International Journal of Arts & Sciences,
CD-ROM. ISSN: 1944-6934 :: 07(03):45–57 (2014)

USING GUIDED RESPONSE TO STIMULATE STUDENT ENGAGEMENT IN THE ONLINE ASYNCHRONOUS DISCUSSION BOARD

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The online asynchronous discussion (OAD) board has long been the accepted format for interaction within the online classroom. Although best practices include clear articulation of expectations for posting requirements and participation, the asynchronous nature of the OAD may result in a sense of isolation. The current incarnation of the OAD pales in comparison to traditional face-to-face conversations which include the acknowledgment of statements from each participant in a meaningful interchange, thus supporting both low-level cognitive behaviors such as knowledge sharing and higher-level exploration with the integration of ideas. Adult learners often use management strategies to optimize grading outcomes with the minimum amount of time and effort and many prefer to work alone; this preference may impact course participation. In order to increase student-student/student-instructor interaction, the traditional OAD was transformed through a series of specified response parameters which more closely resemble a true threaded discussion. Not only were students instructed to post initially and respond substantively to a defined number of their colleagues, they were also required to respond to those who had posted to their original threads. While in many ways a simple innovation, this moved the OAD discussion forum to the right with longer discussion chains, thus creating online conversations (OLCs) which more closely resemble an in-class discussion and promoted greater interaction and higher level thinking. Intrinsic motivations within the OLC included the gratification of spontaneous facilitation, validation, and an enriched learning environment. Extrinsic motivations, such as grading rubrics incorporating these parameters, were also used to promote desired behaviors within the discussions. The results included an increase in overall interaction within the discussions as well as greater elaboration of subject content, with challenging topics more fully analyzed through discussion of key concepts. The improved interactive environment illustrated the value of connectivity for students when sharing ideas in a public forum.

Keywords: Online asynchronous discussion board, Guided response, Student engagement, Online forum.

The Online Asynchronous Discussion Board

This paper reports a study in modifying the parameters for participation in the online asynchronous discussion board (OAD) with the intent of increasing student engagement. The OAD has long been the accepted format for interaction within the online classroom, and has alternatively been referred to as asynchronous discussion forums (ADFs) and online conversations (OLCs). The asynchronous format provides access to classmates independent of scheduling restrictions that may interfere with an adult learner's personal obligations. Other aspects of this online course tool are the facilitation of learning by

developing critical thinking and writing skills, as well as allowing students to become part of a learning community via peer and instructor interaction. Typically, participation requirements are designed to ensure that all students are engaged in the educational process, which may be an advantage as compared to the traditional face-to-face (F2F) classroom setting.

Research has demonstrated that online discussions encourage student reflection and promote a deeper understanding of subject content. The asynchronous format allows time for preparation of discussion materials, and instructor facilitation provides students with a safe environment for interactive discussion (Rosser & Nelson, 2012). However, students may not recognize or understand the value of this type of learning activity (Ellis &Calvo, 2006). Students can achieve this enculturation by performing in their role according to published rules of the community. Making contributions as part of their participation can result in identity change and encourage an appreciation of the meaning of the activity (Hung & Chen, 2003). The OAD can thus supplement prepared course materials with student-generated alternative perspectives on topical content.

However, "ground rules" are necessary to establish the norms of the community and set the parameters for sanctioned interactions (Wang & Chen, 2010). These rules are usually provided as directions for appropriate responses ("Guided Response" instructions) that are included with a prompt or query that starts the discussion.There is no immediate nonverbal feedback as would occur in the setting of natural interpersonal relationships in real-time physical proximity (traditional classroom). Thus, an approach is needed to support the valuation of ideas as presented by student or instructor in order to achieve the highest levels of cognitive activity (Levine, 2007). Although best practices for online teaching include expectations for posting requirements and responses, the asynchronous nature of the OAD may still result in a sense of isolation.

While F2F discourse is interactional, written discourse is more transactional in nature. Research has shown that many messages in the OAD receive no response and thus have no interactive component. For this reason, many students voices are not heard (Thomas, 2002). Enhanced learning outcomes cannot be achieved without meaningful discourse (Topcu, 2007). Since most OADs rely on text-based communication, interaction must be reconsidered in the context of this format. To develop and maintain socially meaningful interpersonal interaction, it is necessary to provide evidence that others are attending to individual contributions. Research has shown that measurable objects of interaction include continuing a thread (using the reply feature), quoting from others' posts, and explicitly referring to others' comments (Rourke, Anderson, & Garrison, 2001).

Social network analysis (SNA) of participation on the OAD can measure patterns of interaction, flow of information, and effects on relationships. This form of analysis is therefore ideal, since participant interaction is of central importance in online teaching. Research employing SNA can measure degree of member participation, density (linkage between members), cliques (subgroups), centrality (power), betweenness (connectedness) and other measures of interaction. Using SNA research, it has been shown that an instructional approach providing increased direction regarding requirements for interaction on the OAD does result in improved connectedness and student interaction (Fidalgo & Thormann, 2012).

Another issue is the fact that adult learners often use management strategies to optimize grading outcomes with the minimum amount of time and effort, necessarily balancing participation in class with the obligations of work and family. Many prefer to work alone and may not recognize the contributions of classmates as valuable in achieving learning goals (Dixon, Dixon, &Siragusa, 2007). This preference may impact student success, since research has shown that the dynamics of online interaction can affect grade outcomes. Students who have lower levels of interaction on the OAD are also those more likely to fail their courses (Davies & Graff, 2005).

For these reasons, the interaction level in the typical OAD pales in comparison to traditional F2F conversations which include the acknowledgment of statements from each participant in a meaningful interchange. Guided Response parameters are crucial in supporting both low-level cognitive behaviors such as knowledge sharing as well as higher-level exploration with the integration of ideas. If aligned with grading rubrics, such response instructions can also serve as extrinsic motivation for participation.

This paper reports a study in modifying the Guided Response parameters for the OAD in a 300-level undergraduate course in physiological psychology, part of the core curriculum for the undergraduate degree in that discipline, and also offered as an elective in other programs. The intent of these modified parameters was to increase student engagement as reflected in the amount and levels of participation as well as to increase elaboration of subject content, with challenging topics more fully analyzed through interactive discussion of key concepts.

Communities of Inquiry, Social Presence, and Computer-Mediated Education

Much has been written about the "three presences" – cognitive, teaching, and social – that define the classroom as a Community of Inquiry (Garrison, Anderson, & Archer, 2001). Social presence theory, developed in 1976 by Short, Williams, and Christie, emphasized the degree of salience (quality/state of "being there") between individuals or groups engaged in communication. This became relevant to various forms of telecommunications media, including computer-mediated communication and the online discussion forum (see Figure 1) (Short, Williams, & Christie, 1976).

Social presence is necessary to support the knowledge construction inherent in cognitive presence. Thus, methods to increase connectivity in the OAD are essential in achieving learning outcomes. Knowledge sharing as a fundamental aspect of the OAD is also influenced by sense of community. In order for sharing to occur, an exchange must take place between the source and the recipient. As the sense of community is strengthened via connectivity, so does participation in knowledge sharing increase (Sharratt&Usoro, 2003). Conversely, lack of personal interaction is an often-cited reason for student attrition in online classes (Rosser & Nelson, 2012). Research has shown that there is a direct relationship between student satisfaction and social presence (Lowenthal, 2010).

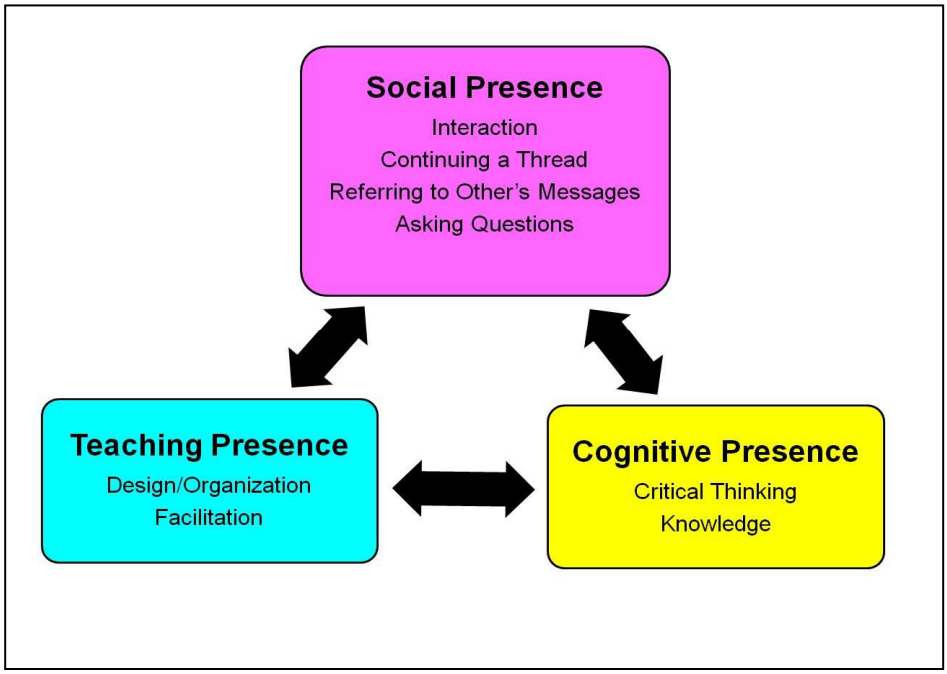


Figure 1. Relationship of the three "presences."

Student engagement can be increased by encouraging students to interact with each other. There is evidence that the social presence of both instructor and students enhances connectivity, which in turn helps students to feel engaged in a virtual environment (Dixson, 2010). Greater social presence is

supported by providing clear expectations of behaviors and participation in the course, so that social interactions are founded on shared community goals and maintained via sustained communication (Mokoena, 2013). A necessity for this connection to occur is to hear and be heard by others, recognizing the value of their ideas (Rodgers & Raider-Roth, 2006).

How can one be heard and how can teachers facilitate this goal? Research has demonstrated that when OADs are unstructured and open ended, they do not support cognitively in-depthdiscussions (Lee-Baldwin, 2005). Individuals must be able to project themselves into channels of communication, and also establish relationships. In the online classroom, a common objective is learning, and this establishes the sense of community and cognitive presence. This brings us to the teaching presence and the importance of course design. Strategies that promote the level of student-student and student-instructor interactions also have a strong influence on the quality of discourse. These strategies include being more directive in the instructions provided to students regarding their participation in threaded discussions (Garrison, 2007).

The necessity for direction is driven by research that demonstrates the importance of student-student, student-instructor, and student-content interactions. It has been shown that students do not automatically provide compliments, supportive feedback, a positive tone, or other aspects necessary to a viable learning community. These behaviors develop through instructor modeling and by providing parameters for interaction (Conaway, Easton, & Schmidt, 2005). This does not require formality in the tone or content of participants' contributions. In fact, higher-levels of cognitive processing may in fact tend to become more social, underscoring that social dialogue is a component of the meaningful exchange of insights, understandings and learning in this setting (Lee-Baldwin, 2005). Another potential benefit of increased direction is to provide social context clues. Without such clues, the OAD setting may encourage hostile and self-absorbed contributions, as well as a deference for higher-status participants (i.e., the instructor) (Rourke, Anderson, & Garrison, 2001).

In the OAD, establishing discussion threads that acknowledge the importance of each person's contribution will support more thorough analysis of subject content. This can be accomplished with various techniques such as specifying discussion roles, discursive scaffolding, and participation dynamics. Defining participation characteristics – who interacts with whom as well as the intensity of interaction – will increase the likelihood of substantial contributions from participants (Naranjo, Onrubia, & Segues, 2012). Since a prompt-and-response format is the basic premise of computer-mediated communication (Rhoades & Rhoades, 2013), assisting students to create longer discussion chains is one goal of appropriate Guided Response instructions.

Guided Response Instructions and Student Engagement

In the OAD, the quantity of participation may be measured by several indicators, including the number of accesses and postings (Naranjo, Onrubia, & Segues, 2012) and the length of discussion chains (depth of thread levels) as a form of social network analysis (SNA). Achieving a threaded discussion that more closely resembles a true conversation requires the forum to be fully threaded. This format allows individual authoring of topic threads, and the expansion of each thread by the original poster or by other participants. Thus, members in the forum can develop individual discussion trajectories (Rhoades & Rhoades, 2013).

In our study, we aimed to increase student-student and student-instructor interactions by specifying response parameters. Standard (non-modified) Guided Response instructions asked participants to originate an initial post (start a thread) and also respond substantively to a defined number of classmates. Our modification to these directionswas in the form of *additional directions* that asked students to: 1)monitor the OAD and respond to those who had replied to their original thread post, and 2) demonstrate that the student had read existing replies on the board by mentioning information and viewpoints already expressed in that thread (see Figure 2).

Modified Guided Response Instructions
In addition, please observe the following guidelines for all responses: • Provide a courteous and interactive learning environment. • Continue to monitor the discussion board and reply to anyone who has chosen to respond to your original post. • Your responses should address (at minimum) both the neurotransmitter and receptor system in their discussion, as well as the drug of abuse and/or the neurological or psychological disorder they assessed. • Your responses should demonstrate that you have read the existing replies on the board (in your response, mention information and viewpoints already expressed by existing responses to the same post).

Figure 2. Modified Guided Response Instructions – additional instructions provided that specified the dynamics of peer responses provided.

This modified response guidance was designed to create discussions that more closely mimic natural behaviors in a real-time physical setting, where all contributions are acknowledged. One outcome can be described as "moving the discussion board to the right"(i.e., creation of longer discussion chains) (see Figure 3). A comparison of these elements was made using the same discussion forum in the same course, pre-intervention vs. post-intervention.

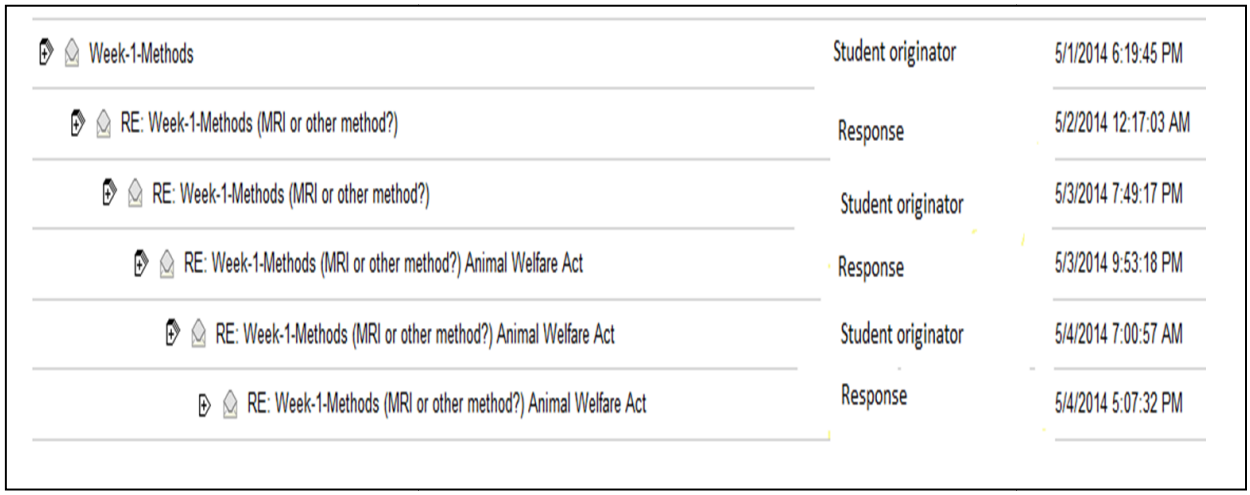


Figure 3. Moving the discussion board "to the right" with longer discussion chains.

Methods

A comparison was made between eight sections of the course with the standard Guided Response instructions and eight sections with the modified instructions. All 16 class sections were taught by the same instructor, with the "before modification" (pre-intervention) sections taught between July 2012 and May 2013, and the "after modification" (post-intervention) sections taught between June 2013 and March 2014. The modified instructions were retained in the course beyond that date. Data were gathered on the discussion that was placed in Week Four, which had the same topic and other instructions for both versions of the course, except for the modified guided response prompt in the newer version. The "before" (pre-intervention) group contained 145 students, and the "after" (post-intervention) group contained 172 students.

To measure engagement, the following dependent variables were created: (1) the number of posts by each student on the student's own discussion thread (opening post), (2) the maximum number of levels (indents) achieved in each student's thread (length of discussion chain), (3) the total number of posts

made by each student in the discussion forum, and (4) the highest level indent (depth of chain) at which each student posted. For measurement of level depth, the initial post for a thread was counted as level 0, a response to the initial post was at level 1, and each successive indent added to the level.

To determine the appropriate statistical test for comparison of before and after conditions involving two independent groups, the dependent variables were checked for normality and equality of variances. Descriptive statistics showed that all of the variables in this analysis were skewed. Therefore, a non-parametric method, the Mann-Whitney U Test, was used to compare the two conditions on each variable.

This project was approved by the Office of Research and Creative Scholarship (ORCS) and the Institutional Review Board (IRB) at Ashford University.

Results

The total sample of 16 course sections contained 317 unique students, with 145 in the before-modification(pre-intervention) condition and 172 in the after-modification (post-intervention) condition. Classes tended to be slightly larger in the after-modification condition, with an average class size of 18.125 before modification and 21.5 after modification. The range of class sizes in the before-modification condition was 14 to 23, with a median of 17. The range of class sizes in the after-modification condition was 16 to 26, with a median of 22.

In the before modification condition, the number of posts by the student on the student's own thread ranged from 0 (i.e., the student did not initiate a thread, n = 9) to 5 (n = 3). The majority of students (n = 79, 54.5%) initiated a discussion thread and did not return to add additional comments to it. In the after modification condition, the values of this variable ranged from 0 to 9, with 59% of students posting at least twice on their own thread. See Table 1 for the frequencies of this variable before and after the modification.

Table 1. Posts by student on student's own thread.

	Before Modification		After Modification	
Number of Posts	Frequency	Percent	Frequency	Percent
0	9	6.2	12	7.0
1	79	54.5	58	33.7
2	32	22.1	41	23.8
3	17	11.7	32	18.6
4	5	3.4	20	11.6
5	3	2.1	7	4.1
6	NA	NA	1	0.6
9	NA	NA	1	0.6

In the before condition, the maximum number of levels in a student's thread ranged from 0 (i.e., the student posted an initial response but no one replied to the thread, n = 1) to 5 (n = 4). This variable was coded as missing if the student did not initiate a discussion thread. The most frequently occurring value was 1 (n = 62, 42.8%), indicating that others responded to the initial post but the originating student did not acknowledge these replies. The second highest frequency was for level 2 (n = 51, 35.2%), in which students replied to those who responded to the initial post. Approximately 15% of the students in the before condition had 3 or more levels in their discussion threads. In the after modification condition, the most frequent number of levels was 2 (n = 57, 33.1%), and almost 30% of discussion threads achieved three or more levels. Table 2 shows complete details on the frequencies of this variable before and after the modification.

Table 2. Maximum levels (indents) achieved in student's thread.

Number of Levels	Before Modification		After Modification	
	Frequency	Percent	Frequency	Percent
0	1	0.7	0	0.0
1	62	42.8	52	30.2
2	51	35.2	57	33.1
3	12	8.3	40	23.3
4	6	4.1	7	4.1
5	4	2.8	4	2.3
Missing	9	6.2	12	7.0

Before the modification, the majority of students made three (the minimum requirement, n = 68, 46.9%) or four (n = 30, 20.7%) posts to the forum. Only 18.6% of the students in the before condition posted more than four times in the forum. After the modification, the distribution became flatter, with 43 (25%) making three posts, 42 (24.4%) making four posts, and a total of 64 (37.3%) posting at least five times in the forum. Details are shown in Table 3.

Table 3. Total number of posts made by student in discussion forum.

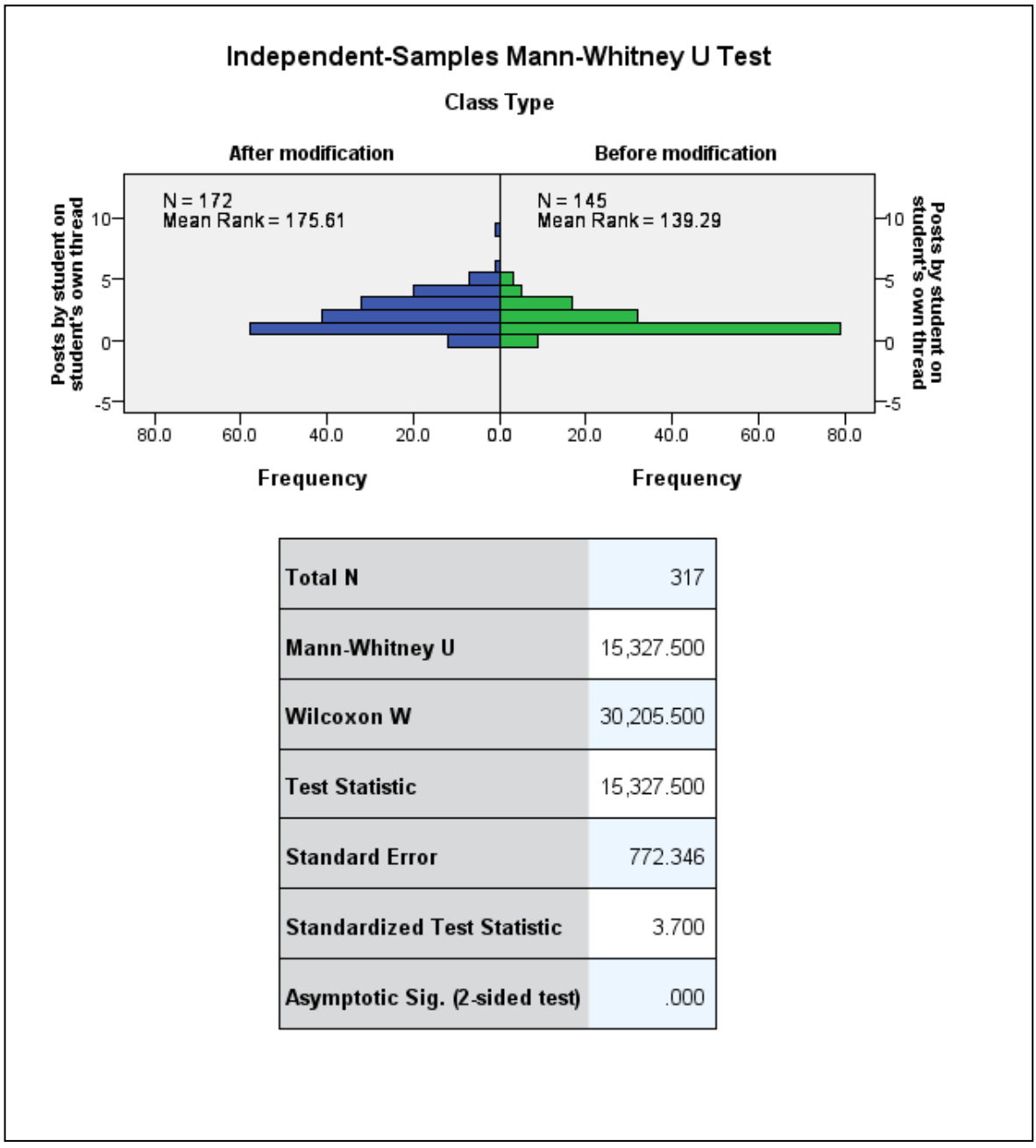
Number of Posts	Before Modification		After Modification	
	Frequency	Percent	Frequency	Percent
0	7	4.8	7	4.1
1	8	5.5	12	7.0
2	5	3.4	4	2.3
3	68	46.9	43	25.0
4	30	20.7	42	24.4
5	13	9.0	24	14.0
6	5	3.4	22	12.8
7	7	4.8	14	8.1
8	1	0.7	2	1.2
9	1	0.7	1	0.6
12	NA	NA	1	0.6

Before modification of the guided response prompt, the highest level posted by the largest number of students (n = 70, 48.3%) was 1, followed by level 2 with 43 students (29.7%). A total of 41.4% of students posted at level 2 or higher. After the modification, more students posted at higher levels. The largest frequency was for level 2 (n = 79, 45.9%).Altogether, 55.8% of students in the after modification group posted at level 2 or higher. See Table 4.

Table 4. Highest level (indent) of post for this student.

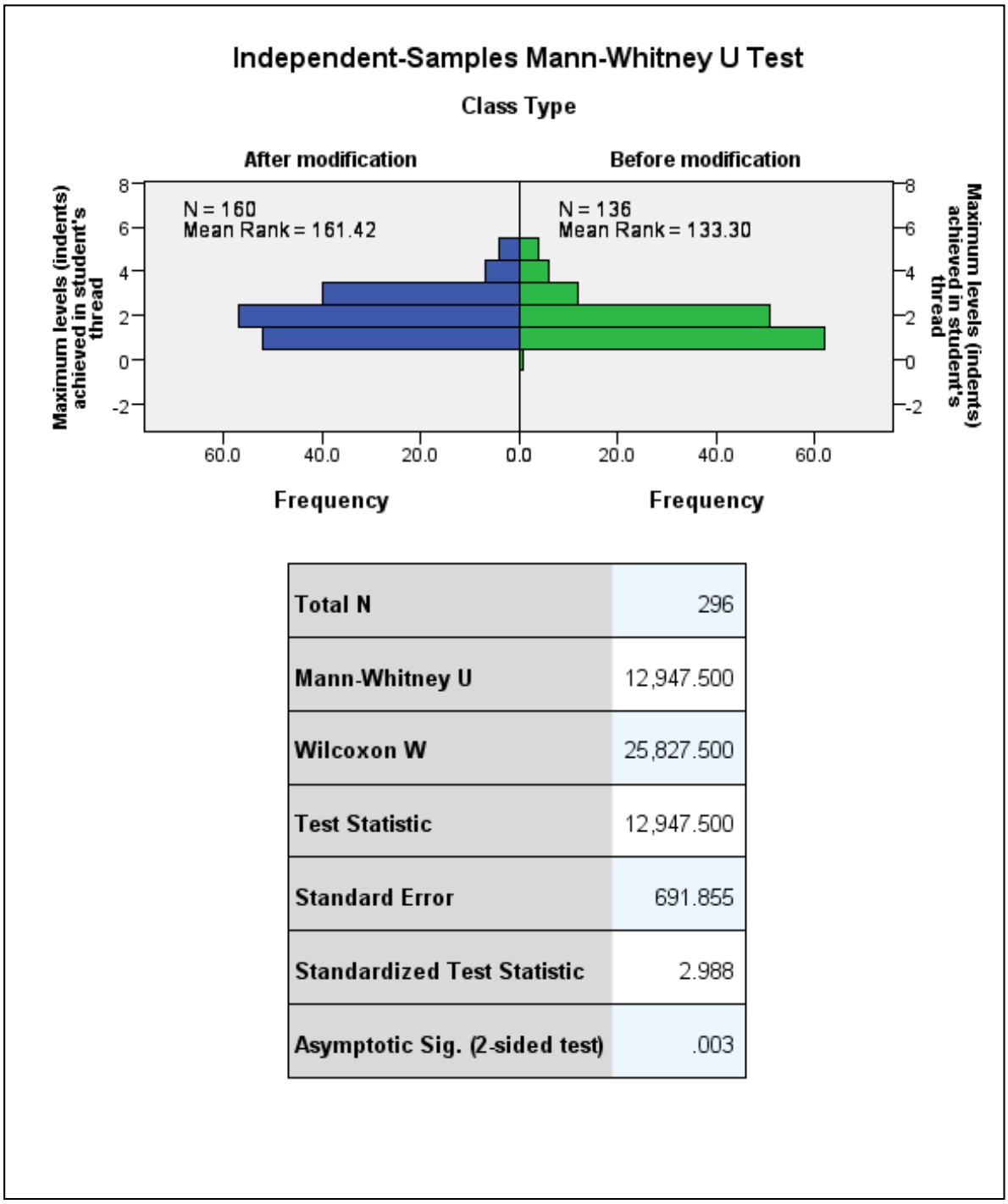
Highest Level	Before Modification		After Modification	
	Frequency	Percent	Frequency	Percent
0	8	5.5	11	6.4
1	70	48.3	58	33.7
2	43	29.7	79	45.9
3	7	4.8	9	5.2
4	9	6.2	6	3.5
5	1	0.7	2	1.2
Missing	7	4.8	7	4.1

The results of the Mann-Whitney U tests showed statistically significant differences between groups for three of the four dependent variables. The standardized values shown in the output are equivalent to t ratios. These differences were significant for the number of posts made by the student on the student's own thread (U = 15,327.500, standardized = 3.7, p = .000); maximum levels achieved in student's thread (U = 12,947.500, standardized = 2.988, p = .003); and student's total number of posts in the forum (U = 15,329.000, standardized = 3.622, p = .000). The difference between groups was not statistically significant for the highest level of post for the student (U = 12,589.000, standardized = 1.711, p = .087). These results are illustrated in Figures 4 through 7.



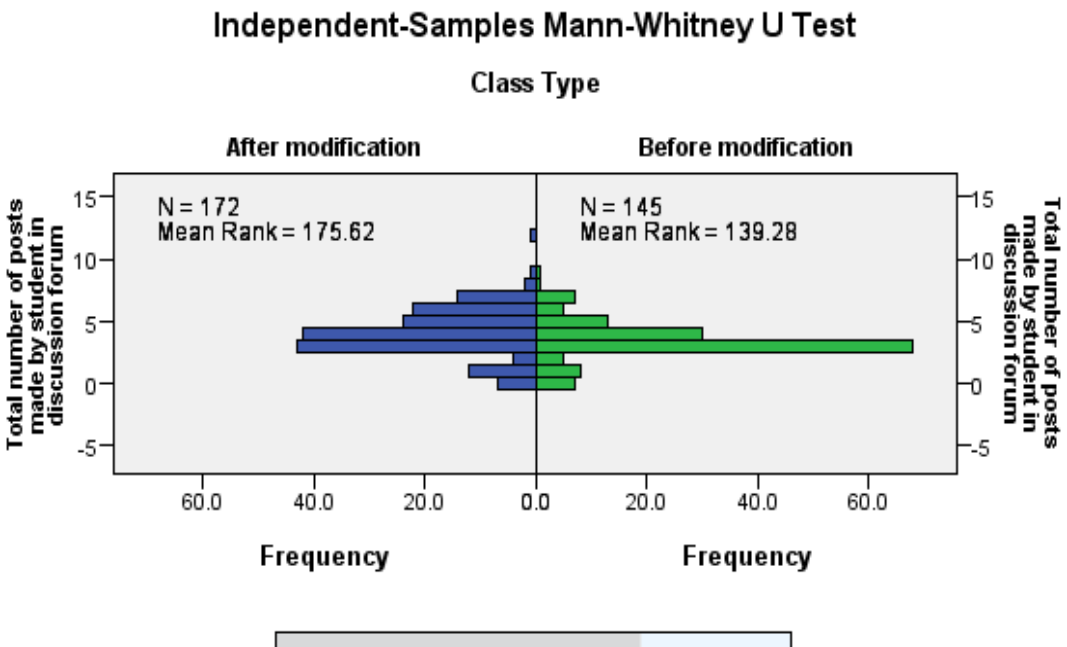
Total N	317
Mann-Whitney U	15,327.500
Wilcoxon W	30,205.500
Test Statistic	15,327.500
Standard Error	772.346
Standardized Test Statistic	3.700
Asymptotic Sig. (2-sided test)	.000

Figure 4. Posts by student on student's own thread.



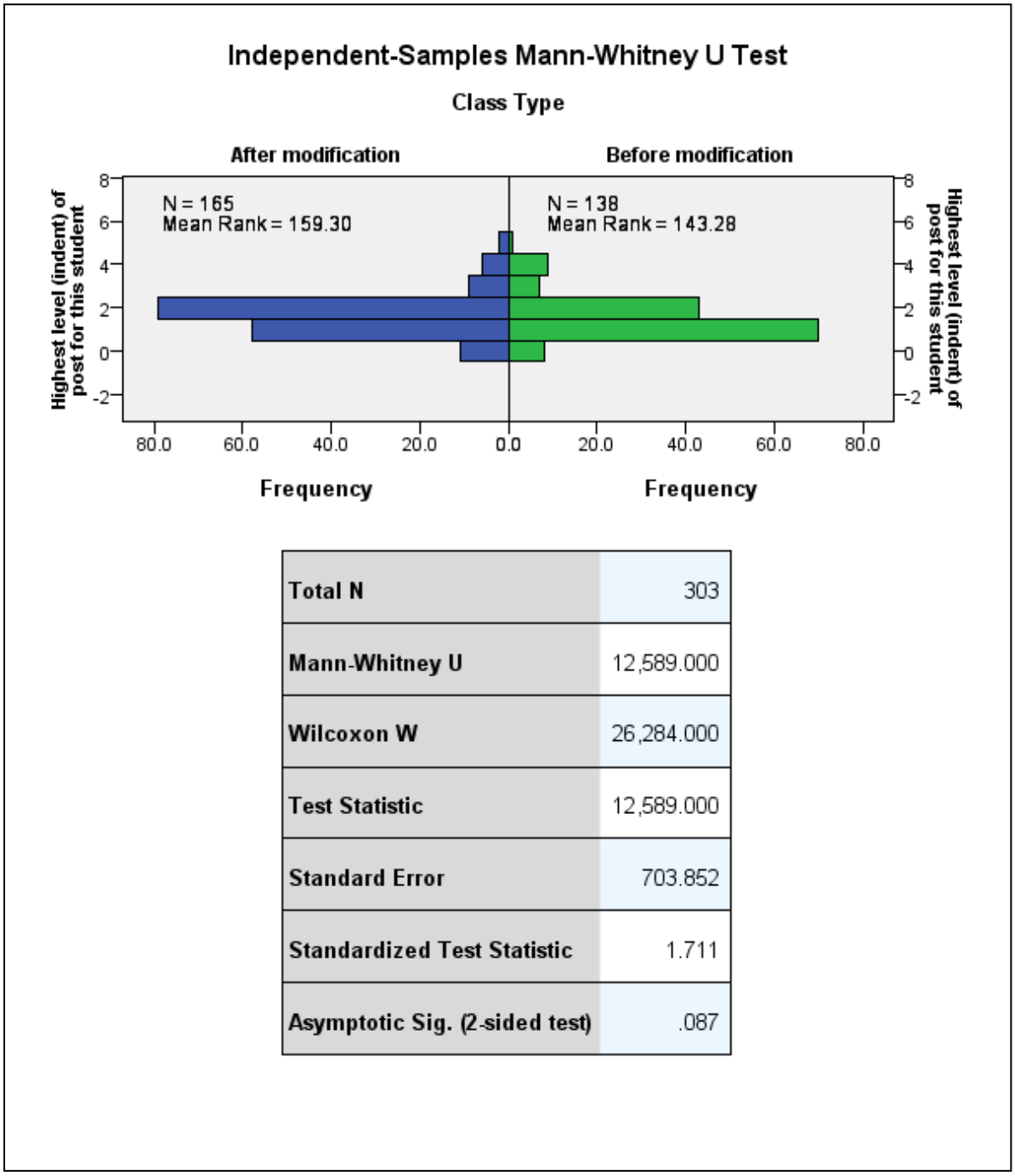
Total N	296
Mann-Whitney U	12,947.500
Wilcoxon W	25,827.500
Test Statistic	12,947.500
Standard Error	691.855
Standardized Test Statistic	2.988
Asymptotic Sig. (2-sided test)	.003

Figure 5. Maximum levels (indents) achieved in student's thread.



Total N	317
Mann-Whitney U	15,329.000
Wilcoxon W	30,207.000
Test Statistic	15,329.000
Standard Error	789.245
Standardized Test Statistic	3.622
Asymptotic Sig. (2-sided test)	.000

Figure 6. Total number of posts made by student in discussion forum.



Total N	303
Mann-Whitney U	12,589.000
Wilcoxon W	26,284.000
Test Statistic	12,589.000
Standard Error	703.852
Standardized Test Statistic	1.711
Asymptotic Sig. (2-sided test)	.087

Figure 7. Highest level (indent) of post for this student.

Conclusion

While in many ways a simple innovation, providing increased direction regarding participation responses in the OAD provided social context and created online conversations that more closely resembled an in-class discussion, promoting greater student engagement. Student engagement has been linked to student satisfaction, emphasizing the importance of the interactive component of the OAD. Our results indicated an increase in overall interaction within the discussions, as well as greater elaboration of subject content,

with challenging topics more fully analyzed through discussion of key concepts. The improved interactive environment illustrates the value of connectivity for students when sharing ideas in a public forum.

Modifying other aspects of the OAD may provide additional methods to support engagement, foster social, cognitive, and teaching presences, and promote greater student success.

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