Motivating Knowledge Seeking and Sharing Behavior in the Online Discussion Forum

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Abstract: This study developed an online discussion forum that motivate students' knowledge seeking and sharing. The forum enables students post questions anonymously and provides a question or response prompt that invite students to engage in the discussion after completing a quiz. A quasi-experimental approach was conducted with a sample of 100 students. The results indicated that the students in the experimental group exhibited more active participation in knowledge seeking and sharing, as well as showed a higher density of group's social network. The findings provide some evidence for the value of the motivational design, in terms of anonymous questioning and prompt features, to address the challenge of under-contribution in online discussion forums.

Keywords: Knowledge seeking, knowledge sharing, motivation, online discussion forum

1. Introduction

With the advancement of information and communication technology, the Internet now provides students new channels such as email, search engines to seek academic help online. Online discussion forums have already demonstrated their potential to facilitate collaborative problem-solving among students. However, the effectiveness of these forums is intrinsically tied to how actively students participate and how deeply they engage with one another. Additionally, previous research has shown that only a minority of students would like to post their questions or to respond to others' queries (Chao et al., 2018). As a result, it is essential to create a supportive environment for online discussions in order to motivate student engagement in actively seeking and sharing knowledge.

2. Literature Review

2.1 Knowledge Seeking and Sharing Behavior in the Online Discussion forum

Online discussion forums provide a place where students and teachers can have discussions regarding course materials and assignments online, regardless of time and place (Demir et al., 2023). In these forums, students interact with peers and teachers to seek and share knowledge. Knowledge seeking behaviors involve looking for information, help, or advice in response to a need. It's like learning from what others have experienced. Knowledge sharing behaviors include offering information and/or knowledge about personal experiences and making it available to others (Kumi & Sabherwal, 2019). Active participation and engagement in these discussions are crucial for facilitating effective knowledge exchange (Arazy et al., 2016). However, the well-known dilemma of the "tragedy of commons" manifests in online discussion forums, where many individuals tend to free ride or under-contribute rather than take the time to continually share their knowledge (Chen et al., 2019), leading to a decrease in participants posting questions. Therefore, motivating students to participate in and

contribute to online discussions for the purpose of seeking and sharing knowledge is challenging.

2.2 Motivation to Seek and Share Knowledge

Motivation refers to those methods that attribute efforts, direction, or purpose to the requisite behaviors, and plays an important role in the knowledge seeking and sharing process (Ergün & Avcı, 2018). In such situation, the self-determination theory differentiates two primary types of motivations: intrinsic motivation, driven by inherent satisfaction and enjoyment, and extrinsic motivation, characterized by the inclination to perform for external rewards.

Previous studies have explored the internal and external motivating factors that support individuals' engagement in knowledge seeking and sharing in various contexts. For example, Kwahk and Park (2016) underscored the positive correlation between knowledge self-efficacy and knowledge sharing, as well as continued sharing. Individuals with high knowledge self-efficacy demonstrate a heightened sense of responsibility, motivating them contribute high-quality contents to the online discussions (Zhang et al., 2019). Therefore, considering interventions that invite individuals with high knowledge self-efficacy, such as students with extensive experience or a profound grasp of the subject to engage in knowledge-seeking processes, may enhance the value of knowledge exchange and improve students' willingness to actively participate in knowledge acquisition in an online discussion forum.

Additionally, reputation serves as a significant motivator for active engagement in online discussions. Karabenick and Dembo (2011) proposed that the absence or avoidance of knowledge seeking may not be directly related to the degree of help a student may need. Instead, when students refrain from seeking help, it may mean that they are embarrassed to seek academic help (Koc & Liu, 2016). Hence, it is recommended that the fundamental design of any online discussion forum should consider concealing the questioners' identities to safeguard self-esteem and thereby enhance students' participation in knowledge seeking.

Based on the aforementioned concerns, the design of an online discussion forum system for enhancing knowledge seeking and sharing should consider the motivational factors that encourage meaningful interaction among students. To address this need, the current study modified an online discussion forum to enable students to post questions anonymously and actively engage in online discussions. Furthermore, this study investigates the impact of the modified online discussion forum on students' engagement in both knowledge seeking and sharing activities. The research questions in this study are as follows: (1) What impact does the modified online discussion forum have on students' engagement in knowledge seeking and sharing? (2) What impact does the online discussion forum have on students' social network?

3. Methods

3.1 Participants

The study included 100 graduate students (24 males and 76 females) enrolled in the C programming course at a university in Beijing. All students are all non-computer majors, including psychology, physics, and other majors. Each participant was assigned to either the experimental or control group at random.

3.2 Online Discussion Forum

Daily Quiz is a practice system that offers a sequence of multiple-choice questions and supports distributed practice for novice programming (Li et al., 2021). This system enables students to take quizzes, view correct answers, as well as read the related materials. Below each daily quiz is an online discussion area where students can post their questions or provide responses to others' queries. As a question is posted, the system generates timely

notifications to inform the students of any comments from peers or teachers, facilitating rapid checking and response to the received messages. Furthermore, they can also express their perspectives on the replies received using the 'like' feature.

Daily Quiz provides two discussion forum-related features exclusively for the experimental group. The first feature is the anonymous questioning, which allows students to post questions without revealing their identities (see Figure 1.). The second is a question or response prompt that invite students to engage in the discussion. For example, after successfully completing a quiz, the system creates a prompt encouraging participation in the discussion forum, along with a message like "Congratulations! Please enter the discussion forum to help the 5 students who are experiencing trouble with this quiz."

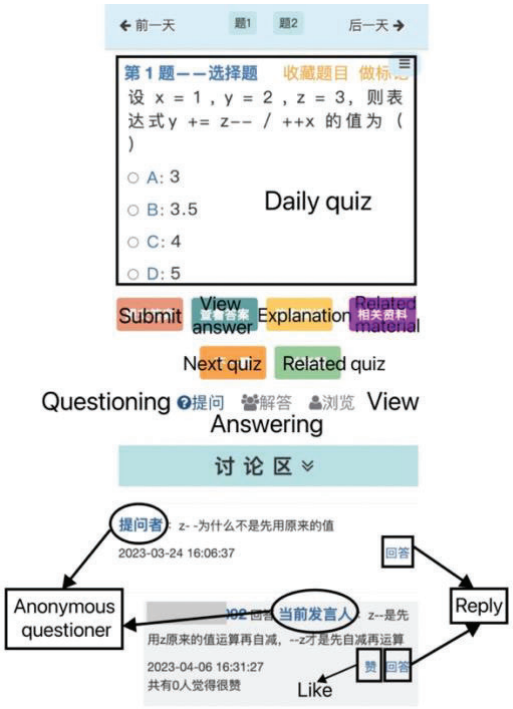

Figure 1. The Online Discussion Forum for Experimental Group

3.3 Procedure

The study lasted for eight weeks. In the first week, the teacher introduced students to the Daily Quiz and provided them a video tutorial outlining the basic features of the system. Students were encouraged to use the discussion forum to post their questions or provide comments to the questioners. In the remaining weeks, the teacher continued teaching the C programming course, and students used Daily Quiz for practice and engaging in interaction during their available spare time. Notably, students in the experimental group would remain anonymous when they ask questions and receive the prompt after completing a quiz. In contrast, the functions of anonymous questioning feature and prompts were turned off for the control group within Daily Quiz.

3.4 Data Collection and Analysis

During the course, the two groups of students were free to use the features of Daily Quiz to do quizzes and resolve their questions in a convenient location and at a convenient time. All students' activities of taking quizzes, posting questions, making comments on questions, giving likes were collected. To address the research questions raised in this study, the frequency of these activities was computed to compare the differences between the experimental group and the control group.

Social network could represent social connections between people and reflect the qualitative aspect of participation in collective activities. Social Network Analysis (SNA) is a valuable method for revealing relationship patterns among members of social systems. Various studies have indicated that SNA can map interactions in text-based asynchronous online discussions in an effective and analyzable manner (Norz et al., 2023). For example, Lim (2023) used SNA to investigate the features and patterns of student interactions on online discussion boards during a course and found the critical role of social presence in enhancing students' online learning experiences and outcomes. Through SNA, we could gain insight into students' activity levels and participation patterns participation patterns in online discussions. Thus, SNA was employed to explore the degree of student participation in interaction in this study. The network data which comprise a set of nodes and ties was derived from the interactions among students through exchanged postings. SNA was then created with UCINET 6.0 software and visualized with Netdraw (Borgatti et al., 2002).

4. Results

4.1 The Differences in Knowledge Seeking and Sharing Behavior

A series of independent sample t-tests was used to examine the difference between the experimental and control groups in terms of students' behavior in the online discussion forum, as shown in Table 1. The results revealed significant differences in the participation of asking questions, answering, and liking responses. Specifically, students in the experimental group had significantly higher frequencies than those in the control group for posting questions (t = 6.585, p < 0.001). In terms of answering questions, the experimental group made significantly more comments on others' questions (t = 9.969, p < 0.001) than the control group did. Moreover, there was significant differences in giving likes on the responses with the experimental group had higher frequencies of liking than the control group (t = 4,362, p < 0.001). These results indicate that the modified online discussion forum could potentially facilitate students' knowledge seeking and sharing activities as well as motivate them to interact with others.

Table 1. *Comparison of Students' Behavior of the Experimental and Control Groups*

Variables	Experimental group (N=52)	Control group (N=48)	*t*
Questioning	4.44±5.09	0.00±0.00	6.585***
Answering	23.79±17.33	0.67±0.58	9.969***
Liking	4.96±7.86	0.15±0.55	4.362***

Note. ***p<0.001, **p<0.01, *p<0.05.

4.2 The Differences in Social Network

SNA was employed in this study to explore the social connections within both experimental and control groups. Figure 2. illustrates the social network of the control group, which has just 3 nodes (students) and 2 ties (connections between students), showing that there is little interaction among them. As shown in Figure 3., the social network of the experimental group exhibits a higher density and increased connectivity. A significant majority of students in the experimental group actively engaged in the online discussions and responded to peers' questions. These findings demonstrate that the value of the design strategy that prompt students to enter the discussion forum to post or answer questions. This strategy not only facilitate their engagement in meaningful conversations but also serve as a motivation for their knowledge seeking and sharing behaviors.

Figure 2. The Social Network of the Control Group

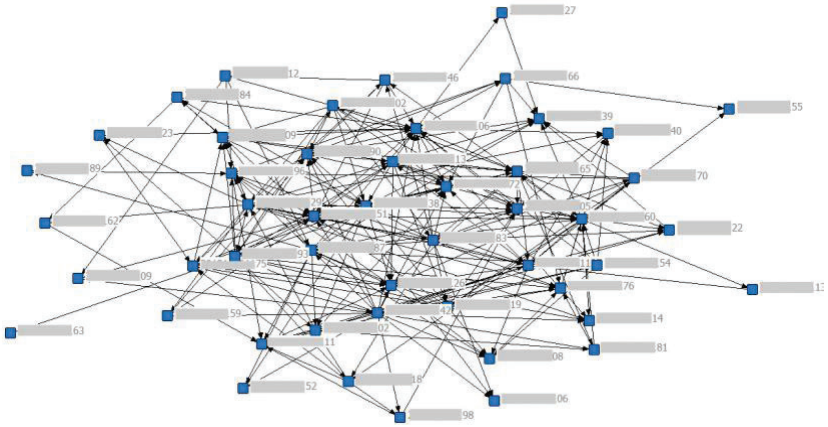

Figure 3. The Social Network of the Experimental Group

5. Conclusion

This study introduced an online discussion forum to motivate students' active engagement in knowledge seeking and sharing activities. The effectiveness of this forum was further explored by analyzing students' participation in knowledge seeking and sharing, as well as the social network of student groups. The results indicated that the students in the experimental group have significant higher frequencies than the those in the control group for questioning, answering and giving positive feedback on those valuable comments. Knowledge construction mainly happens in reading and commenting on others' posts by internalizing and integrating external useful information from others(Ye & Pennisi, 2022). The active participation of students in the experimental group in the discussion forum may help them achieve better knowledge construction. In terms of the social network, the experimental group exhibited a closer relationship among students than the control group. The overall results revealed the efficacy of the modified online discussion forum in promoting active participation and knowledge exchange. The anonymous questioning feature in the online discussion forum fostered a comfortable environment where students felt at ease posting their queries publicly. Moreover, the prompt inviting students to participate in the discussions instilled a sense of responsibility among those proficient in the quiz content, motivating their help to peers in need. Consequently, this study provides innovative approach to address the challenge of under-contribution in online discussion forums from the motivational perspective.

This study has some limitations that offer opportunities for future research. Specifically, the current study explored the combined effects of two features. Future research could adopt a segmentation approach, segregating participants into distinct groups to investigate specific impacts on knowledge seeking and sharing. Furthermore, it should be noted that a minority of students displayed limited engagement in discussions, with some forming only minimal ties (2 or 3) in the social network of the experimental group. Future studies can explore strategies more adept at stimulating students' participation and engagement in knowledge exchange in the online discussion forums.

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