of notes read, students' attempts to revise their notes, the use of keywords to make their work more accessible for other members (Lee, Chan, & van Aalst, 2006; Niu & van Aalst, 2009; van Aalst & Chan, 2007). It was demonstrated that students engaged more actively online did not necessarily improve their school grades (Davies & Graff, 2005).

Despite creativity is the important requirement of graduate students, less study has been done about online behavior and creativity, except that it was found that using internet benefitted innovative and creative thinking process (Cameron & Webster, 2005).

### 2.3. PVC behaviors and creativity

Creativity means the novel and useful output (Amabile, 1996), it is the result of personality, cognitive ability, process and environment (Meusburger, Funke, & Wunder, 2009). Among them, knowledge is an important factor of creativity (Ford, 1996; Ward, 1994). Domain-relevant knowledge (Mumford & Gustafson, 1988) or knowledge from different domains will help creativity (Phelps, Heidl, & Wadhwa, 2012; Ziebro & Northcraft, 2009).

Virtual communities serve as storehouses of knowledge, in which people could absorb or share information, knowledge spread rapidly in these communities (Hung & Cheng, 2013). PVCs are places where people could share their own viewpoints anonymously. It is very convenient to broadcast a request for specific information and get access to numerous, diverse and resourceful sources of information in PVCs (Constant, Kiesler, & Sproull, 1996; Granovetter, 1973). Researchers proposed that the executives of organizations should consider PVCs as a new innovation or knowledge pool since they are important knowledge sources for employees (Lin et al., 2009; Nambisan & Sawhney, 2007; Tang, 2014). Graduate students' behaviors in PVCs might also matter with their creativity.

Up to now, online behaviors are mostly related with course learning or online course discussion. PVCs are different with students' online course learning, it is students' self-determined or habit related behaviors. But the enrichment of knowledge in PVCs has already made it as important external knowledge sources. Current studies learn few about students' PVC behaviors and its impact on students' creativity. Exploring this issue will help

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