ANONYMITY, MOTIVATIONS AND PARTICIPATION IN VIRTUAL LEARNING COMMUNITIES: A CASE STUDY IN THE INTEGRATED VIRTUAL LEARNING ENVIRONMENT (IVLE)

SHEN CUIHUA (B.A., ZHEJIANG UNIVERSITY)

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Summary

With the advent of information and communication technologies, virtual learning communities, supported by Computer-Mediated Communication, have been created and utilized ubiquitously in organizational and educational settings.

As community-based learning generally requires members’ voluntary contributions of knowledge and information goods for the benefits of a collective, questions arise like how to solve the dilemma of public goods, and how to enhance participation in online community. From different perspectives, people are motivated to participate in virtual learning communities because of extrinsic rewards like bonus marks, intrinsic rewards like the sense of self-importance, and community interest. Anonymity, as studied in computer mediated communication, affects people’s communication behavior and group decision-making. However, so far little empirical studies have focused on how anonymity and motivations could affect students’ participation in virtual learning communities.

This case study aims to fill the gap through a 14-week field experiment of an online learning community in the Integrated Virtual Learning Environment (IVLE) at the National University of Singapore. It attempts to empirically examine how people’s knowledge-sharing behavior in virtual learning communities are influenced by 1) anonymity of the participants; 2) the motivations and barriers to participation in virtual learning communities, and 3) the interaction of anonymity, motivations and barriers, and other situational variables, such as attitude towards the community.
The results offer insights on people’s behavior in virtual learning communities. In short, motivations of participants, moderated by anonymity, are found to influence participation, whereas anonymity alone is not observed to have significant impact on the quantity of contributions. Theoretical and practical implications are also discussed in the thesis.
Chapter 1 Introduction

As the latest of a series of technological breakthroughs in the history, computers and Internet are being ingrained into the 21st century society. Although they are welcomed by some people as a panacea while feared by other as a curse, it is widely agreed that they are able to transform every aspect of our lives – private, social, cultural, economic and political. Among their overwhelmingly intensive social implications, information and communication technologies (ICTs) have exerted huge impact on the way people work, learn and collaborate, both in organizational and educational settings (Kearsley, 2000).

For educational purposes, ICTs have been introduced and embedded into primary schools, secondary schools, and universities worldwide. In some countries, ICT integration in schools even reaches a considerable level of maturity and stability (e.g., Lim & Hang, 2003). Computer-Mediated Communication (CMC) offers distinct features which can be utilized to enhance learning (Hutchings, 2002). It can be used as a complementary tool of traditional classroom learning, as well as to help creating a virtual classroom to facilitate distance learning (Hutchings, 2002; Palloff & Pratt, 1999).

In workplace, ICTs are widely integrated into and quickly transforming organizations across the world. The impact of technology can be witnessed in

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1 One example, as mentioned in Lim and Hang (2000), is the five-year Singapore Master Plan for IT in Education, initiated by the Ministry of Education in 1997. The Master Plan was a blueprint for the use of IT in schools and access to an IT-enriched school environment for every child. Some basic achievements of IT Master Plan include providing pupils with access to IT in all learning areas in the school, and with school-wide network and link all schools through Wide Area Network, enabling high speed delivery of multimedia services on island-wide basis. Please visit http://www.moe.gov.sg/edumall/mpite/overview/index.html for details.
Computer-Supported Collaborative Work (CSCW), the replacement of hierarchical
bureaucracy with flat, networked organizational structure, virtual group building
and decision-making, and knowledge management, just to name a few (Dimaggio,
Hargittai, Neuman, & Robinson, 2001).

In both educational and business realms, the rapid emergence of virtual
communities, made possible by CMC, has attracted particular attention. It is found
that CMC enables people with shared interests or expertise to form and sustain
relationships regardless of time and space constraints (Hiltz & Wellman, 1997).
Besides its technical capacity, CMC has been discovered to have social
psychological implications on individual and group communication as well, though
opinions are divided. For example, some researchers posited that people engaged
in CMC enjoy a certain degree of social anonymity since social context cues are
filtered out. Therefore, compared with real communities created offline, it is
argued that CMC may enjoy a democratizing power to trigger more equal
participation among members, despite the fact that irresponsible behaviors, such as
flaming, are also observed almost at the same time (Kiesler, Siegel, & McGuire,
1984).

For communities established across educational or organizational settings,
one of their core functions is knowledge building and sharing. Literature on
Computer-Supported Collaborative Learning (CSCL) indicates that social creation
of knowledge is the basis of learning, and student learns through actively
participating in knowledge building as a member of a group (Brandon &
Hollingshead, 1999). From a pedagogical point of view, an active, constructivist form of learning requires the developing sense of community within the group of participants in order for the learning process to be successful (Palloff & Pratt, 1999). In organizational settings, communities of practice have become a widely used knowledge management tool in various corporations worldwide (Ardichvili, Page, & Wentling, 2003). Sharing a similar objective with learning community, communities of practice aim at developing members’ capabilities to build and exchange knowledge, through voluntary participation, and to reinforce and renew themselves as they generate knowledge (Wenger & Snyder, 2000).

However, setting up virtual communities is only the first step to information sharing. Instead of visiting well-sustained virtual communities, it is not unusual for net surfers to come across “ghost towns”, consisting of empty message boards, unanswered questions and ancient posts (Duggan, 2000). Often against the designers’ goodwill, participation does not take place automatically and effortlessly. Rather, it sometimes takes consistent cultivation and encouragement to motivate contribution from community members. Hence it is essential to explore the reasons why people participate in community discussion and knowledge sharing, and various studies attempted to unearth the motivations and barriers to participation in communities of practice and discretionary databases.

As the Internet provides new opportunities for anonymous communications, there are also on-going discussions on the impact of anonymity on people’s behavior in online communities (e.g., Nissenbaum, 1999). However, empirical
studies, especially quantitative ones, on motivation and disincentives to participation in online learning communities are quite sparse. This study is an attempt to explore the factors affecting people’s participation through a quantitative case study in National University of Singapore, particularly focusing on motivational factors and anonymous communication. The results will offer insights on people’s behavior in online learning communities.

This research aims to answer the following questions:

RQ1. What are people’s motivations and barriers to participation in virtual learning community?

RQ2. Does anonymity have an impact on people’s participation?

RQ3. How does anonymity interplay with other variables, especially motivations and barriers?

RQ4. How can we manipulate anonymity to enhance participation in virtual learning community?

Chapter 2 of the thesis provides a comprehensive picture of theoretical and empirical studies on virtual learning communities. It begins with the characteristics of CMC, followed by the development of learning communities in organizational and educational settings. Drawing theories from social psychology and communication, this thesis presents and discusses the findings from previous motivational studies on community participation as well as contribution to discretionary databases. Finally, researches on anonymity are reviewed, paying special attention to anonymous communication in virtual communities.
Chapter 3 presents the methods used in this thesis. The case selected is a discussion forum in the Integrated Virtual Learning Environment (IVLE) of the National University of Singapore. After a 14-week quasi-experiment and a questionnaire survey, the data collected were analyzed using explorative factor analysis, correlation analysis, and regression analysis. The results are reported in Chapter 4. Discussion and implications are followed in Chapter 5.

Chapter 6 is the conclusion part. Besides an overall summary of the whole thesis, the limitation of the study is discussed. Social implications and suggestions for future research are also included in this chapter.
Chapter 2 Theoretical Background

2.1 Virtual Communities and CMC

Virtual communities, powered by CMC, have received considerable academic attention since their emergence more than two decades ago. Whenever people log online, they instantly encounter millions of communities, which are set up for different purposes, with different size and life-span, and represent different groups of people in the cyberspace.

Before defining what exactly makes a virtual community, it is crucial to clarify the definition of community first. According to Shaffer and Anundsen (1993), human beings are yearning for a sense of belonging, kinship, and connection to a greater purpose. Community is defined as a dynamic whole that emerges when a group of people share common practices, are interdependent, make decisions jointly, identify themselves with something larger than the sum of their individual relationships, and make a long-term commitment to well-being. Palloff and Pratt (1999) pointed out that community can be built through several crucial steps:

- Clearly define the purpose of the group.
- Create a distinctive gathering place for the group.
- Promote effective leadership from within.
- Define norms and a clear code of conduct.
- Allow for a range of member roles.
– Allow for and facilitate subgroups.

– Allow members to resolve their own disputes.

The increasing prevalence of Internet and CMC has significant impacts on the ways people interact and on the notion of community as well. Rheingold (1993) referred to virtual communities as social aggregations emerged 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. By choosing their gathering place in the air, virtual communities relieve the constraints of geographical locations and changes interpersonal communication dynamics (Lee, Cho, Gay, Davidson, & Ingraffea, 2003). Unlike traditional communities, virtual community is no longer place-based. It is formed around issues of identity and shared purposes, and exists in various forms including email, electronic forums (including Bulletin Board Systems), chat rooms, instant messaging services, etc. Our basic desire to connect and share with other people is the driving force of communication technology, and in turn, is affected and amplified by its advancement. Information and communication technologies have helped us to build a far more complex network of relationships, both virtual and actual, global and local (Shaffer & Anundsen, 1993).

Besides the emancipation from spatial and time constraints, virtual communities may still differ from the traditional communities in many ways. One of the early researchers of online behavior, Sherry Turkle (1995), reported that those who lack confidence in face to face situations often lose their inhibitions
online and become more confident. She documented many cases of this phenomenon and, using her knowledge of psychotherapy, she explained how people explore new personas online in which they act-out facets of their personalities that are problematic in face to face situations. For example, people who are shy and find making relationships hard become bolder online because they do not have to face the person with whom they interact, and if the going gets tough they can switch their computer off.

These early observations have spurred numerous efforts to study online behavior. Researchers have looked at the effects of CMC by doing experimental and field studies in CSCW, social relationship, idea-generation, and group decision-making, among others.

One influential line of research to compare CMC against the benchmark of face-to-face communication argues that CMC has a limited bandwidth. The main components of this argument include social presence theory (Culnan & Markus, 1987), media richness theory (Daft & Lengel, 1986), and lack of social context cues hypothesis (Kiesler, Siegel, & McGuire, 1984).

Social presence is the feeling that other actors are jointly involved in communication interaction. It is defined as a quality of the communications medium itself, and affects the interpersonal relations of the communicators (Short, Williams, & Christie, 1976). CMC, with fewer nonverbal elements, is extremely low in social presence, which is argued to account for task orientation and impersonality of CMC (Culnan & Markus, 1987).
Similarly, media richness theory (Daft & Lengel, 1986) suggests that media differ on their bandwidth, or their capacity to deliver different cues. Face-to-face is touted as the richest medium, while CMC is a very lean channel, because nonverbal cues are absent. Communicators would match the richness of each available medium that may be used to the ambiguity of the intended message, in order to achieve optimal efficiency and effectiveness. Therefore CMC is considered as suitable for communicating simple and unequivocal messages.

Some researchers also argued that CMC suffers from a lack of social context information (Kiesler, Siegel, & McGuire, 1984). In plain text through electronic channels, people’s social status, power and prestige are not communicated contextually like the way physical surroundings and clothes communicate, nor dynamically, as the way gaze, touch, and facial expressions communicate. Communication is predicted to be more impersonal because the rapid exchange of text, the lack of social feedback, and the paucity of social context cues redirect attention away from others and toward the message itself (Kiesler, Siegel, & McGuire, 1984).

Social presence theory, media richness theory and the lack of social context cues approach can all be summarized as “cues-filtered-out” approach (Culnan & Markus, 1987). They all suggest that CMC is inherently a medium of limited bandwidth, and is good for giving and receiving information, opinions, and suggestions. CMC is less suited for communicating ambiguous messages or social-emotional tasks involving conflict and negotiation.
There is also more equality of participation in CMC than in face-to-face group interaction (Hiltz & Wellman, 1997). According to Sproull & Kiesler (1991), by reducing cues on hierarchical dominance and power information, social influence among communicators might become more equal and democratized. Moreover, CMC also removes one primary impediment of idea-generation in face-to-face interaction - production blocking (Valacich, Dennis, & Connolly, 1994). As turning-taking is effectively eliminated in CMC, communicators can contribute entries whenever they like, therefore more productive results can be anticipated.

However, field research has contested the above claims by showing evidences for substantial emotional support and relation formation online in both socially close and distant groups. Walther (1992) argues that text-based CMC differs from face-to-face interaction only on the rate of information transfer. It just takes CMC a great deal longer than face-to-face to accomplish the same level of social interaction. Given sufficient time, computer mediation should have very limited effect on relational communication, as social information accumulates and gets processed. Relationships developed and maintained online are much like the relationships formed off-line. Moreover, ties initially impersonal and instrumental can broaden out to be socially supportive, that is why participants often become increasingly attached to virtual communities (Hiltz & Wellman, 1997).

2.2 Learning Communities / Communities of Practice
Discussion has never stopped on the impact of Internet and virtual communities on our life. Although “we can't kiss anybody and nobody can punch you in the nose” (Rheingold, 1993), the potential offered by virtual communities can still be immense and gradually, indispensable to every person having access to them. According to Rheingold (1993), enormous leverage is made accessible to ordinary citizens at relatively little cost--intellectual leverage, social leverage, commercial leverage, and political leverage, among which the potential of knowledge building and sharing in virtual communities, and how to better understand and help release this potential, become the central focus of this thesis.

In recent years, computer-supported learning communities are constantly popping up and becoming ubiquitous in educational institutions worldwide. However, the concept of learning communities, at the same time, remains vaguely defined.

Hiltz and Turoff (2002) define what they call “learning networks” as groups of people who use the Internet and web to communicate and collaborate in order to build and share knowledge. A similar definition of learning communities is groups of people who investigate problems and share what they learn with others in the community, thus advancing both their individual knowledge and the community’s knowledge (Collins & Bielaczyc, 1997).

These definitions largely overlap and share the same theoretical foundations in learning theory. Rooted in behavioral psychology and information processing theory, traditional instructional design presumes that learning involves a process of
knowledge transmission. Epistemologically, knowledge is considered as an objective entity that can be codified and stored, and it is non-contextual in nature. However, this knowledge-as-object view and the transmissive model of education are far too inadequate to account for more creative and interactive learning other than simple acquisition of recognized knowledge (Jonassen, Hernandez-Serrano, & Choi, 2000).

Built on several different theories, constructivist conceptions of learning have developed and gained popularity as compared to the traditional model. Constructivists argue that learning is primarily a process of meaning making, instead of knowledge transmission. Knowledge is not considered as an objective entity acquired from someone else, but personally or socially constructed by the meaning-makers. Meaning-making is a process of social negotiation among participants in an activity, and falls under the influence of communities of discourse and practice (Jonassen, Hernandez-Serrano, & Choi, 2000). Hence, groups, organizations, and schools are knowledge creating and sharing communities. Knowledge resides in the dialogue between individuals, the social relationships binding them, and the physical artifacts they use and produce in the dynamic process.

The constructivist conceptions of learning have significant implications in instructional design and ICT use. Instead of using ICT for data storage or delivery only, the real potential of ICT is unleashed to create collaborative social networks, through which multiple members share, collaborate and co-construct
community-based knowledge. Those learning communities facilitate not only one-to-one exchange, but many to many sharing and collaboration.

Learning communities are created and nurtured for extensive educational purposes. Their applications can be found in distance learning programs, online college courses, and also as an important supplement to traditional classroom learning. The online communication and collaboration tools may include distribution list, online forum, Group Decision Support System (GDSS), instant messaging service, etc.

Similar theory and practice appear in organizations, where the notion of knowledge management attracts considerable attention lately. In the past few years, there has been a growing interest in treating knowledge as a significant organizational resource. This knowledge is embedded in and carried through organizational culture, identity, routines, policies, systems, as well as individual employees (Alavi & Leidner, 2001). Though an intrinsically ambiguous term, knowledge can be generally divided as tacit and explicit. According to the Socialization – Externalization – Combination – Internalization (SECI) framework developed by Nonaka and Konno (1998), there are four processes of knowledge creation and conversion: tacit/tacit through socialization; tacit/explicit through externalization; explicit/tacit through internalization; and explicit/explicit through combination.

As a result, in order to create and share knowledge, communities of practice are established and maintained far and wide within knowledge-intensive
organizations. Wenger (1998) defines communities of practice with three dimensions:

What it is about—it is a joint enterprise as understood and continually renegotiated by its members

How it functions—mutual engagement that bind members together into a social entity

What capability it has produced—the shared repertoire of communal resources (routines, sensibilities, artifacts, vocabulary, styles, etc.) that members have developed over time.

Just like learning community in the educational setting, virtual communities of practice are enabled by online interactive technologies, and have become a widely used knowledge management tool in various corporations worldwide (Ardichvili, Page, and Wentling, 2003). Sharing a similar objective with learning communities, communities of practice aims at developing members’ capabilities to build and exchange knowledge, through voluntary participation, and reinforce and renew themselves as they generate knowledge (Wenger and Snyder, 2000).

Summarizing all the generally similar while slightly different definitions brought forward by educators and management scientists at large, in the present study we adopt the definition suggested by Brown and Campione (1990): A learning community is defined as a group of individuals who engage in discourse for the purpose of advancing the knowledge of a collective.
2.3 Motivational Perspectives in Virtual Learning Communities

To set up virtual learning communities, or communities of practice, however, is only the first step of the knowledge-sharing process. Whether they can function in accordance with designers’ intention is a totally different story. For companies and educational institutions, they usually start with the implementation of technological capabilities, and only after this early step do they realize how vital the people factors are. Many organizations expended incalculable efforts in an attempt to promote the sharing of expertise and nevertheless achieved very little success. A survey of 431 U.S. and European firms by Ernst & Young found that only 13 percent of the respondents thought they were doing a good job at transferring knowledge held by one part of the firm to others in the same organization (Ruggles, 1998). By sharp contrast, the same survey revealed that changing people’s behavior (56%) topped the list of biggest difficulties facing knowledge management practice.

As encouraging people’s information sharing behavior proves instrumental to the success of any knowledge sharing communities in either corporate or educational realms, these concerns point to a significant research opportunity to investigate the reasons of people’s propensity, as well as reluctance, to participate in such communities. To date, there are various studies conducted on this subject, theoretically and empirically, among which some representative studies will be reviewed in the following.
2.3.1 Intrinsic and extrinsic motivations

To date, there is plenty of literature dedicated to studies on human motivation, i.e., the impetus or inspiration to act. Among numerous efforts to categorize motivation, the most basic attempt is to distinguish between intrinsic and extrinsic types of motivation. The distinction between them, though often difficult to delineate precisely, has shed important light on human development studies, educational practice, and organizational behavior.

Educational psychologists are among the pioneers to present universal definitions for the two types of motivations in the Self-Determination Theory (Ryan & Deci, 1998). Intrinsic motivation is defined as the doing of an activity for its inherent satisfactions rather than for some separable consequence. When intrinsically motivated a person is moved to act for the fun or challenge entailed rather than stimulated by external sanctions or rewards. The basic innate needs people seek to fulfill are for competence, autonomy, and relatedness. On the contrary, extrinsic motivation is a construct that pertains whenever an activity is done in order to attain some separable outcome. However, unlike some perspectives that view extrinsically motivated behavior as invariantly nonautonomous, Self Determination Theory proposes that extrinsic motivation can vary greatly in the degree to which it is autonomous. For example, in the current context, an employee who contributes regularly to the knowledge-sharing community in his organization only because he fears possible sanctions for not doing so is extrinsically motivated because he is doing something in order to attain
the separable outcome of avoiding sanctions. Similarly, an employee who contribute to the organizational information commons because she personally believes it is valuable for her development of expertise is also extrinsically motivated because she too is doing it for its instrumental value rather than because she finds it interesting. Both examples involve instrumentalities, yet the latter case entails personal endorsement and a feeling of choice, whereas the former involves mere compliance with an external control.

Ryan and Deci (1998) further explicated the construct of extrinsic motivation by introducing different degrees of autonomy, as illustrated in Figure 1. At the far left is amotivation, which is the state of lacking an intention to act. To the right of amotivation, is a category that represents the least autonomous forms of extrinsic motivation, a category labeled external regulation. Such behaviors are performed to satisfy an external demand or obtain an externally imposed reward contingency. Individuals typically experience externally regulated behavior as controlled or alienated, like the employee who participates out of the fear of sanctions. A second type of extrinsic motivation is introjected regulation. Introjection describes a type of internal regulation that is still quite controlling because people perform such actions with the feeling of pressure in order to avoid guilt or anxiety or to attain ego-enhancements or pride. Although the regulation is internal to the person, introjected behaviors are not experienced as fully part of the self. A more autonomous form of extrinsic motivation is regulation through identification. Here, the person has identified with the personal importance of a
behavior and has thus accepted its regulation as his or her own. Finally, the most autonomous form of extrinsic motivation is integrated regulation. Integration occurs when identified regulations have been fully assimilated to the self. This occurs through self-examination and bringing new regulations into congruence with one’s other values and needs. The more one internalizes the reasons for an action and assimilates them to the self, the more one’s extrinsically motivated actions become self-determined. At the far right hand end of the figure is intrinsic motivation, which is regarded as a prototype of self-determined activity. Yet, this does not imply that as extrinsic regulations become more internalized they are transformed into intrinsic motivation. Integrated regulations are still extrinsic because behavior is done for its presumed instrumental value with respect to some outcome that is separate from the behavior, even though it is volitional and endorsed by the self.

The formulation that these different types of motivation do indeed lie along a continuum of relative autonomy was testified by Ryan and Connell (1989, as cited in Ryan & Deci, 1998). They also found that differences in attitudes and adjustment were also associated with the different types of extrinsic motivation. For example, the more students are externally regulated the less they showed interest, value, or effort, and the more they indicate a tendency to blame others, such as the teacher, for negative outcomes. Subsequent studies (e.g., Connell & Wellborn, 1990, Miserandino, 1996, Vallerand & Bissonnette, 1992, Grolnick & Ryan, 1987, and Sheldon & Kasser, 1995, as cited in Ryan & Deci, 1998) have
extended these findings concerning types of extrinsic motivation, showing for example that more autonomous extrinsic motivation is associated with greater engagement, better performance, less dropping out rate, higher quality learning, and greater psychological well-being for students.
Figure 1 A Taxonomy of Human Motivation
(Ryan & Deci, 1998)
To sum up, intrinsically motivated behaviors, which are performed out of interest and satisfy the innate psychological needs for competence and autonomy are the prototype of self-determined behavior. Extrinsically motivated behaviors—those that are executed because they are instrumental to some separable consequence—can vary in the extent to which they represent self-determination. Internalization and integration are the processes through which extrinsically motivated behaviors become more self-determined. As these types of motivation lie along a continuum of autonomy, no distinct demarcation could be imposed. As they discovered that as social contextual conditions that support one’s feelings of competence, autonomy, and relatedness are the basis for one maintaining intrinsic motivation and becoming more self-determined with respect to extrinsic motivation, the facilitation of more self-determined learning requires classroom conditions that allow satisfaction of these three basic human needs as one is exposed to new ideas and exercises new skills.

Slightly modified definition was proposed in accordance with an organizational context. In their study of motivation and knowledge transfer in organizations, Osterloh and Frey (2000) conceptualized employees’ intrinsic and extrinsic motivation mainly on the basis of economic and organizational theories. Employees are extrinsically motivated if they are able to satisfy their needs indirectly, especially through monetary compensation. Money is a goal which provides satisfaction independent of the actual activity itself. For extrinsically motivated people, the ideal incentive system is strict pay-for-performance.
By contrast, motivation is intrinsic if an activity is undertaken for one’s immediate need satisfaction (Osterloh & Frey, 2000). The ideal incentive system is in the work content itself, which must be satisfactory and fulfilling for the employees. They emphasize intrinsic motivation in the form of identification with the firm’s strategic goals, shared purposes, and the fulfillment of norms for its own sake. They consider intrinsic motivation to be an undisputed organizational advantage because it lowers transaction cost and raises trust and social capital.

Compared with Self Determination Theory by Ryan and Deci (1998), the present definition is more lenient in characterizing what is considered “intrinsic” and “extrinsic”. Instead of stressing on “separable outcome”, they emphasized the directness and immediacy for people to reach their goals through certain behavior. In an organizational context, only rewards or sanctions are considered as extrinsic. Here, the intrinsic motivation not only refers to the inherent satisfaction and fulfillment from the work itself, but also includes part of the components that classified as extrinsic by Ryan and Deci (1998), e.g. identification with firm’s strategic goals, shared purposes, and shared norms.

In our study of virtual learning communities, the second definition of intrinsic and extrinsic motivation is adopted to classify all types of reasons of knowledge contribution. It provides an operational and less stringent scheme to identify both motivations, and is relatively easy for the subjects to self-report their motivation. Though it does not follow strictly the definition set forth by Ryan and Deci (1998), the current categorization still complies with the classic continuum
of relative autonomy. Since it draws upon organization theory, this definition is also proved suitable for the context under investigation - the virtual community as a social system.

2.3.2 Communication dilemmas in sharing discretionary information

Shared databases, including data warehouses and expert repositories, are becoming inextricable of organizational communication systems. Users benefit from shared databases by accessing information stored at a commonly recognized location. However, difficulties arise as users must stock the database with discretionary information, which is defined as “initially under the control of one organizational member, who can choose whether or not to make it available to others” (Connolly & Thorn, 1990, p.219). Laboratory experiments demonstrated that when users are provided free access to the database regardless of their contribution, there tend to be undersupplied discretionary information in shared databases. This phenomenon is consistent with other problems associated with “public goods”.

Several researchers have made important extensions of the classical economic theory of public goods to interactive communication systems. Two key public communication goods - connectivity and communality - are identified (Fulk, Flanagin, Kalman, Monge, & Ryan, 1996). Connectivity fulfills one of the most basic functions of communication – to link members together, while communality links members through commonly held information. Communality
is the true public good underlying discretionary databases.

Public goods are characterized by both jointness of supply and impossibility of exclusion. For interactive communication systems, jointness of supply stipulates that one person’s consumption of communal information does not reduce the amount available to anyone else, while impossibility of exclusion provides non-discriminate access to people who wish to consume the information. However, people by nature are tempted to opt for a “free ride” in the interest of individual gain. They may enjoy the benefits of communal information without contributing to the discretionary database, despite the risk that others may follow suit, resulting in either over-consumption or undersupply of public goods, and sometimes both.

Under some circumstances, there are several ways to resolve the undersupply problem in shared databases. One strategy is to make database contribution mandatory, which is often difficult to implement in real life settings. Another way is to reward people for the quantity of participation, often with the inevitable side effect of encouraging lesser quality of information. In any attempt to resolve the communication dilemma in shared databases, managers seem to be ultimately at a disadvantage, because unlike other traditional factors of production, knowledge is a resource that cannot be forced out of people.

Social dilemmas are generally known as situations in which interests of the collective are tampered by the rational behavior of its members in pursuit of personal gains. They underlie a number of common problems, including social
loafing and information hoarding. Communication dilemmas exist whenever the organization’s interests demand that people share discretionary information, but their individual interest motivate them to withhold it (Kalman, Monge, Fulk, & Heino, 2002). People may fear negative consequences, or simply lack sufficient motivation to offset the cost of sharing.

Kalman, Monge, Fulk and Heino (2002) have developed an expectancy model in the study of people’s motivation to contribute discretionary information in a database-mediated collaboration, which shares the same feature of virtual learning community—voluntary participation. In expectancy theory, motivation is predicted by the multiplicative product of (a) the anticipated value of the outcome a person expects to occur from contributing and (b) the strength of the person’s belief these outcomes are likely to occur (Vroom, 1964, as cited in Kalman, Monge, Fulk and Heino, 2002). They extended expectancy theory to discretionary databases and further proposed that motivation is the product of organizational commitment and the expectation of organizational gain.

Organizational commitment (OC) is defined as identification and involvement with an organization. It involves three facets: a) desire to remain a member of the organization, b) concern for the organization’s welfare, and c) willingness to extend extra effort on the organization’s behalf.

Organizational gain is the strength of a person’s belief that individual performance, such as contributing discretionary information, produces gain to the whole organization. It is again decomposed to three components.
Motivation = $OC \times (OI \times CnE \times ISE)$

(a) Organizational instrumentality (OI), an instrumentality that links successful collective information sharing to broader organizational gain.

(b) Connective efficacy (CnE), an expectation that information contributed to the database will reach other members of the collective; it reflects the belief held by a person regarding the likelihood that his or her own contributions will find a receptive audience.

(c) Information self-efficacy (ISE), the self-perceived value of a contributor’s information to other database users.

Empirical evidences showed that the predictors in this model accounted for more than 50% of total variance in motivation. This research demonstrated that organizational commitment and expected outcomes can motivate people to contribute discretionary information, thus providing a resolution for communication dilemmas.

However, behavioral intention, instead of actual behavior, was chosen as the dependent variable in this study. Despite the fact that current behavioral intention is an indicator of future information system use, we are unable to extrapolate the correlation between the proposed model of motivation and contribution of discretionary information based on the results of this study. The link between behavioral intention and actual behavior was left to be established and tested.
2.3.3 Motivations and barriers to participation in virtual communities of practice

Several past studies have made explorations on the motivations and barriers to participation in communities of practice in organizational settings, often by empirical research carried out in real organizations. These studies, employing qualitative and open-ended methods, offer a richness of data and have laid foundations for further quantitative explorations on causes and effects.

Wasko and Faraj (2000) have summarized and compared three perspectives on knowledge. The first perspective views knowledge as an object, defined as “justified true belief” which exists independent of human action and perception (Nonaka, 1994). Knowledge is to be codified and stored in knowledge repositories of the organization. As such, knowledge is assumed as a structural asset owned by the organization, and people are motivated to contribute knowledge out of self-interest. When knowledge is considered a private good, it can be appropriated by the organization and be exchanged for another commodity. To promote knowledge exchange, organizations offer extrinsic rewards like bonus and financial rewards to the employees.

The second perspective views knowledge as something embedded in people. Knowledge is highly difficult to share, because it is inseparable from its owner, and only meaningful to those who are already knowledgeable. Identification of experts and one-to-one interaction are thus indispensable to transfer tacit knowledge. As knowledge is also considered a private good owned by the individual rather than owned by the organization, contributions are motivated by
intangible returns like reputation, status, and obligation.

Apart from the two traditional perspectives on knowledge, a fresher perspective emphasizes on community, with knowledge management system aiming to support communities of practice. Organizations can be understood as a cluster of overlapping communities of practice, with each community developing its own language, shared narratives and memories. This “knowledge embedded in community” view suggests that knowledge is highly context dependent, and as a public good, knowledge is socially generated, maintained, and transferred within communities of practice. Any attempt to capture knowledge should leverage people’s desire to engage in a community. Motivations to participate include generalized reciprocity, self-actualization and access to a community.

Corresponding to the different conceptualizations of knowledge, the underlying reasons why people exchange knowledge are fundamentally different across these perspectives. If the motivation to exchange knowledge is primarily economic and out of self-interest, people behave through market mechanisms in order to seek tangible and intangible returns. Tangible returns include access to useful information and expertise, answers to specific questions, and personal gain. Intangible returns encompass intrinsic satisfaction and self-esteem. By contrast, when knowledge is considered a public good, rather than following the ration choice to free ride, people may also be motivated by non-economic reasons like community interest and moral obligation. People behave altruistically and pro-socially, making contribution without expecting direct commensurate
benefits.

Wasko and Faraj (2000) conducted an open-ended survey to participants of three technical communities in Usenet newsgroups, to address the question of why people contribute time and effort to the provision of knowledge as a public good despite the rational inclination to act out of self-interest. The technique of content analysis was chosen to capture the underlying motivations of contribution without imposing a pre-determined theoretical structure.

The qualitative data collected fall into prominent categories: tangible returns, intangible returns, and community interest. Some people contribute to the knowledge community specifically to generate tangible returns. These may include access to useful information and expertise, answers to specific questions, and personal gain like enhancement of standing in this profession or even job offers. Alternatively, some people are motivated by intangible returns in the forms of intrinsic satisfaction, confidence in their expertise, and self-actualization. The majority have demonstrated motivation of the third category: the desire to be involved in a community of practice. People are participating in order to exchange knowledge pertaining to practice, and they value the exchange of practice related knowledge within a community of like minded members. Moral obligations or perceived generalized reciprocity also motivate people to contribute knowledge, resulting in pro-social and altruistic behaviors.

Besides motivations, barriers to participation in knowledge communities are also presented in the study. One apparent reason people don’t participate is
that they are not confident about their level of expertise. Nevertheless, even if they have the knowledge, people may choose to withhold it if they do not like the information seeker due to their laziness, big ego, or other unwelcomed manners. Time constraint and size of the community are also perceived as barriers, since people can only devote limited energy to follow the thread and participate, especially when the community grows very sizable.

Ardichivili, Page and Wentling (2003) have conducted another qualitative research of motivations and barriers to participation in virtual knowledge-sharing communities of practice. They did in-depth case studies of three communities of practice in a large multinational corporation. Semi-structured interviews were conducted to 30 members of virtual CoP, including managers of three communities, community experts, community members, and managers in administrative units responsible for managing and supporting the knowledge network.

The findings suggest that the majority of interviewees view their knowledge as a public good owned by the organization, instead of the individual. Given the “knowledge-as-public-good” perception, people are motivated to contribute knowledge by moral obligation and community interest. The moral obligation goes to the organization as a whole as well as the professional community. Another set of motivations for knowledge exchange is self-based considerations, including the need to establish themselves as experts, and the obligation to share their knowledge and mentor novices in the community.
They also examined the barriers preventing people from contributing knowledge to communities of practice. Surprisingly, the frequently cited reason of “information hoarding” is not recognized as a major barrier of knowledge exchange. The majority of people are reluctant to share knowledge because they are afraid that what they post to the community is unimportant, not completely accurate, or even misleading for other members. Many users fear possible criticisms or comments belittling their contribution. Some are concerned that questions they post might be considered something they should already know.

The reviewed two studies were all conducted in virtual communities of practice. Qualitative methods, namely open-ended survey and interview, were employed to capture the details without presupposing any conceptual structure. The findings are quite similar, despite slightly different categorizations of motivations. “Knowledge-as-public-good” view or community interest tops the list of motivations to participation, while lack of confidence on expertise, among other barriers, is mentioned by the majority of interviewees. However, it is also noteworthy that the divergence on contexts for these selected communities may reflect on the motivational factors and pattern of participation. For the Usenet technical communities examined in the first study, the widely-agreed cultural norms, which expect help-seekers to go over the manuals or repository before any question is posted, is observed to be a factor putting off knowledge contributions. As for the second study where organizational culture is supportive for knowledge sharing, employees generally accept the “public good” idea.
The above two studies found that fear of face-losing or letting down colleagues, rather than “information hoarding”, are among the major barriers. These factors, to some extent, coincide with the findings of previous research on productivity loss in idea-generating groups. Though apparently dissimilar in their function, idea-generation groups share two important traits with virtual knowledge communities, as they are fundamentally “social” (since social dynamic processes are involved) and the productivity of these groups all require members’ contribution. Three factors were proposed to explain the failure of idea-generation groups: (1) evaluation apprehension (group members may not express some ideas because they worry about what others think); (2) free-riding or social loafing (compared with working alone, individuals in groups do not feel as accountable for producing ideas, so they devote less effort); and (3) production blocking (compared with working alone, individuals’ idea generation is "blocked" while they wait their turn to talk, and listening to others hampers thinking) (Diehl & Stroebe, 1987). In virtual knowledge communities, though the last barrier is claimed to be successfully eliminated by means of communication technology, evaluation apprehension and social-loafing are still rampant in spite of the advanced communication medium.

The question why people do not participate in knowledge communities, rather than their motivations to do so, has become the main focus of some studies. When answering why organizations don’t “know what they know”, Hinds and Pfeffer (2002) propose that cognitive and motivational limitations are the main
reasons. Motivational limitations include competition and status hierarchies. Individual’s relationship to the organization is also an important factor, as information sharing is likely to occur when individual’s claims to be stakeholders are recognized by the organization.

Nonnecke and Preece (2001) are among the pioneers to systematically study lurkers and the reasons of lurking in online communities at large. Lurkers, defined as people who post to the community infrequently or not at all, constitute the often unnoticed yet sizeable “silent majority” in almost every community online. Lurkers are characterized in various ways, such as not confident in their competence to post to the public, exhibiting the kind of passivity commonly associated with television viewers, and free riding. However, observations also show that lurkers in one community might be active participants in another. Even they are constantly lurking, these people may not remain silent in one-to-one communications with other members, and their messages can be very supportive (Katz, 1998).

In their explorative study on why lurkers lurk, Nonnecke and Preece (2001) summarized the major reasons from in-depth interviews to online lurkers. Member characteristics include: 1) personal reasons, such as “want to preserve privacy”, “shy about posting publicly”, difficulty with English language, and etc; 2) relationship to the group, such as “still learning about the group”, “have nothing to offer”, and lack of expertise; 3) intention from outset, including “never intended to post at the beginning”, “no specific need to post”, “not motivated to
post”, and the desire to reduce involvement/commitment. The second category is
group characteristics, reasons belonging to which may include either low or high
volume of messages, poor quality of messages, lack of responses to questions,
poor user interface, and etc. Lurkers may also wish to remain silent when they are
leaving or just joining the group, and external constraints like insufficient time
also play a part in inducing lurking behaviors.

2.4 Anonymity and its Impact on Virtual Learning Communities

The ability to be anonymous is a distinctive feature enabled, and in other
cases, greatly enhanced by advanced information communication technologies.
The advent of new ICTs has increasingly raised various concerns on anonymity in
relation to online privacy, surveillance, policy regulation, interpersonal relations,
and behavioral patterns (Teich, Frankel, Kling, & Lee, 1999).

Efforts have been made to delineate the conceptual landscape of anonymity
and identifiability in contemporary settings. Naturally, people understand
anonymity as remaining nameless, and to conduct oneself without revealing one’s
name (Nissenbaum, 1999). However, anonymity is argued to be a polar value of a
broad dimension of identifiability and non-identifiability. Marx (1999) has
proposed seven types of identity knowledge: (1) legal name, (2) locatability, (3)
pseudonyms that can be linked to legal name and/or locatability–literally a form
of pseudo-anonymity, (4) pseudonyms that cannot be linked to other forms of
identity knowledge–the equivalent of “real” anonymity (except that the name
chosen may hint at some aspects of “real” identity), (5) pattern knowledge – the person’s distinctive appearance or behavior patterns, (6) social categorization, as many sources of identity are social and do not differentiate the individual from others sharing them (e.g., gender, sexual orientation, health status, employment), and (7) symbols of eligibility/noneligibility, as identification may involve certification in which the possession of knowledge (secret passwords, codes) or artifacts (tickets, badges, uniforms) or skills (performances such as the ability to swim) labels one as a particular kind of person. To be fully anonymous means that a person cannot be identified according to any of the seven dimensions of identity knowledge.

In studies of CMC reviewed earlier, some scholars argued that in most communication media (such as text-based interaction via computers) non-verbal behavior and social contextual cues are absent (Sproull & Kiesler, 1991). Restricted bandwidth thus removes information that we normally have in face-to-face interaction. For this reason all types of text-based CMC are often characterized as being relatively anonymous (Postmes & Lea, 2000). Again, anonymity, as a broader variable, should be recognized as a spectrum of values rather than a simple “Yes or No” concept. Nevertheless, for control purpose, the notion of anonymity tested in this study refers strictly to its literal meaning, which is a technical characteristic provided by the system to conceal the real name of the message sender in the process of communication.

The lack of identifiability may have an impact on the communication and
people’s behavior in virtual communities. According to Sproull and Kiesler (1991), one positive outcome of the inability to present socio-emotive cues, however, is that CMC democratizes relationships. CMC has a significant social impact on organizational hierarchy. A relative lack of social cues due to the anonymity and depersonalization of CMC liberates individuals from rigid and hierarchical systems and can change group dynamics. In face-to-face interaction, there is a strong correlation between social hierarchy and the amount of participation in an organizational meeting with, for example, managers speaking much more than their subordinates. The relative lack of social status cues renders electronic communication more democratic, providing a "voice for the voiceless" as people forget their social position, appearance, age, race and even gender. In addition, the absence of social barriers makes people express themselves more openly (Shaffer & Anundsen, 1993).

Apart from the anonimitizing trait of CMC, an extensive body of literature has studied actual anonymity in relation to behavior and performance, both online and offline, under various circumstances. Falling prey to contextual factors, the observed effects of anonymity in these empirical studies may differ dramatically from one another, sometimes even demonstrating contradictory directions of its impact. On the one hand, anonymity decreases conformance pressure for the participants in a group setting and allows participation based on content of communication rather than the source that generated that communication. On the other hand, anonymity has the potential to cause social-loafing whereby some
members of the group rely on others to accomplish the task (El-Shinnawy & Vinze, 1998). For example, some researchers find that anonymity facilitates the origination of more solutions and comments, in comparison to groups where the identity is revealed (Connolly, Jessup & Valacich, 1990), while in other studies, low participation is observed under anonymous condition (Ahern & Durrington, 1995).

Applying the findings of these studies, interactive communication systems have been developed to suit organizational and educational needs. For example, Group Decision-Making Systems (GDSS) and idea-generation environments are widely introduced in business realm, with anonymity function enabled. In classroom, innovative interfaces such as Classroom Feedback System (CFS) are designed to promote student-instructor interaction\(^2\) (Anderson, Anderson, VanDeGrift, Wolfman, & Yasuhara, 2003). In this case, the anonymity function serves a decisive role to break up socio-psychological hurdles that used to make classroom participation notoriously difficult.

The exciting change brought by anonymity encourages its further extension to a prevailing form of communication-virtual learning communities, with the support from relevant theoretical and empirical evidences. First, anonymity may affect the motivations to participation in the virtual learning community.

\(^2\) The Classroom Feedback System (CFS) is a computer-mediated feedback system to promote student initiated interaction. Students view lecture slides on the classroom display and on their wireless devices, and the instructor controls the presentation from her own device. Students can annotate any point on a slide with feedback from a preset list selected by the instructor (e.g., MORE EXPLANATION, GOT IT). CFS anonymizes feedback before displaying it to the instructor within slide context. CFS is novel in empowering students to provide simple yet descriptive feedback on their own initiative, and through empirical testing, it is proved to successfully promote student-instructor interaction in classroom (Anderson, Anderson, VanDeGrift, Wolfman, & Yasuhara, 2003).
Self-based considerations poses an important component of people’s motivation, including tangible returns like personal gain or reward if the teacher/knowledge moderator adopts a reward system, and intangible returns like self-esteem, all of which will be difficult to redeem if the person is unidentifiable.

In the motivational model to solve communication dilemmas in database-mediated communication, it is also suggested that anonymity may also affect the connective efficacy, and then have an impact on the motivation to share discretionary information (Kalman, Monge, Fulk, & Heino, 2002). If the contributors are identifiable in the database, then high-status users or individuals with reputations for high task-relevant expertise will likely feel more confident that contributions will gain positive attention than other holding lesser status or reputations. In contrast, when the database provides anonymity, connective efficacy may have less to do with user status or reputation.

Still evidences are found in the study of major barriers to participation in virtual learning community. Even when individuals give the highest priority to the interests of the organization and of their community, they tend to shy away from contributing knowledge for a variety of reasons. Specially, people in a learning community or community of practice hesitate to contribute out of fear of face losing, or of misleading the community members (Ardichvili, Page, and Wentling, 2003). If anonymity is ensured for the message sender, the feared consequence will not prevent individuals from making contributions which they are not very confident about.
However, cautions should be taken when interpreting the results or making new hypotheses on the impact of anonymity, which is, apparently, implied as an affordance of the interface, before an important conceptual distinction is made between real and perceived affordances. The term “affordance” was first coined by the perceptual psychologist J.J. Gibson to refer to the actionable properties between the world and an actor (a person or animal) (Gibson, 1979). The affordances are what the environment offers the animal, what it provides or furnishes. Defined in this way, affordances are objective in that their existence does not depend on the value, meaning, or interpretation of the actor.

The concept of affordance was popularized in the HCI community ever since the seminal book “The Psychology of Everyday Things” (POET) by Donald Norman (1988), who loosely defined affordance as “perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could be used” (p.9). Norman’s definition of “affordance”, originated but deviating from Gibson’s, virtually led to ambiguity in understanding and ignited heated discussion on the calibration of the term (McGrenere & Ho, 2000). Upon further clarification in 1999, Norman reaffirmed that his “affordance” is referred to perceived affordances, which are perceived properties that may or may not actually exist. Perceived or cognitive affordances are only suggestions or visual clues as to how to use the objects, rather than reliable projections of the real or physical affordances. In that sense, real and perceived affordances are orthogonally different, with perceived affordance
having an important, or even starring role in interaction design.

Relating to the studies on anonymity, it is vital to distinguish real anonymity—the property that an interface could offer—with perceived anonymity—the suggestions and clues from the interface. As a matter of fact, it is the cognitive possibility of being anonymous that influences people’s behavior, with or without actual anonymity enabled by the interface. Therefore, through the manipulation of perceived anonymity, designers can improve the usability of the interface or adjust user behavior in tandem with various situational variables.

2.5 The Research Questions

The above reviewed theories and empirical studies constitute a conceptual framework on motivational factors and anonymity in virtual learning communities. These studies have suggested the major motivation and disincentives to contribution to an information commons. However, they either proposed a model predicting behavioral intention, or merely explored the motivations and barriers by collecting qualitative data. These studies all failed to quantitatively analyze the relationship between motivational factors and actual behavior. Also all the above motivational studies are done in communities of practice in corporations. Although learning community in educational settings share most of the characteristics with communities of practice, there are relatively few research done in this field. Whether the motivations and disincentive discovered in organizational setting can apply to educational settings as well remains largely
unexplored.

The impact of anonymity is never neglected in the discussion of CMC and virtual learning communities. Theoretical postulations have been made to associate anonymity to its various effects on motivational factors and behavior. Yet so far very few studies have actually tested the effect of anonymity on motivational factor as well as participation in a knowledge community. This study aims to fill the gap through a quantitative case study by answering the following research questions:

RQ1. What are people’s motivations and barriers to participation in virtual learning community?

RQ2. Does anonymity have an impact on people’s participation?

RQ3. How does anonymity interplay with other variables, especially motivational factors?

RQ4. How can we manipulate anonymity to enhance participation in virtual learning community?
Chapter 3 Methodology

3.1 The Research Setting

This case study, using multiple data collection and analyses techniques, was conducted in the Integrated Virtual Learning Environment (IVLE) of National University of Singapore (NUS), one of the leading tertiary education institutions in Singapore and Asia Pacific.

In 1997, to recognize Internet’s unique potential to revolutionize teaching, NUS launched IVLE, enabling over 30,000 students and faculty to communicate and share coursework and information from anywhere with Internet access("NUS case study on virtual learning", 2004). Up till the time of this study, IVLE was upgraded to its seventh version. It has become a powerful learning management system and an online extension of teaching and student interaction.

For every module taught at NUS, IVLE enables the lecturer or module coordinator to easily build an individualized module website. They can choose to incorporate a wide array of functions to the website, including threaded discussion forum, chat room, online quizzes, courseware download, lesson plan, course videos,…etc.

Among all these functions, this study focused on discussion forum only because it is the major tool in creating the virtual learning community. In corporate settings, forum or electronic mailing list is reported as the main seedbed to spawn and sustain virtual communities of practices. Particularly, the IVLE
forum enabled the forum manager to manipulate the level of exposure of every message sender. The forum manager can choose to display the poster’s real name, nick name, or make it completely anonymous. If granted by the forum manager, the poster may also have the option to choose his/her own preferred level of exposure.

This case study chose an undergraduate module website as the object of study. Participants were 101 undergraduates enrolled in the module “E-learning”. They were either at their second year or third year, with an overwhelming majority majoring in social sciences and a minority majoring in computer science or information systems (from respondents who completed the survey, there were only 2 students from school of computing, with the rest all from social sciences).

In order to moderately motivate the subjects to participate, they were informed at the beginning of the semester that forum participation would make 5% of their final grade for this module.

3.2 Research Design and Data Collection

This study seeks to understand the relationship between participation in virtual learning communities and anonymity as well as motivational factors. A quantitative method was selected over a qualitative one. Quantitative methods are generally considered more apt to establish and test the linkages between causes and effects (Sarantakos, 1993). Though qualitative methods are also widely employed in social and management research, for example, the qualitative study
to discover motivations and barriers in a virtual knowledge-sharing community (Ardichvili, Page & Wentling, 2003), to explore the unknown or to identify structural trends was well beyond the scope of this study.

This study was designed as a field experiment, for experimental design is well accepted as one of the most rigorous research designs to illuminate causal inference for social science research (Shadish, Cook, & Campbell, 2002). Apart from disciplines like behavior science and psychology where experiment is arguably one of the most established methods, it is also widely adopted by researchers in communication studies and Human-Computer Interaction (HCI) because of its superiority in identifying causal relationships. One example is the experimental study on media equation by Reeves and Nass. In their case, experiment was acclaimed as an indispensable method since their major discovery was against common beliefs on media perception, and would not have been made possible if other methods had been employed in the place of experiment (Reeves & Nass, 1996).

The true experiment requires the researcher to have full control over the scheduling of experimental stimuli, in this case, to randomly assign subjects into experiment and control groups, while making all the conditions (e.g., module content, instructor, time series of participation, past experience with IVLE…etc) exactly the same except for the exposure to the treatment. However, in most natural social settings like the case of this study, full experimental control is nearly impossible to achieve (Campbell, Stanley, & Gage, 1966). Hence this study
was designed as a quasi-experiment rather than a true one.

Though a few of the many variables involved in the study were beyond control, I tried to eliminate plausible alternative explanations for the treatment effect by implementing a one-group repeated-treatment design, which is often used in behavioral researchers in psychology, perhaps because it meets a basic criterion for quality research: reproducibility (Shadish, Cook, & Campbell, 2002). As its name indicates, repeated-treatment design attempts to improve the internal validity by presenting the treatment more than once, provided that the treatment must be one that can be withdrawn and has transient effects over the outcome (Shadish, Cook, & Campbell, 2002). Repeated-treatment design is suitable for this study as the manipulated variable – anonymity can be removed without confounding the direction of effects.

<table>
<thead>
<tr>
<th>Period</th>
<th>Duration</th>
<th>Mode of forum</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-I</td>
<td>4 weeks (Jan 5 – Feb 1, 2004)</td>
<td>Real name</td>
</tr>
<tr>
<td>A-I</td>
<td>3 weeks (Feb 2 – Feb 22, 2004)</td>
<td>Anonymous</td>
</tr>
<tr>
<td>R-II</td>
<td>3 weeks (Feb 23 – Mar 14, 2004)</td>
<td>Real name</td>
</tr>
<tr>
<td>A-II</td>
<td>4 weeks (Mar 14 – Apr 11, 2004)</td>
<td>Anonymous</td>
</tr>
</tbody>
</table>

The treatment was introduced twice in this study. As shown in table 1, through the first four weeks, the forum displayed the poster’s real name; from the 5th to the 7th week, it was transformed into an anonymous forum; from week 8th to 10th, it displayed real name again, and was again transformed to anonymous
forum from week 11\textsuperscript{th} to week 14\textsuperscript{th}. As the manager of this IVLE forum, the researcher switched the mode of forum display in IVLE at the end of each experimental period. All the entries of the forum during these periods were recorded automatically by the IVLE system, with the real name of every poster, even if the message may be posted during anonymous periods.

To induce and gauge the exact impact of anonymity on participation, measures were taken to ensure that the perceived affordance (anonymity) matches the real one. At the beginning of the experiment, students were informed of the experimental schedule, i.e. four periods with different mode of communication. At the commencement of each period (except the first one), an announcement was sent to every student logging into IVLE. Besides, students were informed through another announcement that they remain anonymous on the instructor’s interface as well as on the student’s interface during anonymous periods, hence messages posted in A-I and A-II could not be acknowledged and accumulated as part of their assessment.

In order to eliminate possible interference to the experiment, the lecturer and the tutor did not post any messages to the forum unless there was a need to do so, e.g., to post announcements or replies to queries directed to them. These entries were removed from data analysis after the experiment. Meanwhile, other variables were kept unchanged as much as possible.

A questionnaire survey was created on the basis of previous studies. In the pilot test at the beginning of the experiment, I included open-ended questions
along with close-ended items and multiple choices. Afterwards, the questionnaire was further modified and some new items were added according to answers collected. When the whole experiment was over, the questionnaire survey was conducted online, taking advantage of the IVLE survey tools. The survey gathered data on subjects’ motivation and barriers to participation in the IVLE forum, as well as other variables like attitude towards IVLE forum and demographic information. By comparing and analyzing the data from both the survey and forum participation, I try to elicit a possible model or mechanism of anonymity on participation, to answer all the research questions.

3.3 Measures

3.3.1 Participation

As the dependent variable, participation was measured by the quantity and length of the messages posted to the forum. Throughout the four periods of the experiment, every message\(^3\) was recorded automatically by the IVLE system and was retrieved when the experiment ended.

Apart from the quantity of messages, the quality of contribution was also considered as an equally important indicator of the effort made by the message poster, in accordance with the guideline of assessment given to the subjects at the beginning of the experiment. In this study, message length was treated as

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\(^3\) There are two ways to participate in the IVLE forum. If someone initiates a new thread, then it is considered a “topic”. Alternatively, people can also contribute their thoughts to an existing topic, resulting in “replies”. Both forms of participation are equally treated as a “message”, and are counted for their quantity and length respectively. The assessment of people’s participation for the final grade does not discriminate over these two forms of participation. In the whole thesis, “posting” and “message” are used interchangeably, referring to either “topic” or “reply”.

dependent variable in addition to the number of messages. Strictly speaking, message length does not necessarily associate with the information quality or the depth of deliberation. However, this study focuses more on the willingness to participate and the effort spared in participation rather than the sheer quality of information. Moreover, to judge and rate the quality of every message would be a highly subjective and time-consuming task, which the current study was unable to accommodate. Due to those concerns on internal validity and practical constraints, message length was chosen as the other dependent variable. As some posters shared an article or referred to an online source, the content of the direct quotation was removed in data analysis as it did not reflect the effort of the message sender. Only the self-composed portion was treated as the real message.

3.3.2 Motivations and barriers

In order to measure the motivations and barriers to participation in virtual learning communities, subjects were asked to rate a list of items which are possible reasons why they would or would not participate in the forum, using a 7-point Likert scale (1 = “not an important reason at all” and 7 = “extremely important”).

Based on empirical findings of previous motivational research in information sharing and participation in communities of practice (Wasko & Faraj, 2000; Ardichvili, Page & Wentling, 2003), a 13–item scale to measure
motivations and a 9-item scale to measure barriers were developed. Motivation items included several major categories established in previous research: personal benefits including tangible returns like bonus marks as well as intangible returns like self-esteem, and organizational motivation. Barrier items, also based on categories unearthed in previous studies, included information ownership, psychological barriers like shyness, and practical constraints like lack of time. However, these categories were not introduced to pre-determine the structure of motivational factors in this study, and were subject to further exploration and modification in the data analysis.

Factor analysis was run to explore structures of motivation and barrier items. After dropping one item because its factor loadings were over 0.45 in two components simultaneously, three factors were extracted - extrinsic motivation (\(\alpha = 0.64\)), psychological motivation (\(\alpha = 0.87\)) and community interest (\(\alpha = 0.83\)). Barrier items, also dropping one item after first round of factor analysis, converged in three factors – social loafing (\(\alpha = 0.66\)), evaluation equal apprehension (\(\alpha = 0.88\)) and lack of time (only one item). A more detailed discussion on factor analysis results can be found in the next chapter.

3.3.3 Attitude towards IVLE forum

In this thesis, the distinction between “motivations” and “barriers” pre-assumes some conceptual difference between them, besides the direction of their impact on people’s participating behavior in the community. A “barrier” does not equal to “lack of motivation”, which should be measured as a motivation item instead. Rather, it refers to a factor that hinders participation, offsets the motivation, or makes the motivated participation virtually impossible to achieve. Motivations and barriers are considered as “motivational factors” since they all represent a unique dimension that exerts influence on people’s participation to the forum. The origins of these dimensions, whether it is because of personal disposition, situational factor, or socio-psychological process, are not stipulated by any means. Here the name “motivations” and “barriers” are merely used as indicators for convenience in grouping these factors.
Attitude towards computer technology has been long recognized as an important determinant of user behavior with technology (Davis, Bagozzi, & Warshaw, 1989). Two theoretical models – Theory of Reasoned Action (TRA) and Technology Acceptance Model (TAM) – all incorporate user attitude as a predictor of the behavioral intention. TRA proposes that Behavioral Intention (BI) is the sum of Attitude (an individual’s positive or negative feelings about performing the target behavior) and Subjective Norm (the person’s perception that most people important to him think he should or should not perform the behavior in question). TAM, an adaptation of TRA specifically tailored for modeling user acceptance of information systems, posits that two particular beliefs – perceived ease of use and perceived usefulness – are of particular relevance for computer usage. TAM proposes that the sum of Attitude and Perceived usefulness determines behavioral intention.

In this study, attitude toward the virtual learning community is hypothesized to have some impact on people’s participation, and may interplay with motivational factors and anonymity. Subjects were asked to rate five items on a 7-point Likert scale (1 = “strongly disagree” and 7 = “strongly agree”). These items (Cronbach’s Alpha = 0.759) measuring attitude included perceived user-friendliness, perceived ease of use, perceived usefulness, perceived enjoyableness and quality of interface design (adapted from Rice & Aydin, 1991).

3.3.4 Other variables
Apart from the above major variables, other variables specific to the sample were also measured. In order to measure their familiarity with the system, respondents were asked to report how many years they have been using IVLE forum as well as using computer, and the frequency of visit during the experiment period. As respondents experienced two different modes of IVLE forum, namely anonymous mode and real name mode, their feedbacks on the preferred level of exposure were also collected.
Chapter 4 Results

4.1 *Response Rates and Sample Characteristics*

Throughout the fourteen week quasi-experiment, the students of ‘E-Learning’ module posted 284 messages to the IVLE discussion forum, excluding the messages posted by the lecturer and teaching assistant. The length of each self-composed portion of message ranges from 1 line to 21 lines (mean = 5.06 lines, s.d. = 3.48), excluding the ‘copy-and-paste’ content quoted from elsewhere. 55 students authored all the 284 messages (participation rate 54.46%), whereas 46 students didn’t post anything though they were told the forum participation accounted for 5% of their final grade at the beginning of that semester.

Among the 101 enrolled students of ‘E-learning’ module, 83 finished the questionnaire survey after the whole experiment, with a high response rate of 82.17%. There were 66 female students and 17 male students. Though female respondents are significantly more than male respondents, the gender proportion is not a rare one in the social sciences modules at NUS. The majority of respondents major in social sciences, while 10 out of 101 people are from School of Computing.

All of the respondents have at least two years of experience in using computer, with an overwhelming majority of 78 people (94.0%) who have used computer for at least four years, and 52 students (62.7%) have used computer for
at least eight years. Regarding their familiarity with IVLE, all but two of the respondents have used IVLE for at least one year, and 44 respondents (53.0%) have used IVLE for at least two years.

28 respondents reported that they visit IVLE forum less than once a week, while 29 visit IVLE forum once a week, and 26 people visited IVLE at least twice a week, some of which even frequented the forum once a day. With a mean attitude of 4.16 on a 7-point Likert scale (s.d. = 0.88), Respondents hold a slightly favorable attitude towards IVLE forum.

These 83 students, who finished the survey without missing categories, contributed 271 messages to the forum. In the subsequent analysis combining data from different sources (forum participation and questionnaire), the core sample of these 83 students was used. 50 out 83 (participation rate 60.24%) had posted at least one message to the forum.

4.2 Anonymity and Participation

To answer the first research question, I compared people’s participation during different periods of experiment. The numbers of messages posted in each of the four experimental periods are listed in Table 1. Judging from the overall number of messages posted in each period, it is simply observed that students posted fewer messages in anonymous periods than in real name periods, but not the average length of the message.
Table 2 Quasi-Experiment in IVLE Forum

<table>
<thead>
<tr>
<th>Period</th>
<th>Duration</th>
<th>Number of messages</th>
<th>Average No. of messages per week</th>
<th>Average message length (lines)</th>
<th>No. of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-I</td>
<td>4 weeks</td>
<td>94</td>
<td>23.5</td>
<td>5.33</td>
<td>23</td>
</tr>
<tr>
<td>A-I</td>
<td>3 weeks</td>
<td>73</td>
<td>24.3</td>
<td>4.88</td>
<td>24</td>
</tr>
<tr>
<td>R-II</td>
<td>3 weeks</td>
<td>80</td>
<td>26.7</td>
<td>4.68</td>
<td>31</td>
</tr>
<tr>
<td>A-II</td>
<td>4 weeks</td>
<td>37</td>
<td>9.25</td>
<td>5.60</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>284</td>
<td>20.3</td>
<td>5.06</td>
<td>55</td>
</tr>
</tbody>
</table>

A paired t-test was conducted to participation between anonymous mode and real name mode (paired-\(t\) [83] = -2.347, \(p = 0.023\)). The result shows that there is significant difference between the quantities of messages posted in both modes. Students posted significantly fewer messages during anonymous periods than real name periods.

However, when testing the participation between respective experimental periods, contradicting results were found by comparing the average messages posted per week. The average number of message per week in Period R-I (23.5) is even less than that of Period A-I (24.3). By contrast, the average number of message per week in Period R-II (26.7) is higher than those of Period A-I (24.3) as well as Period A-II (9.25). No significant difference was observed on average message length.

The observed results could be understood as the experimental periods are not symmetrically divided (R-I and A-II lasted for four weeks respectively, while A-I and R-II last only three weeks). Hence, the result of the comparison of the average messages per week in the four periods may not match that of the
comparison of total messages in the four periods. Also, other variables, including situational and methodological ones, are suspected to act as confounding factors. Detailed discussion may be found at the next chapter.

4.3 Motivations and Barriers

All the 83 respondents of questionnaire survey rated the 13 motivation and 9 barriers items on a 7-point Likert scale. As shown in Table 3, Among the motivation items, “impact on my grade” was perceived as the most salient reason for people to participate in the forum (mean = 5.3012, s.d. = 1.368), followed by reciprocal participation (mean = 4.35, s.d. = 1.24), to access useful information (mean = 4.35, s.d. = 1.51), and to access useful discussion (mean = 4.35, s.d. = 1.27).

Table 3 Motivations for Participation

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Percentage (No.) of respondents choosing this as a most important reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>impact on my grade.</td>
<td>5.30</td>
<td>1.37</td>
<td>24.03(56)</td>
</tr>
<tr>
<td>my participation is a response to others' contribution</td>
<td>4.35</td>
<td>1.24</td>
<td>9.01(21)</td>
</tr>
<tr>
<td>To access useful information</td>
<td>4.35</td>
<td>1.51</td>
<td>9.87(23)</td>
</tr>
<tr>
<td>To access discussions regarding the module.</td>
<td>4.35</td>
<td>1.27</td>
<td>9.87(23)</td>
</tr>
<tr>
<td>everybody’s contribution to the forum will advance the learning community.</td>
<td>4.34</td>
<td>1.29</td>
<td>9.01(21)</td>
</tr>
<tr>
<td>seek others' help</td>
<td>3.98</td>
<td>1.34</td>
<td>6.87(16)</td>
</tr>
<tr>
<td>share multiple viewpoints and complement each other</td>
<td>3.88</td>
<td>1.44</td>
<td>7.73(18)</td>
</tr>
</tbody>
</table>
learning and sharing is enjoyable. 3.77 1.22 4.72(11)

enjoy interacting with peers interested in the same subject. 3.77 1.39 5.58(13)

gain strong self-satisfaction when I contribute 3.66 1.38 4.72(11)

gain strong confidence through contributing 3.47 1.24 3.43(8)

make friends and get to know each other better 2.55 1.28 3.00(7)

others will pay respect to me. 2.48 1.27 2.15(5)

Among the barrier items, lack of time achieved the highest average rating (mean = 5.04, s.d.= 1.57), followed by “already good postings on the topic” (mean = 5.28, s.d.= 1.43), “my contribution might be misleading” (mean = 4.07, s.d.= 1.73), and fear of showing ignorance (mean = 4.02, s.d.= 1.64). Interestingly, the tendency to free-ride is not perceived as an important disincentive to participation in online learning communities, contrary to the popular belief that free-riding or social loafing is one of the major reasons contributing to people’s reluctance towards participation.

Table 4 Barriers to Participation

<table>
<thead>
<tr>
<th>Reason</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Percentage (No.) of respondents choosing this as a most important reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>do not have enough time to contribute as much as I wish.</td>
<td>5.04</td>
<td>1.57</td>
<td>24.76(52)</td>
</tr>
<tr>
<td>already good postings on the topic. I fear that my contribution is not helpful.</td>
<td>4.28</td>
<td>1.43</td>
<td>11.90(25)</td>
</tr>
</tbody>
</table>
In order to reduce factors and explore the underlying structure, an exploratory factor analysis was carried out to motivation and barrier items in the questionnaire data. In the questionnaire survey, altogether there were 13 motivation items included. Three components were finally extracted after two rounds of factor analysis using principle component analysis method, followed by a rotation using Varimax method with Kaiser normalization. After the first round of factor analysis, one motivation item “to access useful information” was dropped from further analysis, because the factor loading was over 0.45 in two components at the same time.

As shown in Table 5, three factors emerged from the motivation items. The first factor, consisting of “impact on my grade”, “to access useful discussion regarding the module” and “to seek others’ help” can be summarized as economic benefits or tangible returns expected from forum contribution. The second factor has to do with anticipated intangible returns from participation, which consisted of enjoyableness, self-esteem, satisfaction, socialization and confidence. The last
factor addressed the community commitment of the individual.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Item</th>
<th>Component 1</th>
<th>Component 2</th>
<th>Component 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extrinsic motivation</td>
<td>seek others help</td>
<td>.756</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>impact on my grade</td>
<td>.746</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>access discussions regarding the module</td>
<td>.405</td>
<td>.622</td>
<td></td>
</tr>
<tr>
<td>Psychological motivation</td>
<td>learning and sharing is enjoyable.</td>
<td>.761</td>
<td>.334</td>
<td>.313</td>
</tr>
<tr>
<td></td>
<td>gain strong confidence through contributing</td>
<td>.789</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>gain strong self-satisfaction when I contribute</td>
<td>.699</td>
<td>.370</td>
<td></td>
</tr>
<tr>
<td></td>
<td>make friends and get to know each other better</td>
<td>.704</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>others will pay respect to me</td>
<td>.859</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community interest</td>
<td>share multiple viewpoints and complement each other</td>
<td></td>
<td></td>
<td>.737</td>
</tr>
<tr>
<td></td>
<td>enjoy interacting with peers interested in the same subject.</td>
<td>.303</td>
<td>.749</td>
<td></td>
</tr>
<tr>
<td></td>
<td>everybody’s contribution will advance the learning community</td>
<td></td>
<td></td>
<td>.822</td>
</tr>
<tr>
<td></td>
<td>my participation is a response to others’ contribution</td>
<td></td>
<td></td>
<td>.798</td>
</tr>
</tbody>
</table>

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

These three factors make up of the major motivation for forum contributors, which coincide very well with the research framework (see Wasko & Faraj, 2000, Ardichvili, Page & Wentling, 2003, and Chapter 2 of the current thesis for reviews). These factors also survived reliability test by scoring 0.64, 0.87, and 0.83 respectively in Cronbach’s Alpha.

An exploratory factor analysis was also conducted to the barriers to participation, also followed by Varimax rotation with Kaiser normalization. One item – “few responses from others” – was dropped from further analysis because
of factor loading below 0.6. Three factors were extracted after two rounds of analyses. As shown in Table 6, the items on evaluation apprehension converged, and insufficient time to participate also distinguished itself as a factor. The items on information self-ownership and dislike of other community members were extracted as one factor in rotated component matrix. The result suggests that these barrier items may have measured different dimensions of one variable, which is summarized in this thesis as social loafing. Previous studies revealed that individuals tend to exert less effort and obligation toward group performance, and the decreased group cohesiveness is associated with increased level of social loafing (Karau & Hart, 1998; Liden, Wayne, Jaworski, & Bennett, 2004).

Table 6 Factor Analysis of Barriers

<table>
<thead>
<tr>
<th>Factor</th>
<th>Item</th>
<th>Component 1</th>
<th>Component 2</th>
<th>Component 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation apprehension</td>
<td>My contribution might be misleading</td>
<td>.791</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>If I ask some question(s), I fear that others may think it is something I should already know.</td>
<td>.844</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>shy to post to the forum.</td>
<td>.880</td>
<td></td>
<td>.449</td>
</tr>
<tr>
<td></td>
<td>already good postings on the topic. I fear that my contribution is not helpful.</td>
<td>.639</td>
<td>.342</td>
<td></td>
</tr>
<tr>
<td></td>
<td>others may criticize or belittle my contribution.</td>
<td>.794</td>
<td>.342</td>
<td></td>
</tr>
<tr>
<td>Social loafing</td>
<td>My information and ideas are my own</td>
<td>.864</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Social loafing is a widely researched phenomenon. Apart from the two variables identified here (individualistic orientation and low group cohesiveness), its antecedents also include lack of identification of individual contributions to the group, lack of challenge and uniqueness of individual contribution, low intrinsic involvement, lack of peer appraisals, among others (Liden, Wayne, Jaworski, & Bennett, 2004). In this study, the two items used to represent “social loafing” are not exhaustive measures for this construct. Instead, the factor of “social loafing” is only used as a discriminative label to indicate a single factor. It has to be noted that these two items measures only a portion of “social loafing”.
do not like some of the people in the forum. .843

Lack of time do not have enough time to contribute as much as I wish. .942

Regarding barriers preventing subjects from participation to the forum, the two factors extracted from factor analysis, except the lack of time which was already on the questionnaire as one factor, all enjoy satisfactory reliability with an Alpha of 0.88 and 0.66 respectively. We combined these items in the following analysis:

4.4 Interaction Between Anonymity and Motivational Factors

Table 4 shows the correlations among measures of participation, motivation and barriers towards IVLE forum. Throughout the whole experiment, the correlation between extrinsic motivation and the number of messages posted in the forum is significant ($r = 0.205, p = 0.062$). Psychological motivation also enjoys marginally significant correlation with participation ($r = 0.154, p = 0.165$). However, community interest is uncorrelated with participation ($r = 0.061, p = 0.583$). By contrast, all the barriers to participation are negatively correlated with the number of messages posted to the forum. Among them, social loafing is

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6 In this study, the result is considered as “significant” when the “p” is less than 0.10, and “marginally significant” when the “p” ranges from 0.10 to 0.20. The relative leniency of this significance level is determined in recognition of the small size of the core sample (n=83). However, caution is taken when interpreting the results, especially “marginally significant” ones (see Chapter 6 for discussion).
7 There are two dependent variables in this study: number of messages and the length of messages. However, throughout the data analysis, these variables demonstrated very similar results. Hence thereafter I look into “number of messages” only as the dependent variable, and “participation” will refer to “number of messages” only unless indicated otherwise.
significantly correlated with participation ($r = -0.203$, $p = 0.065$), while evaluation apprehension and lack of time are not ($r = -0.097$, $p = 0.385$, and $r = -0.047$, $p = 0.674$). Attitude towards participation in IVLE forum is significantly correlated with participation ($r = 0.246$, $p = 0.025$).

Table 7 Correlations between Motivations, Barriers and Participation

<table>
<thead>
<tr>
<th></th>
<th>Extrinsic Motiv.</th>
<th>Psychological Motiv.</th>
<th>Community interest</th>
<th>Evaluation apprehension</th>
<th>Social loafing</th>
<th>Lack of time</th>
<th>Attitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Total No. of msg</td>
<td>(.205)</td>
<td>.154</td>
<td>.061</td>
<td>-.097</td>
<td>(-.203)</td>
<td>-.047</td>
<td>.246*</td>
</tr>
<tr>
<td>2 No. of msg in anonymous mode</td>
<td>.217*</td>
<td>.150</td>
<td>.062</td>
<td>(-.186)</td>
<td>-.241*</td>
<td>-.080</td>
<td>.250*</td>
</tr>
<tr>
<td>3 No. of msg in real name mode</td>
<td>(.183)</td>
<td>.143</td>
<td>.056</td>
<td>-.045</td>
<td>-.168</td>
<td>-.027</td>
<td>.223*</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).
( ) Correlation is significant at the 0.10 level (2-tailed).

During the periods when real name was displayed, extrinsic motivation enjoys significant correlation with participation ($r = 0.183$, $p = 0.097$) while psychological motivations correlates less significantly with participation ($r = 0.143$, $p = 0.198$). Community interest is not correlated with participation ($r = 0.056$, $p = 0.617$). Regarding the barriers to participation, only social loafing has marginally significant negative correlation with participation ($r = -0.168$, $p = 0.128$), while evaluation apprehension and lack of time are not correlated with participation ($r = 0.045$, $p = 0.684$; $r = 0.027$, $p = 0.807$). Attitude positively associates with participation ($r = 0.223$, $p = 0.042$).
During anonymous periods, extrinsic motivation shows significant correlation with participation ($r = 0.217$, $p = 0.049$). Psychological motivation also correlates with participation though the significance is marginal ($r = 0.150$, $p = 0.175$). Community interest is not correlated with participation. Two of the barrier factors show negative correlation with participation: evaluation apprehension ($r = -0.186$, $p = 0.093$) and social loafing ($r = -0.241$, $p = 0.028$). Time constraint doesn’t correlate with participation, while attitude shows significant correlation ($r = 0.250$, $p = 0.022$).

The impact of anonymity may be discovered by a close look at different correlations between motivational factors and participation during real name and anonymous periods. Surprisingly, extrinsic motivation was more correlated with participation in anonymous periods than in real name periods. In different modes of communication, the correlation between psychological motivation and participation, as well as the correlation between community interest and participation, remain somewhat unchanged. In anonymous periods, social loafing exerted more negative influence on participation than in real name periods. However, evaluation apprehension, the effect of which is expected to diminish in anonymous periods, actually enjoyed more correlation with participation. The discrepancies observed may be explained both theoretically and methodologically. A detailed discussion on this could be found in the following chapter.

Because of unexpected findings, additional correlation analysis was conducted between the original items involved in extrinsic motivation and
participation (see Table 8). To our surprise, “impact on my grade” does not correlate with participation in real name periods, but correlates significantly with participation in anonymous periods. On the contrary, “to access discussions” and “to seek help” are less correlated with participation in anonymous periods than in real name periods.

Table 8  Correlations between Participation and Original Items on Extrinsic motivation

<table>
<thead>
<tr>
<th></th>
<th>access discussions regarding the module.</th>
<th>impact on my grade</th>
<th>seek others’ help</th>
<th>extrinsic motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 number of msg in anonymous mode</td>
<td>.129</td>
<td>.217(*)</td>
<td>.148</td>
<td>.217(*)</td>
</tr>
<tr>
<td>2 number of msg in realname mode</td>
<td>(.191)</td>
<td>.061</td>
<td>.171</td>
<td>(.183)</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).
( ) Correlation is significant at the 0.10 level (2-tailed).

The correlation between evaluation apprehension and participation is also contradictory to our expectation. Additional correlation analyses were also conducted between the original items involved in evaluation apprehension and participation (see Table 9). For all the barrier items, the variances of correlation in both modes are in the same direction.

Table 9  Correlations Between Participation and Original Items on Evaluation Apprehension
already good postings on the topic. I fear that my contribution is not helpful. If I ask some question(s), I fear that others may think it is something I should already know.

If I ask some question(s), I fear that others may think it is something I should already know. My contribution might be misleading, others may criticize or belittle my contribution. I am shy to post to the forum.

Table 9 reports the correlation between extrinsic motivation, evaluation apprehension and participation in each of the four periods. Table 10 shows that the impact of extrinsic motivation on participation actually rises except for the last period (A-II), and the negative impact of evaluation apprehension also aggravated throughout the semester. From these data, it is unclear whether anonymity has exerted salient effects on the correlation between these factors and participation.

Table 10 Correlation between Extrinsic Motivation, Evaluation Apprehension and Participation in Each of the Four Periods

<table>
<thead>
<tr>
<th>Period</th>
<th>extrinsic motivation</th>
<th>Evaluation apprehension</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-I</td>
<td>.128</td>
<td>.014</td>
</tr>
<tr>
<td>A-I</td>
<td>(.194)</td>
<td>-.122</td>
</tr>
<tr>
<td>R-II</td>
<td>.231(*)</td>
<td>-.137</td>
</tr>
<tr>
<td>A-II</td>
<td>.104</td>
<td>-.179</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
( ) Correlation is significant at the 0.10 level (2-tailed).
To test these variables’ ability of predicting participation, I regressed the number of messages on motivations, perceived barriers and attitude towards forum. The model is not satisfactorily significant, with social loafing and attitude account for most of the variance, which may result from multicollinearity of these variables. As attitude significantly correlates with participation in both modes, its impact on user behavior is empirically affirmed. However, since attitude also enjoys relatively high correlation with motivational factors, we are unclear about the causal relationships between them, and how they exert influence on participation and interact with anonymity.

Table 11 Results of Multiple Regression(a)

<table>
<thead>
<tr>
<th></th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>-.315</td>
<td>6.377</td>
<td>-.049</td>
<td>.961</td>
</tr>
<tr>
<td>extrinsic motivation</td>
<td>.263</td>
<td>.951</td>
<td>.045</td>
<td>.783</td>
</tr>
<tr>
<td>eva_apprhsn</td>
<td>.453</td>
<td>.706</td>
<td>.113</td>
<td>.524</td>
</tr>
<tr>
<td>lack_time</td>
<td>-.268</td>
<td>.742</td>
<td>-.060</td>
<td>.719</td>
</tr>
<tr>
<td>Community interest</td>
<td>-.444</td>
<td>.976</td>
<td>-.079</td>
<td>.651</td>
</tr>
<tr>
<td>psychological motivations</td>
<td>.157</td>
<td>1.182</td>
<td>.026</td>
<td>.895</td>
</tr>
<tr>
<td>social loafing</td>
<td>-.1868</td>
<td>.763</td>
<td>-.403</td>
<td>.018</td>
</tr>
<tr>
<td>attitude</td>
<td>1.831</td>
<td>1.029</td>
<td>.286</td>
<td>.082</td>
</tr>
<tr>
<td>a</td>
<td>Dependent Variable: number of messages</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As we also surveyed on the preference of the subjects regarding mode of communication in the virtual learning community, the answers show that after
experiencing the two modes of communication, the most preferred mode is “to choose their preferred level of exposure” (see Table 12). Both of anonymous and real name modes of communication have similar popularity, while “to display nick name”, a choice between these extremes, was selected to be the second most favored choice.

Table 12  Preferred Mode of Communication

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
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</thead>
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<tr>
<td>anonymous</td>
<td>3.6024</td>
<td>1.63005</td>
</tr>
<tr>
<td>real name</td>
<td>3.8072</td>
<td>1.36559</td>
</tr>
<tr>
<td>nick name</td>
<td>4.8795</td>
<td>1.54128</td>
</tr>
<tr>
<td>Free choice</td>
<td>5.8072</td>
<td>1.70693</td>
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</tbody>
</table>
Chapter 5 Discussion

The purpose of this study is to empirically examine how people’s knowledge-sharing behavior in virtual learning communities are influenced by 1) anonymity or identifiability of participants; 2) the motivations and barriers to participation in virtual learning communities, and 3) the interaction of anonymity, motivations and barriers, and other situational variables, such as attitude towards the community.

Through a 14-week quasi-experiment in a discussion forum hosted in the Integrated Virtual Learning Environment (IVLE) of National University of Singapore, we gained deeper understanding on the complex interactions between anonymity, motivations and participation in a virtual learning community. The results presented have answered the three research questions brought forward. In short, motivations of participants, moderated by anonymity, are found to influence participation, whereas anonymity alone is not observed to have significant impact on the quantity of contributions.

5.1 Motivations and Barriers

5.1.1 Why do people participate?

The results show that economical motivations, or tangible returns, especially the perceived impact on participants’ final grade, are among the most important reasons why people contribute to the forum, with community interest coming in a distant second, and psychological motivations, or intangible returns,
lagging as the third. This finding is pretty surprising because it does not correspond to previous explorative studies, e.g. the study by Wasko and Faraj (2000) and the other one done by Ardichvili and his colleagues (Ardichvili, Page & Wentling, 2003), whereby they discovered that community interest is the most mentioned reason of contribution to virtual knowledge communities.

The discrepancy could be understood by several explanations. First of all, the contextual factors, particularly organizational culture, are instrumental in inducing or preventing knowledge sharing behaviors. De Long and Fahey (2000) mapped out a conceptual framework to understand how cultural elements would exert substantial influence on the success of knowledge management. They asserted that organizational culture or climate 1) shapes our assumptions about what knowledge is important, and, hence, which knowledge is worth managing; 2) mediates relationships between individual and organizational knowledge, hence determines which knowledge is considered “private” or “public”; 3) creates the context for social interaction that ultimately determines how effective an organization can be at creating, sharing, and applying knowledge, and 4) shapes the processes by which new organizational knowledge is created, legitimated, and distributed. As members are affected by prevalent cultural norms of the organization or the community, their perception of knowledge ownership and motivations varies accordingly. Research has also shown that people’s cooperative or competitive behaviors in social dilemmas are socially constructed. People form expectations upon other people’s behavior on the basis of past experiences, and
make adjustment to their own upon the feedback of others’ actual behavior (Pilluta & Chen, 1999).

These arguments have been supported by the findings of both motivational studies, where a supportive culture of knowledge sharing is in place (Wasko & Faraj, 2000, Ardichvili, Page & Wentling, 2003). As all these studies are highly context-dependent, it is not sensible to directly compare the motivations and barriers across different settings. The results of this study may not necessarily mirror the motivational factors of university students as a whole, or even the same participants involved in different learning communities hosted in IVLE.

Second, in the present study, the participants were informed that an extrinsic reward is given for their participation. At the beginning of “E-Learning” course, the syllabus explicitly stated that participation to the IVLE discussion forum would make 5% of students’ final grade. Past experiences with the course suggested that the absence of extrinsic reward may result in apathy towards knowledge-sharing, and finally render the forum desolate. Hence, a 5% was given to students, in order to moderately motivate them to participate.

However, the reward strategy may involve other side effects, complicating the psychological process, of which the “crowding-out effect” is the most noteworthy. In a study on organizational forms and motivations for knowledge transfer, Osterloh and Frey (2000) pointed out that under specific conditions there is a trade-off between extrinsic motivation and intrinsic motivation, the so called

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8 “E-Learning” is a quite new module in NUS. From the past experience of the same module in 2003, students were not keen on forum participation without the extrinsic rewards. However, the same thing may or may not happen in other modules as specific situational variables differ.
“hidden costs of reward” (Lepper & Greene, 1978). When an extrinsic reward is introduced, individuals would devalue the attribution of a self-determined action, believing themselves to be subject to the outside control. This being the case, there is possibility that the impetus of an action is over-attributed by the participants to external rewards, and the perceived self-determination or intrinsic motivation is undermined. This “crowding-out” effect may explain the salience of extrinsic motivations among the participants.

Finally, methodological differences may account for part of the discrepancy. In order to generate rich qualitative data, the previous studies often selected active members from each community\(^9\), resulting in sampling bias. People interviewed or who completed the survey are more likely to behave pro-socially, and cannot reflect the general public in virtual learning communities\(^{10}\). In that sense, the results reported in this study expanded the sample of population, covering both lurkers and active contributors.

The structure of motivations supports the categorization adopted in previous studies, despite the difference of contexts. This finding may indicate that tangible returns (or extrinsic motivation), intangible returns (or psychological motivation) and community interest are the three distinctive factors that apply to virtual knowledge/learning communities in general.

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\(^9\) In their qualitative study of why people participate and help others in electronic communities of practice, Wasko and Faraj (2000) analyzed the saved messages within a seven-week time frame of three electronic forums, and identified unique participants. They then sent a survey to these participants via emails.

\(^{10}\) According Nonnecke and Preece (2001), lurkers reportedly make up the majority of members in online groups and discussion lists. The level of lurking can range from as much as 99\% to a low of 1\% in the online community.
5.1.2 What prevents people from participating?

On the top of the list of barriers we find time constraint, followed by evaluation apprehension, including fear to lose face, fear to mislead colleagues, and fear to ask questions that others may think the knowledge-seeker should already know. Contrary to popular belief, “knowledge-as-private-good” view or information hoarding is perceived as one of the least consequential barriers. These findings reflect some insights from the previous studies, especially the one conducted in corporate communities of practice (Ardichvili, Page, & Wentling, 2003), while still managing to maintain a style unique of this learning community under examination.

Relating to the reasons of lurking artfully categorized by Nonnecke and Preece (2001), it is evident that barriers are a bit more context-dependent, compared to motivations which seem to pertain to a universal audience. Barriers, or why lurkers lurk, are associated with both group characteristics and personal characteristics, and may vary according to the course and level of membership. As Nonnecke and Preece (2001) pointed out, lurkers in one online community may be active contributors in another community. The distinctive culture of a learning community may set the expectation for “good” or “bad” participation, and be internalized as member’s own perception of the rules or standards. Personal characteristics, including shyness, fear to lose face, etc, also serve to discourage contribution. Note that these characteristics are not rigid, rather, it is the dynamic
interaction between group culture and personal traits that engender or intensify some of the barriers, such as evaluation apprehension (see the section below for more detailed discussion).

5.1.3 *The impact of motivations and barriers on participation*

The findings shed light on the influence of motivational factors on participation in the virtual learning community. Extrinsic motivation was found to be most significantly correlated with overall participation. Extrinsic motivation, combining the multiple stimuli from better grades, other’s help on actual questions, and access to relevant discussion, is leading to actual information-sharing behaviors in the virtual learning community. This finding is consistent with the fact that extrinsic motivation fills the top post in the list of the reasons why people ever post anything. Psychological motivation is moderately, yet not significantly, correlated with community participation, while community interest exerts barely any impact.

However, it is too hasty to make any assertion that extrinsic motivation, rather than intrinsic motivation, significantly influences knowledge-sharing behaviors, without acknowledging the “crowding-out effect”, which was mentioned earlier. Two psychological approaches theories may explain the origin of crowding effect. According to cognitive evaluation theory advanced by Deci (1975), intrinsic motivation depends on the perceived locus of control. If the impetus for an action is attributed to an external influence, the perceived cognitive
self-determination is undermined. Individuals who feel forced by outside intervention to behave in a specific way would be “overjustified” if they maintained their intrinsic motivation. Hence the perceived locus of control may shift from the inside to outside of the actor. Psychological contracts theory (Rousseau, 1995) may also explain the crowding-out effect from a different perspective. Psychological contracts established among human beings may involve emotional ties and loyalties, which establish an implicit contract that goes beyond transactional exchanges but includes a reciprocal appreciation of intrinsic motivation. By introducing external rewards, e.g. money, the original contract is breached and the parties tend to perceive their relationship as an extrinsically motivated (transactional) contract. For example, when guests express their appreciation of a host’s efforts with a symbolic gift (such as a bouquet of flowers), the host’s intrinsic motivation tends to be raised. However, when guests try to present money as a gift, the host’s intrinsic motivation is decreased (Osterloh & Frey, 2000).

The possibility is further enhanced by the fact that the questionnaire on motivations and barriers were conducted after the whole experiment. All the community members, instead of reporting their instinctive answers, had the opportunity to retrospectively deliberate regarding their motivations to participation. On the one hand, they may discover ways to exploit the practical benefit of participation, e.g., to seek others’ help on a specific question. On the other hand, their impression on the external reward (e.g. the impact on their grade)
might be reiterated and reinforced throughout the semester. According to the two psychological approaches reviewed, students would either perceive the control as outside of them and overattribute their participation to external impetus, or feel the reciprocal good faith in intrinsic motivation is breached, and consider their contract a transaction-driven one.

Social loafing is the only barrier item that enjoys significant negative correlation with participation. Time constraint, though rated the highest on the barrier list, does not contribute to the lack of participation. This finding may lead to an interesting interpretation that practical constraints, even though perceived as essential, are probably only lending themselves as excuses or smokescreens to conceal real causes. Time alone is not sufficiently convincing to account for lack of participation in virtual learning communities, while the tendency to free-ride, at least in this study, hinders knowledge creation and exchange. Past explorative studies all claimed that time and other practical constraints as important barriers, while free-riding or social loafing is far less a prevalent one reported by members of knowledge communities. The findings of this study may provide an alternative explanation for this phenomenon.

5.2. *The Impact of Anonymity on Participation*

To test the effect of anonymity on participation in virtual learning communities is one of the main objectives of this study. Anonymous communication is found to have some impact on members’ input to knowledge
community, but not as severe or unidirectional as speculated.

An extensive body of literature has studied anonymity in relation to behavior and performance under various circumstances, including decision-making and idea-generation within an identified group (see Connolly, Jessup, & Valacich, 1990, Valacich et al., 1994, El-Shinnawy & Vinze, 1998 and Ahern & Durrington, 1995 for reviews), while relatively little attention has been directed to the effect of anonymity on participation in learning communities.

Falling prey to contextual factors, the observed effects of anonymity in these studies may differ dramatically from one another, sometimes even demonstrate contradictory directions. On the one hand, anonymity decreases conformance pressure for the participants in a group setting and allows participation based on content of communication rather than the source that generated that communication. On the other hand, anonymity has the potential to cause social-loafing whereby some members of the group rely on others to accomplish the task.

The present study, aiming to add a small piece to the already complex patchwork of research on the effects of anonymity, has resonated part of the previous findings, though under a slightly different context. Interestingly, there are significantly more overall postings in real name periods than anonymous periods. Nevertheless, since the length of experimental periods are asymmetrical in this study, no significant difference was observed between the numbers of messages per week in real name and anonymous periods. The average message
length in each period does not demonstrate pertinent differences for both modes of communication either.

Though seem to be quite arbitrary, the findings of this study might be understood as the product of intertwined variables. As this study is designed as a quasi-experiment, contrasting the results in different periods naturally involves the assumption that students have the same rate of participation throughout the course of the semester. However, it is highly unlikely that the forum messages should have been evenly distributed. At different point of the semester, for example, the beginning or the exam period, students could be participating more/less in the forum than usual. When some interesting topics are introduced during the lecture or raised by participants, ad hoc discussion could take place, resulting in more active participation. More importantly, the overall quality of messages, other than the sheer number and length, were not included in our measurement. In addition, behavior of people with different motivations may vary according to the mode of communication, whereby the variances, counteracting each other, may not be reflected in the overall quantity of participation.

5.3 The Moderating Effects of Anonymity

Anonymity was discovered to have moderating effects on the correlation between some motivational factors and participation, which is consistent with the discoveries in previous studies of CMC and group behavior (Postmes & Lea, 2000; Valacich et al., 1994). Yet against our speculation, anonymity is also
observed to induce higher correlation between extrinsic motivation and participation, and more severe impact of evaluation apprehension on participation. These anomalies can be partially understood with resort to SIDE theory and methodological causes.

5.3.1 The interaction between anonymity, motivations, and participation

The association between psychological motivation and participation remains more or less unchanged in different communication modes. Though contrasting with common sense, this finding may signal that the psychological satisfaction gained during the process of participation in knowledge communities does not have to entail an identifiable name. It coincides with our observation of altruistic behaviors in many other virtual communities, e.g. leisure community, social support community, etc, where members actively helping each other without revealing their real identity. Evidence is also found in electronic communities of practice in Usenet groups. Though people remain anonymous all through¹¹, they still contribute to the community out of intrinsic satisfaction, self-actualization, self-confidence, and even the opportunity to show off expertise (Wasko & Faraj, 2000). Hence, we may contend that the psychological package, including self-esteem, satisfaction, confidence, and the pleasure of socializing, are attainable even in an anonymous environment. The same speculation may also

¹¹ “Little information about participants is available except for an e-mail address and what the poster voluntarily chooses to disclose.” (Wasko & Faraj, 2000)
apply to community interest, the effect of which on participation hardly exhibited any fluctuation across these two modes of communication. The desire towards good organizational citizenship, the goodwill for community development, and acknowledged general reciprocity to other members, may not be dampened just because the subject is under the mask of anonymity.

However, contrary to our expectation, extrinsic motivation exhibits more correlation with participation in anonymous periods than in real name periods (see Figure 2).

Several reasons are suspected to partially account for the unexpected curve of correlation between extrinsic motivation and participation throughout the four experimental periods. First of all, as we had additional correlation analysis between participation and all the original items which made up of extrinsic motivation, it was observed that “impact on my grade”, instead of other items, accounted for the major variance observed on correlation between extrinsic motivation and participation. This indicates that although these original items are highly homogenous in nature, they induce dissimilar reactions from participants when anonymity was manipulated. The influence of “seek other’s help” and “access relevant discussion” on participation actually declined in anonymous mode, suggesting that people are more willing to ask for help when real name was displayed. Though against our speculation, this phenomenon is not impossible to explain. When trying to resolve communication dilemmas in database-mediated communication, it is argued that anonymity of contributors would affect the belief
held by a person regarding the likelihood that his or her own contributions will find a receptive audience, because the confidence of getting more positive attention for his or her shared task-relevant expertise is affected by the high status and reputation of the contributor (Kalman, Monge, Fulk, & Heino, 2002). Hence, it is reasonable that knowledge seekers may prefer contributions from people with real name, in order to have sufficient social cues to judge the reliability of the received information or expertise. However, for direct external reward (final grade), people responded with more enthusiasm in anonymous mode, when their contribution could not be accounted. This finding is quite puzzling indeed and might be the product of confounding factors.

It is suggested that time sequence of these four periods may have an impact on the motivational factors and people’s behavior. As noted earlier, the impression of the external stimulus may have been reiterated and reinforced throughout the semester, and confounded with the manipulation of anonymity. A certain period was needed for students to fully comprehend and accept the regulation of external reward for contribution, which might be the reason why the impact of extrinsic motivation on participation unexpectedly increased during Period I and Period II. This is recognized as an inherent limitation of this study, which was designed a field experiment, rather than laboratory experiment. Multiple variables, including time sequence, were left uncontrolled, resulting in complex interactions and consequences.

Finally, an important methodological procedure – manipulation check – was
absent in this study, which may contribute to the current results. There is no data available to ensure that the respondents accurately perceived the change of treatment (the three switches between real name mode and anonymous mode) between experimental periods. As no spare time was given between two periods to let the respondents familiarize with the new communication mode, it is highly possible that their perception and reaction of treatment are well retarded or inaccurate, which would result in an irregular curve.

Figure 2 The Impact of Extrinsic motivation and Evaluation Apprehension on Participation in Four Periods

5.3.2 The interaction between anonymity, barriers, and participation

Amongst the barriers, social loafing is found to have stronger correlation
with participation in anonymous periods than in real name periods. This finding supports our postulation and theories in social loafing as well. Identifiably has been found to be an effective deterrent of social loafing in lab experiments (Guerin, 2003; Liden, Wayne, Jaworski, & Bennett, 2004). In face-to-face work groups, identifiability is manipulated through pooling the performances of individuals so that individual’s performance is not easily distinguishable and sometimes through increasing group size, which lowers identifiability, especially to outsiders (Guerin, 2003; Postmes & Spears, 1998), while anonymity is easily achieved in CMC settings (Postmes & Lea, 2000). In both cases, it was supported by empirical evidence that anonymity is positively associated with social loafing behavior. However, evaluation apprehension, the effect of which on participation is expected to diminish in anonymous periods (e.g., Valacich, Jessup, Dennis, & Nunamaker, 1992), is actually found to inhibit participation more severely instead. Demonstrating the exact opposite to our speculation, the anomaly provoked further correlation analysis. Figure also reports the impact of evaluation apprehension on participation across all the four periods.

The same methodological reason resulting in the irregular curve of extrinsic motivation also applies for evaluation apprehension. In the absence of manipulation check, it is unclear whether respondents indulge in the same mentality when the forum mode actually got switched. If it was the case, there is possibility that the correlation between extrinsic motivation and participation would differ from the current one. The retarded or inaccurate perception of
identifiability could contribute to the unexpected rise of the impact of evaluation apprehension on participation.

Apart from the reason mentioned above, there are other explanations to account for the variance of impact of evaluation apprehension on participation, which is the exact opposite of our anticipation. Evaluation apprehension is regarded as one of the undesirable social processes that lead to social dysfunction, which is rooted in the ways group members adapt their behavior to a group, on the basis of their perceptions of the group or its members (Postmes & Lea, 2000). In studies of CMC, anonymity was often heralded for its power to eliminate harmful social processes so as to improve group performance, and to liberate individual from various social influence, group pressure, and status differentials that characterize face-to-face communication. However, the meta-analysis of empirical research on anonymity and CMC did not support this utopian contention (Postmes, Spears, & Lea, 1998). Alternatively, Social Identity model of Deindividuation Effects (SIDE) was proposed to explicate the consequences of anonymity under different circumstances.

When the anonymity of CMC offers people a strategic freedom to express themselves because they are unaccountable, it has also been the cause of an ostensible increase of antinormative and disinhibited behaviors. According to social theorists, it was a basic propensity for collective action stimulated by anonymity in the crowd, resulting in a loss of awareness of individual identity and perceived presence of others. While few empirical evidences are founded to
support this seemingly robust claim, SIDE model argues that factors that have traditionally been identified as causing deindividuation—such as the combination of anonymity, group immersion or CMC—can actually reinforce group salience and conformity to group norms instead. When the individuating information is relatively scarce (people have anonymity), the social identity of participants tend to be accentuated. Deindividuation appears to have increased the sensitivity to situational norms and the responsiveness to cues from the environment indicating what would be appropriate and desirable behavior in that particular context (Postmes, Lea, & Spears, 1998).

For this study, the trajectory of correlation between evaluation apprehension and participation may be explained by SIDE model. Throughout the four periods, the aggregated situational norm influenced people’s participation, substantially so in anonymous periods when communicating behaviors are more susceptible to group influence. When switching from anonymous to real name mode (Period A-I to Period R-II), the correlation remained more or less the same. However, when switching from real name to anonymous mode (Period R-I to Period A-I, and Period R-II to Period A-II), the sensitivity to situational norm sharply increased because of deindividuation in anonymous environment. As people clutched on group identity and became more responsive to cues indicating what would be desirable behavior, it is not difficult to understand that evaluation apprehension exerted more negative influence on community participation. The course of study witnessed a concomitant process of engendering a prevailing norm particular for
this knowledge community. As time went by, the community gradually reached maturity and the situational norm became progressively salient to its members, which explains the unidirectional increase of the impact of evaluation apprehension on participation.

5.4 Implications

The findings of the current study offer a number of theoretical, methodological and practical implications. In the following, we are not going to restate all the points mentioned above, but to situate the most important findings in the extensive research literature on knowledge communities and CMC, and to suggest feasible approaches to improve the real practice.

5.4.1 Theoretical implications

Theoretically, this study confirms the structure of motivations and barriers to participation in knowledge communities proposed in previous qualitative studies. Though under different labels, the major categories of motivations and barriers are not imposed arbitrarily to mirror an inveterate cognitive typology, rather, the classification (extrinsic motivation, psychological motivation, and community interest) is empirically grounded, revealing the real motivational factors of the subjects. Although the study did not attempt to contribute to the precise definition for these motivational categories, e.g. intrinsic and extrinsic motivations, the structure unearthed by quantitative data corroborates and
characterizes the pre-defined categorization, by grouping together individual motivational items.

It is evident from the results that, to a considerable extent, the perceived motivations and barriers correspond to the subjects’ participating behavior in this virtual learning community. The linkage between subjects’ needs and behavior resonates with one influential tradition in mass media theory—"uses and gratifications", proposed by Blumler and Katz (1974). Uses and gratifications is often viewed as a theoretical approach that shifted the focus from “what media do on people” to “what people do with media”. It no longer assumes that audiences are homogeneous and passively receiving the media effects; rather, it presents the use of media in terms of the gratification of social or psychological needs of the individual. This study may borrow this theoretical legacy from mass media studies. Virtual community itself can be viewed as a form of media and the audience, or rather participants, are responsible to determine “why use media”, and purposefully respond with their respective behaviors.

Anonymous communication has been discussed extensively in research literature, despite the unresolved contention over its positive and negative effects on various group processes. By examining the effects of anonymity as well as its interaction with motivations and barriers of each individual in the community, this study attempted to shed some light on the divided causes and consequences of anonymity. It is responsible to deter extrinsic motivation and reduce social processes such as social loafing that are detrimental to participation since people
become unaccountable and lose the sense of presence of others in anonymous communication. But simultaneously, anonymity is also found to leads to more severe evaluation apprehension, which could be explained by SIDE effect. The impact on external motivation remains somewhat complex as other variables might be involved.

The finding again pinpoints the significance of contextual or situational variables, as noted earlier, in understanding and assessing the validity and generalizability of a particular study. Any learning communities, though in virtual forms, do not exist in a vacuum. Given different situational variables, it is easier to understand the discrepancy--or even contradiction in some circumstances--among results found in the reviewed studies, including research on group decision-making support system, group idea-generation, and information commons in various organizations.

5.4.2 Methodological implications

It is quite notable that most of the studies on motivation to participation in knowledge communities adopted a qualitative approach, so as to capture the richness of patterns and details from subjects, without imposing a predefined conceptual framework (e.g. Ardichvili et al., 2003; Wasko & Faraj, 2000). Despite the recent enthusiasm to employ nonexperimental methods in social sciences, experiment was chosen as the main method in this study, because of its robustness to establish causation interferences. Basically, whatever their merits for some
research purposes, non-experimental approaches generates less clear causal conclusion than randomized experiments, or well-designed quasi-experiments such as regression-discontinuity or repeated treatment which this study adopted (Shadish, Cook, & Campbell, 2002). Specifically, experimental methods can prescribe the possibility that people may wish to distort their attribution of reasons for participation depending on their perception of the consistency with social norms, as already pointed out by some researchers in HCI (Reeves & Nass, 1996). When data are collected through ethnographic interviews and open-ended survey, it is often tempting for subjects to modify their accounts, whether consciously or unconsciously, so as to appear socially desirable within the specific context. In other words, experimental approach can uncover causation that may not have been made explicit if other methods are used.

Second, many researchers have noted that time dimension is often neglected in CMC research, impairing the general validity, especially for long term effects (e.g., Walther, 1992). In all the reviewed studies of knowledge communities, efforts are usually directed to describe the motivational factors and analyze their impact at a specified point of time, taking a small slice from a durable lifespan of development without acknowledging the prior history of interaction and the social processes these communities undergo since their initial establishment. The current research, however, takes a longitudinal perspective. From the very beginning to the end, all the community activities are captured and included in examination, which ensures a holistic perceptive towards online
communication and knowledge-sharing behaviors, rather than leading to hasty generalizations that are not rare in existing research literature.

5.4.3 Practical implications

This study has a number of implications for designers or managers of virtual learning communities. One important research question this study seeks to answer is how the manipulation of system variables, especially anonymity, could enhance participation. The finding shows that community members value most the freedom to choose their preferred level of exposure, rather than accepting pre-determined mode of communication. As we already recognized that uses and gratifications model may apply to virtual learning community as well, the finding also reflects the participants’ desire to choose different modes of communication, in order to gratify their diverse needs.

As the results suggest, anonymous mode of communication increases the impact of social-loafing on participation, and also the correlation between extrinsic motivation and participation. Some previous studies on CMC also pointed out that anonymous idea-generation tasks produced significantly more output than in real name setting because anonymity eliminated other process loss (Connolly, Jessup & Valacich, 1990). Hence it is feasible that identifiability, as a system variable, may well serve as a lever to mediate participants’ motivational factors in accordance with task characteristics. System designers could adjust the member’s identity exposure by at least three levels—anonymous, nickname, and
real name—for communities with different purposes. In other cases where complex interactions are anticipated, individuals can be empowered to switch between completely anonymous and real name to suit their needs in different circumstances. For instance, when raising an inquiry publicly in the community, the student may wish to display anonymity only; when contributing individual expertise and relevant information on the subject, the student may wish to have his/her real identity revealed, in order to ensure the efficacy of contribution, or to acquire external and internal gratifications.

Finally, the importance to cultivate a community culture conducive to participation is highlighted again in this study. Various researches, including this one, showed that situational variables, or referred to as culture and subcultures, play an essential part in shaping the assumptions for different aspects of knowledge transfer (e.g., De Long & Fahey, 2000). Collective action has been recognized long before as susceptible to an array of factors, and involves delicate social processes that transcend the summation of individual decisions. Considering that most of the communities of practice in organizational and educational settings do not emerge solely out of spontaneity, interference from management may exert strong influence on shaping the community culture. For example, this study found that in this particular setting, the imposed reward system may have “crowding-out” effect on participants’ perception of motivation. Hence, further steps should be taken to offset the “crowding-out” effects while still manage to sustaining the enthusiasm for contribution among community
members.
Chapter 6 Conclusion

As the concluding part of the thesis, this chapter will summarize the main findings of this study, discuss the limitations and offer some suggestions for future research.

6.1 Summary of Findings

Virtual learning communities, powered by CMC, are thriving in both business and educational settings. Their paramount importance in creating, sharing and retaining knowledge is repeatedly advocated. Despite their inherent spontaneity and informality, to understand how and why people behave in knowledge communities, and how to enhance members’ participation in such communities are always of interest to researchers and practitioners. Wenger and Snyder (2000, p143) made a vivid illustration:

“Although communities of practice are fundamentally informal and self-organizing, they benefit from cultivation. Like gardens, they respond to attention that respects their nature. You can't tug on a cornstalk to make it grow faster or taller, and you shouldn't yank a marigold out of the ground to see if it has roots. You can, however, till the soil, pull out weeds, add water during dry spells, and ensure that your plants have the proper nutrients. And while you may welcome the wildflowers that bloom without any cultivation, you may get even more satisfaction from those vegetables and flowers you started from seed.”
This study is one of the many attempts that try to uncover the “chemistry” of virtual learning communities and discover ways that might affect people’s knowledge sharing behavior. The relationship between anonymity, motivations and participation was examined through a 14 week field quasi-experiment of an online learning community in the Integrated Virtual Learning Environment (IVLE) at the National University of Singapore. During the four periods of experiment, the researcher manipulated the level of identity exposure, switching between real name mode and anonymous mode, and recorded all the forum messages. Based on the motivational factors unearthed in previous qualitative studies, a questionnaire survey was sent to all participants to collect data on their perceived motivations and barriers to participation.

We found that reasons to participate in knowledge communities include extrinsic motivation, psychological motivation and community interest, and the barriers to deter participation include evaluation apprehension, social loafing, and time constraints, which agree with the categories of motivational factors discovered in previous findings.

Motivational factors are found to influence participation. Among them, extrinsic motivation was most significantly correlated with overall participation. Psychological motivation is moderately, yet not significantly, correlated with community participation, while community interest exerts barely any impact. Social loafing is the only barrier item that enjoys significant negative correlation with participation. The findings contradict with participants’ own accounts in
previous qualitative studies that community interest, other than extrinsic motivation, is the major stimulus for voluntary participation, and practical constraint such as time is the main barrier.

Anonymity is found to have moderation effects on the correlation between some motivational factors and participation. Specifically, the association between psychological motivation and participation remain more or less the same in different periods. However, extrinsic motivation does not exhibit consistent variances when the forum was switch to anonymous mode. Despite some methodological explanations, the irregular curve of the impact of extrinsic motivation on participation is quite perplexing. Among barriers, social loafing is found to be significantly reduced in anonymous periods as predicted, but evaluation apprehension is found to inhibit participation more severely in anonymous periods, contrary to our speculation. SIDE effect, along with the lack of manipulation check, and other methodological limitations, is suspected to account for part of the discrepancy.

This study empirically confirms the findings of earlier research on the components and structures of motivations and barriers to participation in knowledge communities. It also strives to establish a link between motivational factors and actual participation in virtual learning communities, which suffers from a scarcity of quantitative evidences in previous studies. Anonymity, though studied extensively in CMC literature, has not been widely explored in the context of knowledge communities. This study fills the gap by examining the impact of
anonymity and its interaction with motivations and barriers of individual members.

Contrary to some previous research on motivations and barriers, this study adopted experimentation as the major method, which is proved to be successful in establishing causal relationships and unveiling complex interactions between variables. Also the current study takes a longitudinal approach, which preserves the continuity of community participation.

One practical implication is that the level of identity exposure could be leveraged to enhance participation in virtual learning communities, contingent on different situational variables. The importance to understand and cultivate a community culture that conducive to participation is also highlighted in the study.

6.2 Limitations and Future Research Directions

The current study, clearly, has important methodological and theoretical limitations which demand attention in future studies.

First and foremost, the quasi-experiment has intentionally excluded the content of messages from measurement. Community participation, the dependent variable in this study, was operationally specified as the quantity and length of forum threads only, either of which, and combined, can indicate the efforts put in each contribution. This in part eased the whole process of data collection and analysis, and was also resulted from the inadequacy of previously developed categorizations of messages in virtual knowledge communities. Yet, the
oversimplification in measuring dependent variable may contain possibilities for negative effects, even though the “copy-and-paste” portion of their messages was already extracted. Quantity and length of messages may not necessarily reflect the effort devoted. A student could lightheartedly post several threads and replies on the same topic without contributing any meaningful asset to the community, while another individual may share an insightful comment that took a few hours of careful deliberation and composition.

Some other dimensions for measurement could be suggested, despite practical constraints. As we wish to measure the effort devoted to participation, time spent on compiling each forum entry could serve as one of the dimension. However, given the luxury of multi-processes online, concentrating on only one task would prove to be difficult, so that the precise time spent on message composition is not easily attainable unless special software is used. Another possible alternative is to include the quality, besides quantity, of knowledge contribution as the dependent variable. One way of doing this is to have external content analyst to categorize and rate the respective messages based on their quality, which inevitably suffers from subjectivity of the raters. The other method is to let the participants, sometimes the information seekers, to rate the “usefulness” of each message received\(^\text{12}\). Apparently it ensures more objectivity, but at the same time requires significantly more efforts from the participants.

\(^{12}\)One example to use participants’ rating is done by Constant, Sproull and Kiesler (1996). They adopted an event-driven survey methodology and sent out questionnaires to those who sought information in the electronic communication system. These subjects were asked to rate the replies to their inquiries based on perceived usefulness.
themselves to review and rate all the relevant messages, which may amount to several hundred and even more. Though with these constraints, future research is recommended to include the qualitative analysis and rating of the knowledge contribution, because it augments the study’s internal validity and facilitates the appreciation of the underlying patterns and intricate processes in knowledge communities.

Second, as noted earlier, the current study relies on the assumption that motivational factors stay unchanged throughout the whole experiment because only after the experiment was over did the participants report their perceived motivations and barriers to participation. In fact, the subjects’ retrospective “self-report” may not truthfully reflect the real causes, because it denies the “crowding-out” effect mentioned earlier, and neglects the possible overattribution of participation to the most recent, most desirable, or reiterated motivations rather than the real important ones. Future researches could consider circumventing the problem by adopting more sophisticated scales for subjects to assess their motivations, and probably repeating the measurement at distributed periods during the experiment.

Moreover, the methodological approach foregrounds the individual psychological and personality factors, while failed to explain their interaction with situational variables. As we acknowledge that the perceived motivations and barriers are not entirely inherent features of the individual, how they were shaped by the social context of a particular community is remain veiled. One promising
direction for future studies is to further explore why some lurkers in one online community may well become active contributors in another, and why some communities thrive while others perish. The ultimate question is to identify the technical features that make virtual learning communities effective, and for what tasks, settings, participants. To empirically explore the contingency theory for virtual learning community despite the already replete literature, we suggest a process-oriented perspective be employed, and the combination of qualitative (such as in-depth interview and focus group) and quantitative methods (such as social network analysis) be adopted.

Another important limitation is that the motivational factors included in the questionnaire survey are not exhaustive, since they were mostly extracted from past empirical studies and the pilot survey. Given that there are some unexpected results, other motivational factors could well be suggested in future research. For example, as the students did not only interact through IVLE forum, the pre-existing social networks amongst participants may play a role on participation. Future studies are recommended to include the participants’ social networks, together with other situational variables, into analysis.

A moderate reward (5% of final marks) was introduced in order to simulate the majority of real knowledge communities in organizational and educational settings, but complex effects were involved which may confound the interpretation of findings. Future research would benefit from testing whether the reward system could affect member’s attribution of motivations, and more
importantly, formulating recommendations for a reward system, leveraging extrinsic motivation, psychological motivation, and community interest, which is conducive to knowledge sharing contingent upon different circumstances.

Meanwhile, as mentioned earlier, manipulation check is essential to ensure the internal validity. Whether the students’ perceived affordance of the interface matched with the real anonymity offered by the system remains questionable. It is highly possible that a student may incidentally find the forum anonymous while other students who did not participate would not know either way. Also, though the purpose of the experiment was not made explicit to the subject, it might be possible that they felt some degree of artificiality and disturbance when the forum was manipulated.

Finally, the subjects were 101 students of “E-Leaning” module and only 83 people with complete files were included in the data analysis, which does not provide a satisfactorily large sample. The homogeneity of the participants also contributes to the relatively meager generalizability of the findings to a broader social context, at least in educational settings. Moreover, some of the results generated from data analysis should be interpreted with caution because of their “marginal significance”. Although the relatively small sample size may contribute to this, it is possible that these correlations are only statistical coincidences and can not provide sufficient evidences. The experimental design could always provoke possible attacks on its external validity. Hence replications and extensions are clearly called for in this area. The inconsistencies occurred in the
results also strongly suggest that qualitative research can be adopted to supplement the current one. A qualitative study can provide a more in-depth perspective on the complexities of system variable (e.g., anonymity), motivational factors, situational variables and participation in learning communities.
References


Appendix A

Integrated Virtual Learning Environment (IVLE) of National University of Singapore
Appendix B

Discussion Forum (Real name)

Format Education (VE, etc): First of all, it is important to learn, learning through self-study. Read the following articles to discover problems that are faced: fact is to share and thus obtain response to how difficult or accurate are your views with partisans to the topic of discussion. (In a nutshell, gauging insights) I don't deny that graded forums would not affect my participation(); neither can I deny that personal gain and satisfaction for posting a view which you feel strongly for does not play any part. If does of o... [text cut]

Informal Interest and Development: I take part in related ICT and philetrum community due to personal interest, position and strong motivation to acquire more knowledge as well as share knowledge. You feel a sense of identity as we are in a certain unmarked understanding of the culture practiced by people sharing the same interest.

Considerations on Community spirit cannot neglect reciprocally... even the most active, spontaneous and, dynamic member will shut a certain community if everyone remains silent.

Discussion Forum (Anonymous)

Form: ANONYMOUS
Date: 01/04/2004 02:33:06 PM
Heading: Default heading
Topic: Re: virtual degree
Although most of us have doubts about the validity of online degrees in the society; success and researches the US have shown otherwise. Almost all of the registered institutions grant online degree and the rest will view on case by case basis. All of the selected companies from the Fortune 500 “Most Admired Companies” accept online degree as long as they are from accredited institutions. In fact, there’s even an online MBA course offered by Babson College specifically tailored to Intel’s employees.

“I think you have to judge the individual and not the institution they attended.”

http://moneycentral.msn.com/content/savinganddebt/finnedbalert/ne/942659.aspx
Appendix C

Online Survey (April, 2004)

Background information:
We are currently doing a research project on Integrated Virtual Learning Environment (IVLE) of the National University of Singapore. This questionnaire survey aims to collect user information about IVLE forum.

Your information is very important to our research, and your kind cooperation will be highly appreciated. We promise: all the information collected in this survey is completely confidential, and will be used for research purposes only.

IVLE (Integrated Virtual Learning Environment, http://ivle.nus.edu.sg) is the learning management system deployed in NUS. To achieve its objectives, IVLE has a set of online tools and resources designed to facilitate collaboration and communication, and promote learning.

A discussion forum is a collaboration tool provided by IVLE that allows you to post a comment or question online. It allows other students taking the same module to read, comment or question what you have posted over time. The IVLE forum mentioned in the questionnaire are referring to module-related forum only.

Now please answer the questions according to the instruction.

1) This semester we have tried both real name forum and anonymous forum. Based on your experience, please indicate your attitude towards the following statements. (1 = strongly disagree; 7 = strongly agree)

<table>
<thead>
<tr>
<th></th>
<th>strongly disagree</th>
<th>strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Compared to real name forum, I feel the sense of community is weaker in the anonymous forum.</td>
<td>1  2  3  4  5  6  7</td>
</tr>
<tr>
<td>2</td>
<td>Apart from technical aspects, I find it is easier for me to speak up (to post messages) in anonymous forum.</td>
<td>1  2  3  4  5  6  7</td>
</tr>
<tr>
<td>3</td>
<td>Compared to real name forum, I feel less motivated to contribute to the anonymous forum.</td>
<td>1  2  3  4  5  6  7</td>
</tr>
</tbody>
</table>

2) The following are possible modes of the discussion forum. Based on your experience and expectation, please indicate your preference of each mode. (1 = not preferred at all; 7 = very much preferred)
1) forum that is completely anonymous

<table>
<thead>
<tr>
<th>Not preferred at all</th>
<th>Very much preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

2) forum that displays your real name

<table>
<thead>
<tr>
<th>Not preferred at all</th>
<th>Very much preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

3) forum that displays your nickname

<table>
<thead>
<tr>
<th>Not preferred at all</th>
<th>Very much preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

4) forum that allows you to choose your own level of disclosure, i.e. you can decide to display nickname, real name, or neither

<table>
<thead>
<tr>
<th>Not preferred at all</th>
<th>Very much preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

3) Throughout this semester, how many percent of all the forum messages of IF3204 have you read? (Altogether there are around 300 messages posted in the forum)

- 0-20%
- 20%-40%
- 40%-60%
- 60%-80%
- 80%-100%

4) Please indicate your frequency of visit to the IF3204 discussion forum every week.

- Less than once a week
- Once a week
- Twice a week
- Three times a week
- Four times a week
- Five times a week
- Six times a week
5) The following are possible reasons why you would participate in the IVLE forum. Based on your past experience, please rate the importance of these possible reasons.

I participate in IVLE forum MAINLY because:

Please rate the importance of the following reasons. (1=not important at all, 7=extremely important)

<table>
<thead>
<tr>
<th>Reason</th>
<th>Not important at all</th>
<th>Extremely important</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I can access useful information/learning material by using IVLE forum.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>2. I can seek others' help by posting question(s) to the forum.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>3. Forum participation is part of the module’s continual assessment.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>4. I use IVLE forum to access discussions regarding the module.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>5. I feel learning and sharing with others in IVLE forum is enjoyable.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>6. I gain strong confidence through contributing to IVLE forum.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>7. I gain strong self-satisfaction when I contribute to the IVLE forum.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>8. I can make friends and get to know each other better in the forum.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>9. My comments can be read by the whole class, and others will pay respect to me.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>10. We can share multiple viewpoints and complement each other in the forum.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>11. I enjoy interacting with peers interested in the same subject.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>12. I believe everybody’s contribution to the forum will advance the learning community.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>13. I think my participation is a response to others' contribution, and all our participations will lead to a more comprehensive and informative forum.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>

6) The following are possible reasons why you would NOT participate in the IVLE forum. Based on your past experience, please rate the importance of these possible reasons.
I do NOT participate in IVLE forum MAINLY because:
Please rate the importance of the following reasons. (1=not important at all, 7= extremely important)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Not important at all</th>
<th>Extremely important</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>My contribution might be misleading.</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>If I ask some question(s), I fear that others may think it is something I should already know.</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>I am somewhat shy to post to the forum.</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>There are already good postings on the topic. I fear that my contribution is not helpful.</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>I fear others may criticize or belittle my contribution.</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>There are few responses from other people.</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>My information and ideas are my own, and I am not obliged to share them with the class.</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>I do not like some of the people in the forum.</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>I do not have enough time to contribute as much as I wish.</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
</tr>
</tbody>
</table>

7) Based on your past experience, please indicate your attitude towards the following statements. (1= strongly disagree, 7 = strongly agree)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Not preferred at all</th>
<th>Very much preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I enjoy using the IVLE forum.</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>I find the IVLE forum user-friendly.</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>I believe using IVLE forum will help me achieve better understanding of the subject of my study.</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>I do not think IVLE forum is well-designed.</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>I think IVLE forum is very easy to use.</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
</tr>
</tbody>
</table>

8) Please indicate your experience of using the IVLE forum:

- More than 3 years (including 3 years)
- 2 to 3 years (including 2 years)
9) Please indicate for how many years you have been using computer.

☐ More than 10 years (including 10 years)
☐ 8 to 10 years (including 8 years)
☐ 6 to 8 years (including 6 years)
☐ 4 to 6 years (including 4 years)
☐ 2 to 4 years (including 2 years)
☐ Less than 2 years

10) Your gender:

☐ Male
☐ Female

This is the end of the questionnaire survey.

Thank you very much for your cooperation! 😊

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i Name and Matriculation number of respondents are automatically recorded when they log on to the online survey in IVLE.