

The Effects of Human Anxiety on Learning Behaviors in e-Learning Communities: The Difference of Gender

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Abstract :

In review of e-learning literature, we found plenty of studies focus on motivation of e-learners but few studies examined the factors negatively influence on learners' attitude and behaviors. To respond this need, this study proposes three-component anxiety, namely trait anxiety, social anxiety and computer anxiety to examine their effects on learners' attitude and their learning behaviors. Our findings show that three-component anxiety has significantly direct effect on attitude toward e-learning communities and indirect effect on learning behaviors. The moderating effect of gender is also examined, the findings show computer anxiety is the strongest factor in male group and social anxiety is the strongest factor in female group. Implications are proposed in the final section.

Keywords-component; CMC anxiety; Trait anxiety; Social anxiety; Computer anxiety; Online learning; elearning community

I. INTRODUCTION

In recent decades, the development and innovative applications of computer-mediated communication (CMC) change the ways people communicate and collaborate. Accompanying with the rapidly growth of online communities, people can meet like-minded people online to share their working experiences or common interests through CMC. For the professional needs, many knowledge workers also turn to virtual communities to seeking knowledge or asking questions for help [6]. Therefore, virtual communities have become a place to share interests, build friendships, create fantasy or perform trade [10]. E-learning communities are groups of learners to share their knowledge and learn from each other. These communities provide learners with formal or informal (marginal) opportunities to participate in e-learning platform anytime and anywhere services. However, free-tojoin model for most of e-learning communities, which attract a large number of members from different backgrounds. It is not easy to recognize the characteristics of members through anonymous or member account participation. Lack of body language and expression tone make the members' passion fade away as time goes by or even turn to other websites, resulting in unstable member relationship [27]. In general, members aim to meet their information, social and psychological needs in the communities. They would develop different levels of relationships with other community members. In view of the difference in community members' participation motivation, previous studies explored community members' intrinsic motivations in using e-learning communities continuously, including community citizenship, mutual trust, knowledge sharing self-efficacy, sense of community and enjoyment in helping others. Only a few research studies examined the negative factors affecting the continuous use of e-learning

communities, for example psychological barriers [21], opportunistic behavior [12] and Computer-Mediated Communication (CMC) anxiety [5].

Using e-learning communities not only requires basic computer and network communication equipment, as well as information processing capabilities, but also serves as an extension of the collaborative learning. It enables participants from different backgrounds and regions to contribute their knowledge and time to a common platform for the shared values. However, one of the core considerations for developing communities is whether participants can develop social skills as well as share interests, experiences and knowledge with strange community members so as to increase interaction frequency among community members. Ridings et al. [21] considered CMC anxiety as a very important factor regarding how to break down the psychological barriers to interacting with people and further develop positive feelings towards the communities. The study discussed the relationship between anxiety and CMC. It believed that CMC anxiety negatively affects individual's attitude towards using CMC and thereby affect the actual use of CMC. As community members using e-learning communities involve difference in characteristics of individuals and CMC, this study illustrates CMC anxiety from the perspectives of trait anxiety, social anxiety and computer anxiety. It further explains community members' behaviors in using e-learning communities.

II. LITERATURE REVIEW

A. *Factors Affecting the Growth of e-Learning Communities*

e-Learning community is a kind of virtual communities. Preece [18] believed that motivation for joining virtual communities includes information exchange, providing support for internet users, informal conversation in chat rooms and discussion on certain issues. Wang et al. [25] pointed out that virtual communities can satisfy people's psychological needs (recognition, sense of belonging, means of involvement), social relationship development and other social needs, including trust, members' relationship development, communication and interaction. As e-learning communities are the extension of communities through CMC tools, members can share with each other their common interests through communication technology. They are a network existed among people, providing functions, such as socialization, support, information, sense of belonging and social identity. Adler and Kwon [1] were of the opinion that social capital can be developed among community members, including network of social relations, norms, shared beliefs and trust. Through continuous accumulation of social capital, it stimulates community members' enthusiasm, so that members voluntarily contribute knowledge in the community or help other community members. Therefore, community members' positive attitude would enhance members' visit frequency and attract community members to keep up their enthusiasm and loyalty [12][27]. Only members with positive attitude towards the communities would be willing to stay and continue to take part in activities. Hence,

H1: In e-Learning communities, positive attitude towards the community will enhance the level of community usage.

B. *Negative Factors for Online Community*

Registration is free for most of the communities, which attract a large number of members from a multiplicity of backgrounds. Therefore, it is not easy to recognize the characteristics of members. Lack of body language and expression tone may make the members' passion fade away as time goes by or even turn to other websites, resulting in unstable member relationship [27]. e-Learning community members can create new identity recognition, showing different appearance from normal circumstances, so that they can communicate more freely and lively. However, it may lead to slander about each other or deliberately provoke internet disputes due to the difference in communication situation and understanding, turning interaction into chaos which is full of misunderstandings [20], social norms and restrictions in certain communities, community members may vent their anger, which they are less likely to express in their daily lives, and other emotions through the Internet [14], causing negative impact on the community. Furthermore, in view of the difference in human nature, most of the community members are only willing to view others' message contents and less likely to share information or respond to online content in a proactive manner [21]. This even produces self-serving speculating behaviors and affects virtual community development [11]. Brown et al. [5] considered CMC Anxiety to be a special type of anxiety. People would create nervous and uncomfortable emotions because of using computer and network to interact with people. They experience uneasy feeling and create negative perception towards CMC, further preventing them from using such kind of technology. Besides, due to the anxiety caused by computer and communication tools, negative influence on attitude towards CMC would reduce the CMC usage. Huang et al. [12] chose the communities of foreign students learning Chinese language as study subjects and found that CMC Anxiety creates significant negative effects on community usage. Hence, this study proposes the following hypothesis:

H2: In e-Learning communities, CMC Anxiety has a negative influence on members' attitude towards the communities.

C. *Decomposed of Community Members' Anxiety*

Anxiety is a state of anxiety and tension. It is also a state of unpleasant feeling. It is usually accompanied by some of the psychological and physiological reactions. Handling a particular job, performing a specific task or exploring a strange environment will create a state of tension and anxiety. It will often associate with nervous system responses, such as sweating, heart palpitations and chest tightness, headache, gastrointestinal discomfort, anxiety and restlessness in more intense situation. The presence of these characteristics varies among individuals. The anxiety felt by each person is different. Due to individual difference in past experience, anxiety created will also be different. If a person gets nervous easily, he will also enter into a state of anxiety easily. If he anticipates failure and believes that the external environment is threatening, he will doubt about his own ability and lose his self-confidence. Thus, he will always respond in an inefficient way or avoid similar high-pressure situations, further affecting his own learning performance [16].

The anxiety discussed in this study is mainly the anxiety caused by using CMC. However, as it is happened in the e-learning communities, the interaction between people and communities not only relates to the use of computer tools, but also involves social skills and the impact of their characteristics, forming distinct form of CMC Anxiety.

Trait anxiety is defined as relatively stable individual differences in anxiety proneness, which is different anxiety response tendency to perceived threats in the environment. Everyone has a different level of anxiety-related personality traits. General speaking, people with high trait anxiety normally experiences a more intense feeling of anxiety than those with low trait anxiety in stressful situations [7]. Trait anxiety belongs to individual's immediate emotional reaction, that is, an individual will immediately enter a state of nervousness, apprehension and impatience when the environment is under pressure or threat. Therefore, the perception response to the environment is sensitive [22]. In a situation under pressure and threats, people with low trait anxiety will indicate defensive, avoidance and rational attitude in response to anxiety, whereas people with high trait anxiety will reflect strong anxiety [2]. Hence,

H3: In e-learning communities, community members' trait anxiety will affect their CMC anxiety.

Social anxiety is originated from real or imagined social situations. The anxiety generated from negative evaluation of expected or experienced interpersonal contacts [22] is also known as social phobia. A majority of people have social anxiety. They are shy and worry about others' perception. Their negative cognitive characteristics are, for example, worrying others' negative evaluation, holding more negative attitudes towards themselves [19], and often showing avoidance or safety behavior. In addition to avoid social occasions, they will avoid eye contact with others, try to stay away from the crowd or speak less in social occasions. In the situation of e-learning communities, they will experience syndromes of anxiety, such as distress, avoidance, and cheerless, while facing strange community users and using unfamiliar community interface tools, such as emoticons. The complexity of technology tools will produce different levels of social anxiety. Furthermore, the difference between using online interaction (such as chat rooms and instant messaging) and using offline interaction (such as message boards and blogs) will produce different levels of social anxiety due to their response time variations.

Hence,

H4: In e-learning communities, community members' social anxiety will affect their CMC anxiety.

Computer anxiety is people producing the emotion of fear, resistance, anxiety, tension or anxiety tendencies towards computer technology. It is accompanied by psychological unwell or discomfort, which may affect or hinder future learning of computer usage or the perception of computer. Social learning theory pointed out that people with high computer anxiety level usually have a low level of computer self-efficacy. Some scholars believe that there is inter-relationship between computer self-efficacy and computer anxiety and thereby affecting the performance of computer usage. A considerable amount of researches in the past have pointed out that computer anxiety negatively affects computer usage behavior. Brown et al. [5] believed that using online functions, such as virtual communities or e-mail, allow a person to have access to computers. Therefore, an individual's computer self-efficacy and computer anxiety will have a positive effect on CMC anxiety. Hence, this study proposes the following hypothesis:

H5: In e-learning communities, community members' computer anxiety will affect their CMC anxiety.

III. RESEARCH METHODOLOGY AND RESULTS

The research model was tested with data from members of one virtual community called YouthWant. It is a well-known knowledge virtual community in Taiwan. YouthWant was founded in April 2000; it had over 20,000 registered members by the end of Oct. 2011. A banner with a hyperlink connecting to our web survey was posted on homepage of YouthWant from July 1 to September 30, 2011 and the members with knowledge sharing experience were cordially invited to support this survey. A number of respondents will be randomly selected for offering incentive payments amounting to US\$10. This is done for increasing the incentives of participants and the quality of questionnaires. Of the 291 surveys received back, 287 were fully completed and usable for the purpose of this study.

A. Construct measurement

Measurement items were adapted from the literature wherever possible. Based on Brown et al.[5], minor modifications were made to fit the specific context of knowledge VC. New items were developed based on the definition provided by the literature. Specifically, community usage was measured using scales adapted from Brown et al., [5]. Trait anxiety was measured using scales adapted from Chung and Long [7]. CMC anxiety was measured using scales adapted from Brown et al.,[5]. Computer anxiety was measured using scales adapted from Thatcher and Perrewe [24]. Social anxiety was measured using scales adapted from Leary[15]. The attributes were then summarized to create a survey instrument, which asks respondents to identify the extent to which they agree/disagree with respect to their experience with usage on YouthWant. Each item was rated on a scale of 1 to 5, where 1 equals “strongly disagree” and 5 “strongly agree.” Table 3 shows the measurement items of constructs.

Pretests were conducted to ensure the instrument is acceptably valid. The instrument was first evaluated for content validity by three IS/KM scholars, and then further tested for reliability, item consistency, ease of understanding, and question sequence appropriateness. Twenty friends who have taken YouthWant were asked to complete the questionnaire. Comments on question sequence, wording choice, and measures were solicited, leading to minor modifications of the questionnaire. Based on feedback from pretest subjects, several items were removed from our instrument.

B. Measurement model

The measurement model was evaluated in terms of convergent validity and discriminant validity. Factor loadings in the study exceeded 0.7, which represents the measure model is significant due to high convergent validity. Composite reliabilities in the measurement model ranged from 0.71 to 0.94 and were all above the minimum of 0.7 as suggested by Nunnally (1978). Average variance extracted (AVE) ranged from 0.61 to 0.84. For discriminant validity, diagonal elements should be larger than off-diagonal elements. Comparing all the correlations and the elements on the diagonal, the results demonstrate adequate discriminant validity for all the reflective constructs. Hence, all two conditions for convergent validity were met.

C. Structural model and hypotheses testing

This study selected PLS for data analysis because of the use of noninterval scales, the absence of multivariate normality, and the small sample size. The ability to detect and accurately estimate the strength of interaction effects are critical issues that are fundamental to social science research in general and IS research in particular. As shown in Figure 1, all the hypotheses were supported. CMC Anxiety is the strongest predictor of numbers toward community attitude and usage. Hypothesis H3-H5 were supported and implied that the antecedents of CMC anxiety (trait anxiety, social anxiety, and Computer Anxiety) had significant effects on members' CMC anxiety ($R^2=0.56$). Since PLS does not generate an overall goodness of fit index, one primarily assesses validity by examining the R^2 of the endogenous constructs and the structural paths.

We then further explore the moderator effect of gender. Demographics of respondents were 49% Female (n=138) and 52% Male (n=149). In Figure 2, showed that computer anxiety determines CMC anxiety. While, Female are more sensitive to social anxiety (as showed Figure 3). Both for male and female, CMC anxiety is negative significant for his/her community attitude.

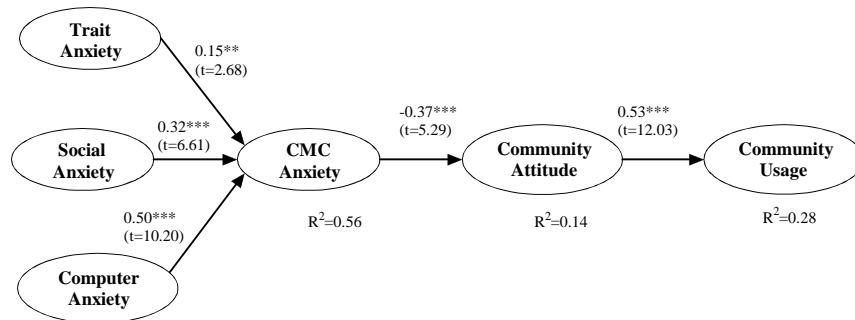


Figure 1 PLS results of structural model (N=287)

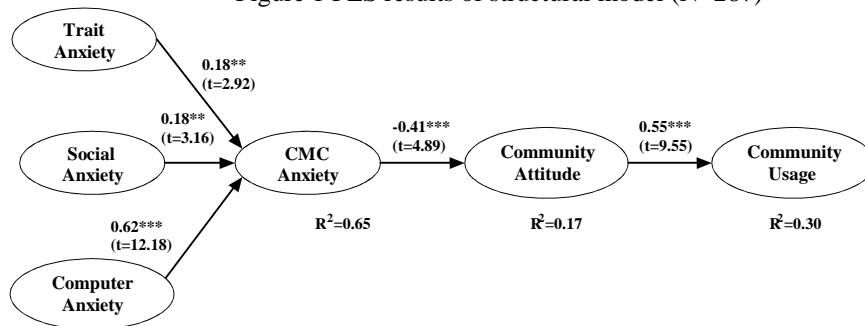


Figure 2 PLS results of structural model for Male (Boys N=149)

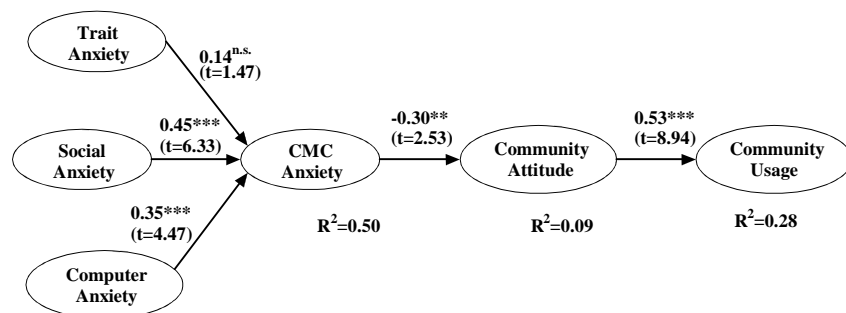


Figure 3 PLS results of structural model for Female (Girls N=138)

IV . CONCLUSION AND SUGGESTIONS FOR FUTURE STUDIES

To many online groups, participating in e-learning communities is part of their daily lives. However, the enthusiasm of some internet communities is much lower than expected. In the past, researchers have already explored many positive factors influencing online community development. Only a few studies have focused on negative factors. This study explored and proved that e-learning community members' CMC anxiety has its impact on community usage attitude and their actual behavior. It found that CMC anxiety significantly affects the community usage attitude ($R^2=0.14$) and indirectly influences the communities' actual behavior through their attitude ($R^2=0.28$). As compared with the result of Brown et al. [5] ($R^2=0.14$), this study can better explain the variations. It may be because this study has a clear research theme and scope. Many technology-related studies consider gender as disturbance variable so as to further interpret the impact of demographic variables on research results. In this way, this study divided the subjects into two groups based on their gender. One group is male community members (a total of 149) and the other group is female community members (a total of 138). The result found that the relative relationship between trait anxiety and CMC anxiety on the two groups are different. It means that male communities members' trait anxiety even have a greater impact on CMC anxiety than that of female community members. Female community members may be shier in nature and their social anxiety influence on CMC anxiety is greater than that of male community members. The results are consistent with previous findings of Pierce [17] groups' CMC anxiety significantly affect community attitude in a negative way. This means that community development can not only consider factors with a positive effect, such as social capital, but also need to focus on the impact of anxiety, try to improve the interface design of internet communities or help to reduce the anxiety of the participating community members in order to maintain the enthusiasm of online community. This study took members participating in e-learning communities as subject group. Future researchers are recommended to carry out further analysis based on theme variation, and investigate the impact of negative factors on other interest groups or business communities.

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