JDER
Journal of Distance Education & Research

July - December – 2016
journal.vu.edu.pk

Effectiveness of Online Discussions in Developing Higher Order Thinking Skills

Asma Zafar
Lecturer, Department of Psychology
Virtual University of Pakistan
asmazafar@vu.edu.pk

Abstract

Online discussion is a major instructional component of e- learning. It promotes students' critical thinking about course materials and thereby sharpens their higher order thinking skills (HOTS). In this context, this study documents the perceived effectiveness of Graded Discussion Board (GDB) discussions in the Psychology courses of Virtual University of Pakistan (VUP). The main objectives of this study were (i) to find out whether GDB discussion facilitate in developing HOTS among students or not and (ii) to determine the effectiveness of GDB discussions in enhancing their analytical and problem solving abilities. The data was collected through an online survey. The sample size was 78 enrolled students in three psychology courses: Clinical Psychology (PSY 401), Abnormal Psychology (PSY 404) and Sport Psychology (PSY 407). Descriptive statistics, one-sample t-test, and independent sample t-test were used to analyze the data. The results of the study revealed that GDB discussions enhance students' subject-related knowledge as well as help them in sharpening their analytical skills. This study by focusing on the role of GDB discussions in enhancing students' HOTS is also expected to provide e-educators and policy makers a food for thought to look for innovative methods of polishing subject specific cognitive skills of students particularly in an e-learning environment.

Key words:

Online Discussion, Higher Order Thinking Skills, Graded Discussion Board, Critical Thinking, Cognitive Skills.

Introduction

Higher order thinking skills (HOTS) are assumed to incorporate more cognitive processing skills than a mere recall or memorization of information among students. HOTS include critical and logical thinking, reasoning, problem solving and creativity. These skills are developed when a person faces novel situations and questions or applies theoretical concepts to new situations (Hallet, 1984; Ruggiero, 1975; Walters, 1994). A common understanding about the development of HOTS is that it may enhance students' learning up to the second level 'comprehension' thus directing their theoretical knowledge towards application, analysis, synthesis and evaluation. When students successfully apply these skills, they are better able to explain their viewpoints, take right choices within the context of existing knowledge that eventually results in the continuous development of HOTS. It has always been a challenge for teachers to inculcate HOTS in their students. However, it is even more critical in online learning environments where teachers do not have face-to-face interaction with their students. This fact has also been ascertained by a few researches as reported that it is difficult to maintain higher order cognitive processing in online environment (Garrison, Anderson, & Archer, 2001; Schellens & Valcke, 2005; Sing & Khine, 2006).

Some researchers (Zohar & Dori, 2003; Zohar & Schwartzer, 2005) proposed a two way approach of teaching HOTS, i.e. infusion approach and separate subject approach. Infusion approach is characterized by teaching of HOTS in a content specific setting whereas separate subject approach refers to general strategies used across subject domains. For assessing students' subject related knowledge or application of theoretical concepts, several techniques are used. Assessment is a significant pillar of any learning system and it has a vital role in designing and structuring a learning environment (Benson, 2003; Comeaux, 2005). "Insufficient attention to pedagogical questions and concerns arising from the practice of on-line teaching ... raises questions about assessment of learners in on-line classrooms" (Speck, 2002, p. 5). In an online learning environment, effective and appropriate assessment techniques are strongly needed to be identified. Further, which assessment technique should be used and how it will be monitored are some of the concerns of e-instructors. Appropriate selection and effective monitoring make the assessment procedure more meaningful for the students as well as teachers (Mandinach, 2005).

Online discussion is not only a major instructional component of online education but it has also become an important element of some courses supplemented with online support. Due to the pervasive use of online discussions, researchers are interested to study their effectiveness and contribution to online learning. Studies reveal that learners demonstrate higher levels of critical thinking in online discussions when effective questions are posed and expectations regarding the discussion are shared by the instructor (DeLoach & Greenlaw, 2007; Wang, 2005). With the help of

asynchronous discussions, students are able to acquire professional knowledge and skills which are needed to excel professionally. Taking part in discussions enhances their ability to think skillfully by analyzing, assessing and reconstructing, which further leads them to communicate effectively. Provision of innovative opportunities on discussion boards is another advantage that increases student satisfaction (Chiu, 2009; McLoughlin & Mynard, 2009; Solimeno, Mebane, Tomai, & Francescato, 2008; Yang, 2008).

A study by Tiene (2000) concluded that in comparison to face-to-face discussions, the participants of online discussions were better able to recall core concepts because they had sufficient time to ponder upon the topic/question, read the related material, and go through their notes before posting their comments. Another reason of this difference can be the anticipation of peer evaluation and they have another advantage of computer interface that "constitutes an additional perceptual channel by which course content was processed and, as such, may strengthen the input of material into cognitive structures" (Johnson, Howell, & Code, 2005, p. 70).

McLoughlin and Mynard (2009) suggested some conditions that must be present in the learning process for flourishing HOTS among the students. Given task should be relevant and appropriate; prompting should be provided by instructors and the last but not the least some guidelines need to be there to ensure the development of HOTS. Lin and Overbaugh conducted a study in 2007 on the format of online discussions. In their research, synchronous discussion was compared with asynchronous discussion and asynchronous discussion was found to be more effective. They concluded that within the context of online environment, many students may not be able to self-regulate their learning. Instructions and guidelines should be very clear and unambiguous while focusing the teaching on learners' cognitive skills. They stressed that the provision of monitored and moderated environment was essential for inculcating HOTS among the students.

Virtual University of Pakistan (VUP) is a pioneer institute in online learning in Pakistan and it has adopted advanced methodologies for learning and evaluation of its students. The discussion fora at VUP are of two types, i.e. graded or non-graded. In this study, Graded Discussion Board (GDB) posts will be focused. These posts are generated for the core purpose of developing HOTS among the students. GDB questions given to the students of BS Psychology are supposed to serve the purpose of developing an in-depth understanding of the social problems, behavioral issues and possible solutions of existing psychological ailments. The basic tenet behind these discussions is to direct the students to develop their own opinion over diverse issues. Topics given for discussions open a room for debate, leading students to grab knowledge and thereby add their personal input about the issues. GDB topics are selected according to the current events/situations while keeping in consideration the basic and core concepts of psychology. Moreover, these posts are given to the students which are

related to everyday situations. Discussion topics are generated in a two way dimension. A statement is given to the students and they may agree or disagree with the given concepts/statements/ situations by giving reasons of agreement/disagreement. The students generate their discussions which are based on their own observations as well as the application of psychological principle. In this regard, the researchers aimed at measuring the perceived learning with HOTS development of the students of BS Psychology program. The main objective of the study is to determine the effectiveness of these GDB posts on the students' learning that may enhance their analytical and problem solving abilities.

Objectives of the Study

The main objectives of the study are to:

- Find out whether or not GDB discussions help the students in developing HOTS
- Determine the effectiveness of GDB discussions on the students' learning and comprehension that may enhance their analytical and problem solving abilities
- Compare the perception of the students who have been engaged in GDB discussions in previous semesters as well as those who are new to these posts

Hypotheses of the Study

H1: A significant mean difference exists between values on the dimensions of subject understanding and analytical skills, critical thinking and real life application from test value (06 and 04 respectively) of the students.

H2: A significant mean difference exists between the students who have attempted GDB posts for the first time with those who have prior exposure GDB discussions.

Method

This study was quantitative with an inductive approach. As objective of the study was to find out the effectiveness of the GDB discussions in developing HOTS among VUP psychology students so, those practical and analytical courses were selected where the students were given HOTS based GDB topics in the semester Spring 2015 i.e. Abnormal Psychology, Clinical Psychology, Sport Psychology. A questionnaire based on 5-point Likert scale inspired by Renda-Tanali's 2012 questionnaire but with certain modifications was deployed as a tool of data collection through an online survey. The core dimensions used to measure HOTS were i.e. subject understanding, critical thought, analytical skill building, and real life application/evaluation. Out of 211 students of the semester Spring 2015, 78 responded to the questionnaire. Reliability of the questionnaire on Chronbach Alpha was 0.81. For data analysis purposes, descriptive statistics, one sample t-test and independent sample t-test were applied.

Description of GDB Topics

Following is the brief description of each GDB topic given to the students for discussion:

Abnormal Psychology (PSY404)

In PSY404 course, following statement was given for discussion:

> *"Stress is usually associated with negative life experiences but there are some research findings which suggest that stress can be experienced even with pleasant life events. In your opinion, why does it happen? Explain with real life examples."*

This GDB topic was about stress. The students were required to discuss by citing real life examples. A life event that requires an individual to make a readjustment or a change in his or her life creates stress in an individual. Major stressors may be the pleasant events such as promotion and wedding may act as stressors because they demand more responsibility.

Clinical Psychology (PSY401)

In PSY 401 course, following statement was given:

> *"People are confused about the role of a psychologist and psychiatrist because they usually obscure the role of prescription as they do not know that clinical psychologist is not authorized to prescribe medication. Do you think, such discretion should be removed or carried out in order to maintain the credibility of both domains? Justify your stance in either case."*

The discussion topic was about the students' choice regarding the discrete role of a psychologist versus a psychiatrist. The students were supposed to share a learned opinion in comparison to general public's confusion about both terms and ensuing roles thereby.

Sport Psychology (PSY407)

The following statement was given for discussion in the course Sport Psychology:

> *"In Cricket world Cup 2015, Wahab Riaz and Shane Watson, both were fined by ICC because of showing aggressive behavior and instigating each other. How acceptable is this behavior in your opinion? Whether this act had a positive or negative effect on their performance? Discuss keeping in view different theories of aggression in mind."*

The topic was about the role of aggression in sports and its impact on the athlete's performance. The students were supposed to discuss whether aggression in sports affects an athlete's performance or not. They were required to discuss the said notion while keeping in mind the current mega event of cricket world cup (2015) in which Wahab Riaz and Shane Watson showed aggressive behavior.

Results

In order to determine the effectiveness of online discussions in developing higher order thinking skills among students, descriptive and inferential statistics was applied.

Table 1

Descriptive Statistics of the Constructs

Subjects Name	Subject Understanding		Critical Thought		Analytical Skill Building		Real life Application	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Abnormal Psychology	11.41	2.78	11.41	2.78	7.67	1.91	8.05	1.73
Clinical Psychology	11.63	3.15	10.50	3.50	7.38	2.13	7.00	2.39
Sport Psychology	12.50	2.25	12.17	2.40	8.00	1.41	8.50	1.51

Mean score in Table 1 shows that the students respond more positively about 'subject understanding' in the course Sport Psychology (*M*=12.50, *SD*=2.25) as compared to Clinical Psychology *(M*=11.63, *SD*=3.15) and Abnormal Psychology *(M*=11.41, *SD*=2.78). Students report that GDB discussions serve the purpose of inculcating critical thought among them as compared to Abnormal Psychology and Clinical Psychology. About 'analytical skill building' the mean values are (*M*=7.67, *M*=7.38, *M*=8.00) respectively. The results show that the courses of Sport Psychology and Abnormal Psychology provide more chances of real life application of the concepts.

Table 2:

One Sample t-test

Variable	Scores				95 % *CI*		
	M	*SD*	*t* (77)	*p*	*LL*	*UL*	Cohen's *d*
Subject Understanding	11.54	2.77	17.65	<.001	4.91	6.16	4.02
Critical Thought	11.37	2.82	16.82	<.001	4.74	6.01	3.83
Analytical Skills Building	7.67	1.87	17.25	<.001	3.24	4.09	3.93
Real life Application	7.97	1.80	19.48	<.001	3.57	4.38	4.43

Note. CI = confidence interval. *LL* = lower limit. *UL* = upper limit.

In order to understand the significant mean difference of the constructs 'subject understanding', 'critical thought', 'analytical skills' and 'real life application', one sample t-test was carried out from the test values of 6 and 4 respectively. Results reveal that significant mean difference exists from the test value for all four dimensions of developing HOTS among the students. An improvement is witnessed in the students' subject understanding, critical thought, analytical skill building, and subject application from test values. Further, values of Cohen's *d* suggest moderate effect size.

Table 3

Independent Sample t-test for Effect on Developing HOTS

	Yes		No		T Statistics		95 % *CI*		
Variable	***M***	***SD***	***M***	***SD***	***t* (77)**	***P***	***LL***	***UL***	**Cohen's *d***
HOTS	38	9.019	39.16	7.07	0.636	0.05	-4.8	2.47	0.08

Significant mean difference was found between those students who were experienced in GDB discussions and those who were new to it by applying independent sample t-test. Results show that there is insignificant mean difference between the two types of the students.

Discussion

The main objective of the study was to find out whether GDB discussions facilitate in developing HOTS among the students of three different subjects, i.e. Abnormal Psychology, Sport Psychology and Clinical Psychology or not. The results revealed from the table 1 that the students of Sport Psychology had more chances to apply their knowledge practically as compared to the students of Clinical Psychology and Abnormal Psychology because the nature of these subjects required specific environmental conditions (clinical setting) to apply their knowledge.

It is clearly seen that GDB discussion topics given to the students in different courses, i.e. Abnormal Psychology, Clinical Psychology, Sport Psychology, enhance the students' subject-related knowledge as well as help them to brush up their analytical skills which ultimately enhance their HOTS (McLoughlin & Mynard, 2009). These discussions provide the students a hands-on opportunity to understand the topic and deepen their understanding of the course as they mirror real life analysis and construct meaningful knowledge, which is the core purpose of learning. Participation in these discussions improved the students' critical skills of relating and comparing events and objects, and helped them to visualize and conceptualize situations related to everyday life. In this regard, a considerable factor is the medium of teaching itself like the students from online mode of learning are in a better condition to reflect and share their ideas by a careful analysis before posting them. In conventional teaching system, the students have to face peer pressure which keeps their thinking limited in order to conform to the predefined boundaries of society (Garrison, Anderson, & Archer, 2000). In a conventional classroom, the students have to participate in a face to face discussion with a limited time span, so only those students can perform better who are more fluent and confident. While in online environment, the students have ample time to develop an in-depth understanding of a phenomenon and then critically analyze how that phenomenon is to be embedded in the social space (Garrison, 2004).

The last objective of the study was to compare the perception of the students about the effectiveness of GDB discussions of those who have attempted it previously with those who

attempted it for the first time. A significant mean difference was not observed between the two groups. One plausible reason could be that the students belonging to both groups feel the need for developing HOTS in them and the reason could be the medium of learning they belong to. People who have chosen distance learning by choice, are intrinsically motivated and self-regulated (Zimmerman, 2000) and have the tendency to improve their thinking skills because thinking styles can be developed (Puchta, 2012). Self-regulated learning is the most suitable justification of no difference between the students who participated in the discussions previously and those who attempted it for the first time.

Conclusion

On the basis of the results of the present study, it can be concluded that GDB discussions are genuinely helpful for the students of Psychology courses in developing HOTS while giving them an opportunity to comprehend situations in everyday routine and facilitating them in their decision making skills. When the students successfully apply these skills, they are better able to explain their point of view, take right choices within the context of existing knowledge.

Limitations and Recommendations

Quantitative approach was used to conduct the present study. However, the qualitative analysis will give in-depth information how GDB discussions enhance the students' HOTS. The data was collected from the students of e-learning environment only. The students in the conventional teaching system may have different perception about the effectiveness of GDB discussions in enhancing HOTS. Data was gathered only from the students of Psychology. The students from other disciplines like Management Sciences and Computer Sciences can be explored to assess the extent of effectiveness of GDB posts for inculcating HOTS in the students. Moreover, findings cannot be generalized due to the small sample size. This study endows a primary footstep in assessing the perceived effectiveness of GDB discussions in a country like Pakistan and this preliminary attempt is successful.

Study Implications

The study will be helpful for e-educators and policy makers to look for innovative methods for polishing their subject specific cognitive skills of the students particularly in an e-learning environment.

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About the Author

Asma Zafar: Ms. Asma Zafar is working as a lecturer in the Department of Psychology at Virtual University of Pakistan. Before joining Virtual University, she has served as an Educational Psychologist in SOS Village. She holds an MS Degree in Clinical Psychology and M.Sc. Degree in Applied Psychology with specialization in Counseling Psychology. Her research interests include adult psychopathology and assessment of psychological problems.