

PROMOTING MEANINGFUL INTERACTION AND COMMUNITY DEVELOPMENT THROUGH DISCUSSION BOARD ACTIVITIES IN THE ONLINE CLASSROOM

Kelly McKenna, Colorado State University
Levi Altringer, Colorado State University
Karen Gebhardt, University of Colorado
Melanie G. Long, The College of Wooster

ABSTRACT

This study investigates community development in the online economics classroom through the presence of meaningful interaction within discussion board activities. The coding of discussion threads suggests that optimally restructuring discussion board activities lead to improved student-to-student interactions as evidenced by an increase in social and/or personal content, internal references, and personable/casual tone. In this study, restructuring discussions led students to express higher levels of procommunity agreement. This work provides further support that the formulation of discussion board structure is crucial in promoting meaningful interaction and community development that leads to improved outcomes in the online economics classroom.

Key Words: Online classroom, distance learning, discussions, community development

INTRODUCTION

Online classrooms are increasingly being utilized by institutions of higher education in the United States. This is especially true for public and private not-for-profit institutions that have seen steady increases in online enrollments over the last decade (Seaman et al., 2018). As of 2016, almost 6.4 million students, or 31.6 percent of all students, were enrolled in a distance education course, with 14.9 percent, over 3 million, enrolled exclusively in distance education courses (Seaman et al., 2018). Increases in online enrollments have been propelled by both institutional-driven supply and student-driven demand. According to the 2015 Survey of Online Learning, which was conducted by the Babson Survey Research Group and cosponsored by the Online Learning Consortium, about two-thirds of academic leaders agree with the statement that online education is “critical to the long-term strategy of my institution.” The online classroom

provides an additional source of revenue for large public institutions that have seen cuts in state and federal funding in recent years. Moreover, the online classroom can increase access to higher education, particularly for populations that might otherwise be unable to participate. Most recently, there was a surge in online learning due to the COVID-19 pandemic.

Rapid growth in the use of the online classroom has placed several capable, but inexperienced, teachers in a difficult situation, since most of them are trained and experienced in face-to-face but not online instruction. While there are many similarities between the online and on-campus classrooms (more than most realize), traditional teaching methods often do not map perfectly into the online classroom (Elison-Bowers, et al., 2010; Palloff & Pratt, 1999). The idiosyncrasies of online versus traditional face-to-face instruction have generated a literature that outlines strategies of effective practice

for online educators (Clark-Ibanez & Scott, 2008; Elison-Bowers, et al., 2010; Haughton & Romero, 2009). Studies emphasize the strategies of effective practice, or what some have called best practices, in areas such as course policies and expectations, time and assignment management, technological fluency, and community building. In this study we are particularly interested in the best practice of community building in the online classroom and, more specifically, we wish to investigate the extent and nature of community that is developed through student engagement in discussion boards in the undergraduate online classroom.

Significant literature suggests that discussion boards, when properly implemented, can be instrumental in promoting community, deep learning, and learner satisfaction in an online setting (Bender, 2003; Block, et al., 2008; Clark-Ibanez & Scott, 2008; Garas-York, 2020; Kasl & Yorks, 2016; Misanchuk et al., 2000). However, given the previously discussed growing pains of the online classroom, are discussion boards being implemented in ways that achieve the desirable outcomes of community, deep learning, and learner satisfaction? Our study investigates discussion board interactions in three undergraduate, online economics courses offered by the Department of Economics at a Research One State University, a department that has been experiencing rapid growth in its online enrollments over the past decade. We investigate research questions at the intersection of discussion board structure and community building: What was the impact of the structure of discussion board activities on the presence of meaningful student-to-student interaction and community development within discussion threads? How did the structure of discussion board activities, and the discussion interactions that took place within the activities, influence student perceptions of community?

The Importance of Community in the Online Classroom

Developing a sense of community in the online classroom is critical for several reasons. According to the constructivist paradigm, which posits that knowledge is inherently intersubjective, the creation and transference of knowledge requires some level of interaction and connection between individuals, or community (Cross, 1998; Wenger, 1998). Here, learning is a social construct in which students

individually create their understanding of reality by connecting with others over shared experience—making sense of these experiences using the language and concepts supplied by the course. Thus, community is not only important in the online classroom, or in any learning environment for that matter, it is required. Community also promotes strong relationships between group members, e.g., students and the instructor in the online classroom, which (a) creates a space where students want to be, (b) encourages a positive learning experience, and (c) reduces isolation, all of which are crucial to student learning and persistence (Chernish, et al., 2005; Ke & Hoadley, 2009; Murdock & Williams, 2011; Richardson & Swan, 2003; Rios et al., 2018; Swan, et al., 2000; Swan, 2002). In addition to the positive short-term impacts on student learning and persistence, developing community in the online classroom is practical in that it prepares students for social, civic, and economic life beyond the classroom (Cross, 1998; Shellenbarger, 2017). Here, community in the online classroom generates long-run social benefits for students by allowing them the opportunity to interact with a diverse set of persons through collaboration, debate, and dialogue.

At the most foundational level, community requires that students are comfortable, feel welcome, and can connect with others. Foundational community is described by Brown (2001) as “making on-line acquaintances or friends” (p. 24) and by Wenger (1998) as the “potential” or “coalescing” stage of community development. In the online classroom, the foundational level of community is often achieved through what Rovai (2002) terms “socio-emotional-driven” interaction, which is defined as interaction that is “directed toward relationships among learners” (p. 5). In a more advanced sense, others have conceptualized community as a fully functioning community of learners (Cross, 1998), a community of practice (Wenger, 1998), or a community of inquiry (Garrison, et al., 1999). At this advanced level of community, students not only feel welcome, comfortable, and connected, but they are motivated and encouraged through guidance, engage each other in rigorous discourse and dialogue, and build camaraderie through participation in casual, or nonformal, social interactions. More advanced levels of community are often developed through “task-driven” interaction where students work

together towards a common goal or, as Rovai (2002) defines it, interaction that is “directed toward the completion of assigned tasks” (p. 5). Therefore, crucial to the development of community in the online classroom is the opportunity for, and presence of, meaningful interaction, which we define to be the fusing of socio-emotional and task-driven interaction in the online economics classroom. This study emphasizes the relationship between meaningful interaction and community development by promoting student engagement in online discussion boards. Ultimately, we demonstrate that through careful design of course content, meaningful interactions increase leading to a higher sense of community.

There are multiple ways in which students can engage in meaningful interaction in the online economics classroom. Courses are often administered through a learning management system (LMS) that includes features such as discussion boards, chat rooms, group hangouts, and other resources, which according to Yang and Cornelious (2005) are efficient tools to build effective online community. However, additional portals (Gee, 2005) can be created for collaboration and the development of community between participants. Learners often connect on social media, Google documents, wikis, etc. (McKenna, 2018); and engagement in, and creation of, external portals strengthens online communities (Yang & Cornelious, 2005). Media such as chat promote meaningful interaction by allowing students additional ways to ask questions and connect with other students and the instructor. Media allow for the types of interactions that often occur naturally and spontaneously in face-to-face settings, creating a space where students and the instructor can engage and build community through meaningful interaction. Discussion boards also have the potential to initiate meaningful interaction within the LMS and can be used to assess student knowledge and develop community simultaneously. The purpose of this paper is to further investigate how discussion board activities can be structured to promote a greater level of meaningful interaction and, therefore, community development.

McKenna et al. (2019) investigated the ways in which the varying structure of discussion board activities across three undergraduate, online economics courses influenced the presence of meaningful interactions within discussion threads

and, therefore, community development. Discussion board structure was broadly defined to include five elements: (a) the prompt, (b) expectations and guidelines, (c) incentives for participation, (d) instructor facilitation and guidance, and (e) tone of interactions. We will revisit the structural elements in detail below.

Each element was determined to be “optimally” or “suboptimally” structured in relation to its ability to promote student engagement resulting in meaningful interaction and, therefore, community development in the online classroom. McKenna et al. (2019) found that differences in the structure of discussion board activities across courses had a large impact on the nature and extent of interactions that took place within discussion threads. For instance, discussion board expectations and guidelines that were “over-rigid” with respect to how and when interactions would take place within discussion threads led to perfunctory student participation and a low level of meaningful interaction amongst students. Further, “overwhelming” instructor participation within discussion threads was found to have a “crowding out” effect on meaningful student-to-student interaction that further limited student engagement and community development within discussion board activities. Study findings are in line with DeLoach and Greenlaw (2007), who argue that excessive moderator presence in online discussions discourages students from elevating their critical thinking as they wait for the instructor to provide the “right” answer.

One of the previous study limitations was that the findings were driven by differences in the structure of discussion board activities across courses. The design of this study, however, allows us to control for such differences through the investigation and analysis of discussion board activities that took place in one course over three semesters, i.e., three sections of the same course. Therefore, course content and instructor characteristics are held constant, while variation in student characteristics across semesters is inevitable, students are more similar in that they are all self-selecting into the same upper-level, undergraduate online elective course. This study focuses on a structural change in discussion board activities that occurred in one course between the spring and summer semesters of the 2017-2018 academic year. Therefore, we are able to observe student engagement within

discussion board activities and student survey responses before and after the structural change in discussion board activities. Using data drawn from discussion threads, instructor observations, and student survey responses, we investigate the following research questions:

1. What was the impact of the structure of discussion board activities on the presence of meaningful student-to-student interaction and community development within discussion threads?
2. How did the structure of discussion board activities, and the discussion interactions that took place within activities, influence student perceptions of community?

The paper proceeds as follows. In the next section we summarize the relationship between discussion board structure and community development in the online classroom, a framework that was developed in the previous work of McKenna et al. (2019). Followed by a thorough description of the structure of discussion board activities in the course of interest before and after restructuring took place. We then investigate the effects of the restructuring using a mixed methods approach. This includes a coding analysis of discussion postings, a discussion of documented instructor observations, and regression analysis of student survey responses. A detailed description of data and methods will be given, followed by a presentation of the findings and results. We then conclude with a summary of our findings and a discussion of the implications.

STRUCTURE AND COMMUNITY DEVELOPMENT IN DISCUSSION BOARD ACTIVITIES

Discussion board activities can vary widely along multiple dimensions. In relatively large online classrooms, discussion board activities can be completed in groups as opposed to one, all-inclusive discussion thread in which students have the opportunity to interact with whomever they please. Further, an instructor may assign a particular role to each student within a discussion group, e.g., the instructor will have created expectations and guidelines that determine who interacts with whom, and how interactions will take place in terms of group member roles. Expectations and guidelines will affect the development of community in the online classroom through their ability to encourage, or discourage, meaningful

interaction within discussion threads. Along with expectations and guidelines, McKenna et al. (2019) determined that there are four additional elements of discussion board structure: (a) prompt, (b) incentives for participation, (c) instructor facilitation and guidance, and (d) tone of interaction (Table 1). These separate, though interactive, elements are determined to be “optimally” or “suboptimally” structured in relation to their ability to engage students and promote meaningful interaction among group members.

While each structural element is defined independently from the others, each element is interconnected in important ways. For instance, guidelines and expectations that emphasize interaction and are purposefully ambiguous leave room for the instructor to reward active participants in the discussion. Another important characteristic of each of the structural elements listed in Table 1 is that they can be managed by the instructor. This is important as the elements are influential in determining student behavior within discussion board activities (McKenna et al., 2019). The instructor can be equipped with a handful of “policy tools” to affect the discussion participation behavior of students in a way that promotes meaningful interaction and community development in the online economics classroom.

In this study we investigate a restructuring of discussion board activities in an upper-level, online undergraduate economics course in which the structural elements expectations and guidelines (2) and instructor facilitation and guidance (4) were restructured in the direction of “optimal” to increase student engagement and promote meaningful interaction according to the descriptions in Table 1. The following section discusses the restructuring details.

RESTRUCTURING DISCUSSION BOARD ACTIVITIES

This section outlines the restructuring of discussion board activities that took place in the online economics course History of Economic Thought during the 2017-2018 academic year. We will begin with a description of the discussion board activities that were utilized in the fall and spring sections of the course, followed by a description of the restructured discussion board activities that were used in the summer section.

Fall 2017 and Spring 2018

Weekly discussion board activities in the fall and spring sections were designed identically and maintained the following structure:

1. Students would make an original post to the thread, i.e., their initial response to the discussion prompt.
2. The instructor would then respond to each student's original post, commenting on the content of the student's post and posing a question.
3. The student was then expected to make a subsequent response to the instructor, engaging with the comments and questions posed in (2).
4. Additionally, and at any point during the weekly discussion, each student was expected to post to another student's subthread. The student could either respond to another student's original post, join in on an interaction between the instructor and another student, or participate in an interaction between students. Essentially, the students were expected to engage with another student in some way.

In summary, students were expected to make three posts to the discussion thread: (a) an original post in response to the prompt, (b) a response post to another student, and (c) a subsequent response post to the instructor. This terminology was used in the coding exercise described below. Exploring discussion board activities, McKenna et al. (2019) found that students followed expectations and guidelines extremely well. However, discussion board expectations and guidelines limited the presence of student-to-student engagement. For instance, most of the interaction that took place within the discussion board activities were student-to-instructor interactions while the posts that students were expected to make in response to one another were often left unacknowledged. Ultimately, student participation within discussion board activities is best described as perfunctory where students were merely "going through the motions." These observations will be revisited in the Findings and Discussion section.

Summer 2018

Alternatively, weekly discussion board

activities in the summer section adopted the following structure:

1. Students would make an original post to the thread—i.e., their initial response to the discussion prompt.
2. After a certain number of days, the instructor would then make three themed posts to the discussion thread. Posts would either emphasize common themes in students' original responses, clarify common misunderstandings, or both.
3. Students were then instructed to engage in a discussion with their classmates concerning one of the themed posts made by the instructor.

As opposed to the more rigid expectations and guidelines of the fall and spring, the expectations and guidelines in the summer section were structured to promote engagement, in particular student-to-student engagement, and were purposefully ambiguous to discourage perfunctory student participation. There is a difference in language used to describe the expectations and guidelines between the fall/spring and summer sections. In the fall and spring sections, students were instructed that they were expected to participate in the discussion board activity by making at least three posts to the thread—i.e., students were given a number.

Students in the summer section, however, were expected to make one initial, general response to the thread and then were instructed to engage in a discussion with their classmates, an expectation that is much more ambiguous and oriented towards promoting meaningful student-to-student interaction. Further, instructor facilitation and guidance was structured to be less overwhelming in the summer section. As opposed to the fall and spring, an emphasis was placed on "instigating interactions between students, keeping the discussion on topic, and emphasizing main themes" (Table 1). Restructured elements of discussion board activities in the summer section, relative to those of the fall and spring, can be seen as a movement from "suboptimality" towards "optimality" based on the results of McKenna et al. (2019) (see Table 1).

DATA

To investigate the effect of restructuring on the presence of meaningful interaction within discussion board activities, we employed three sets of data: discussion threads, documented instructor observations, and student perceptions of community as measured by survey responses.

Participants

Participants in this study were enrolled in History of Economic Thought, an upper-level, online undergraduate economics course at a Research One State University during the 2017-2018 academic year spanning the Fall 2017, Spring 2018, and Summer 2018 semesters. Participation of students across sections and the class level of participants are presented in Table 2. Across the three semesters, the course participants included economics majors (32; 62.75%), other majors and undeclared students (2; 3.92%), and continuing education students who were not degree-seeking students at the Research One State University (17; 33.33%). Continuing education students typically enroll in online courses at the university to earn course credits to transfer to their home university, to satisfy employer requirements, or for other personal reasons. The study participants were disproportionately juniors and seniors seeking degrees at the Research One State University. All but two of the remaining participants were continuing education students. No first-year students were enrolled in the course during any semester. Because an introductory economics course is a prerequisite for History of Economic Thought, first-year and sophomore students are unlikely to be eligible to take the course.

This course is heavily discussion based, with students participating in weekly discussion board activities. While discussion board activities are utilized in all online economics courses to promote student engagement and facilitate student-to-student interaction, discussion board activities in this course also serve as a primary tool in assessing student learning. Further, the instructor was the same over these three semesters and there were no major changes in course content.

Discussion Threads

To investigate the effectiveness of the restructuring of discussion board activities on promoting meaningful interaction and community

development within discussion board activities we undertook a coding analysis of discussion postings. From the pool of weekly discussion board activities, two discussion threads were randomly selected from each section to be coded, one from early in the semester and one from later in the semester, for a total of six discussion threads. Student names were removed from the discussion threads by noncoding members of the research team and replaced with a randomly chosen, but consistent, identification numbers to ensure the anonymity of the participants during the analysis.

Survey Data

We further explored the effect of the restructuring on student perceptions of community in the online classroom through an investigation of student perceptions of community over the course of each semester. Survey data were collected through Qualtrics, where students had the opportunity to complete the Online Success Survey in two rounds: once early in the semester and once late in the semester. The survey included a variety of questions and prompts related to demographics, self-regulated learning, and community, among others. In this study, we made use of the four prompts that made up the community module (Table 3). Using a Likert scale, students responded to these prompts by selecting a level of agreement ranging from strongly disagree (0) to strongly agree (10).

Instructor Observations

In addition to the discussion threads and survey data, this study includes a discussion of documented instructor observations and reflections made by the instructor at the end of the summer semester. Observations and reflections were compiled in a Microsoft Word document by the instructor and recorded their experience with the discussion board modifications.

METHODS

Discussion Threads

The study employs a similar coding exercise to that undertaken in the work of McKenna et al. (2019). The coding rubric measures the development of community within discussion board activities through its ability to measure both the occurrence and nature of interactions taking place among group members within discussion threads, a relationship

that we outlined in the Introduction (Rovai, 2002; Swan, 2002). Coding occurred in three stages, preliminary calibration, intermediate calibration, and final coding, with two coders used in each stage. The primary purpose of the first and second stages of coding were to calibrate both coders and the coding rubric to strengthen the reliability and validity of the exercise.

Specifically, in the preliminary calibration stage, two discussion posts were randomly drawn from the sampled discussion threads in each of the three courses under study and coding was performed on each discussion post. The results of the preliminary coding exercise were examined by each of the coders, and general characteristics found among the preliminary sample of discussion posts, as well as unique particularities, were discussed and minor adjustments were made to the coding rubric in response to unforeseen, structural consistencies across posts. An additional two discussion posts were then selected at random for each course, coded, and compared across coders in the intermediate calibration stage. This stage served as a validation of the conclusions and adjustments made in the preliminary calibration stage. In the final stage of coding, all discussion posts within the sampled discussion threads were coded and cross-validated between coders. Given the trivial number of inconsistencies across the final stages,

the codes produced by the principal investigator were selected to represent the final coding exercise, which we present in the findings below.

The Coding Rubric

The rubric we used to code discussion postings is given in Figure 1. Each row of the rubric represents a single post made to a discussion thread. The rubric columns represent important features of the thread that were used to characterize the development of community.

Administrative and Message Poster. The administrative numbers identify the study participant and the discussion thread to which the particular post belongs. Under the feature “Message Poster,” each post is coded as being made by a student or the instructor.

Audience. This identifies the intended audience of each individual post. All discussion posts can be seen by everyone participating in the thread, and in that sense all posts have a collective audience. However, some posts are made generally to the group and others are made specifically in response to another student or the instructor.

Communication. This identifies the nature of a post with respect to its level of communication as either an original post, a response, or a subsequent response (i.e., a response to a response). The analysis does not focus on identifying who interacts with whom, as might be done in a social

Administrative		Message Poster		Audience			Communication		
First Number	Second Number	Student	Instructor	Instructor	Individual Student	Collective	Original	Response	Subsequent Response
HET DT1	120	x				x	x		
HET DT1	TR		x		x			x	
HET DT1	22R	x			x			x	

Content					
Resources	Social/Personal	Question	Answer	Internal Reference (to something or someone else)	External Reference (to something or someone else)
			x		
x		x	x		x
		x			

Tone			Other	
Professional	Personable /Casual	Inappropriate	Examples	Prompt
x				Comparison of historical schools of thought
x			Provides link to statistics	Comparison of historical schools of thought
x	x		Uses smiley face	Comparison of historical schools of thought

Figure 1. Coding Rubric

networking analysis. Instead, the analysis focuses on interaction and documenting the distribution of posts according to their place within the discussion

Content. This feature was nonmutually exclusive and identifies the nonmutually exclusive content characteristics of each discussion posting. When a post included a reference to an article, a link to a website, a graphic, or a similar reference, the post was coded as containing a Resource.

Discussion posts that contained Social/Personal content must have contained unsolicited personal information or social content. Instructors often ask for students to answer a discussion prompt using a personal example; however, unsolicited personal content describes a social aspect of community that is different from similar required content. If a post contained a question, either directed to another participant in the discussion or posed generally, the post was coded as Question. A post was coded as Answer if the nature of the post was an answer to a question or, in most cases, an answer to the discussion prompt. Responses and subsequent responses were coded as having Answer content if they made a content related contribution to the discussion. A Resource can be differentiated from a Reference in that a post that contained a resource provided access to the information within the post, whereas a reference provided information without also providing what was needed for another participant to access that information themselves. This distinction mostly applied to posts containing information external to the discussion thread itself and labelled External Reference. Lastly, a post was coded as containing an Internal Reference if there was a reference to an earlier post made by another student or the instructor.

Tone. This feature attempts to determine the affective nature of discussion postings. Determining the Tone of a discussion post can be complicated. To simplify the analysis, three nonmutually exclusive subcategories were included: professional, personable/casual, and inappropriate. The category Professional was used as the default tone. Discussion posts were coded as Inappropriate if the posts were explicitly hurtful or divisive and if the existence of the posts would have a negative impact on the development of community in the online classroom. Postings were coded as having a Personable/Casual tone if the message poster was informal, friendly, and/or outgoing when posting.

Other. Examples were retained for reference in the Example section of the rubric and the discussion prompt was also included.

Survey

To investigate whether student perceptions of community changed substantially over the semester we employed a difference-in-differences (DD) regression model. We tested for significant differences in mean responses across sections, over time, by estimating versions of the following model for each of the four prompts:

$$A_{ir}^j = \alpha^j + \lambda_{ir}^j R_{ir} + \beta_{ir}^j \text{Summer}_i + \epsilon_{ir}^j + \eta^j$$

This linear equation specifies student i 's agreement (A) with prompt j in round r to be a function of the group that the student is in "treated" versus "nontreated" and the round that the survey was completed. The Summer section of the course is the treated group since it was the section that was subject to the restructuring of discussion board activities while the fall and spring sections are considered the nontreated, or reference, group. The variable R is a survey round dummy variable that allows for differences in mean responses within sections over time.

The coefficient of interest, β , measures the impact of being in the Summer section on the change in student perceptions of community over time. Essentially, β captures the effect that the restructuring of discussion board activities had on changing student perceptions of community over the course of the semester. Given our conceptual understanding of the relationship between discussion board structure and community development, we hypothesize that the parameter estimates of β will be positive. In other words, we expect students in the summer section, who were subject to a more optimal discussion board structure, to display a more positive change in their perceptions of community if the structural change in discussion board activities was in fact influential in encouraging meaningful interaction and community development. We employed a one-sided t-test to assess the hypothesis.

FINDINGS AND DISCUSSION

Coding Discussion Threads

The results of the coding exercise are shown

in Table 4. The first observation we make on the coding exercise is that the change in structure led to a reduction in the number of posts students made to the discussion board. In fact, the number of posts per student fell by 0.7 posts per student after the intervention from an average of 2.8 posts per student in the fall and spring semesters to 2.1 posts per student in the summer. This quantifies the struggle that instructors often face when formulating the expectations and guidelines for discussion board activities. Rigid expectations and guidelines can guarantee a certain amount of participation that is often perfunctory in nature, while more ambiguous expectations and guidelines may lead to a reduced amount of participation that might be more meaningful. In the findings that follow, we investigate whether the reduced participation that occurred in the summer was in fact more meaningful.

Next, we found that instructor participation and student-to-instructor interaction dominated discussion board activities in the fall and spring, but not in the summer semester after the restructured discussion board activities were implemented. In the fall and spring sections, an average of 37.2% of student posts were general responses to the discussion prompt or “collective;” 32.2% were directed at the instructor, and 32.0% of student posts were directed towards fellow students. The figures can be seen in the Audience section of Table 4. Further, the Communication of student posts was similarly divided between Original (35.9%), Response (27.3%), and Subsequent Response (35.5%) during the fall and spring semesters.

These figures taken together suggest a robust adherence to the expectations and guidelines given by the instructor, which stipulated that students were expected to make three posts—an original post in response to the prompt, a response post to another student, and a subsequent response post to the instructor. While this finding suggests that students are extremely capable of following directions (McKenna et al., 2019), it also suggests that there was little if any student-to-student interaction occurring within discussion board activities.

Essentially, discussion threads in the fall and spring were composed of separate conversations between individual students and the instructor. The students would make an initial post in response to the prompt, the instructor would respond to each

student’s initial post, and then the students would respond to the instructor’s response. During the student-to-instructor interaction one other student would join in, as expected by the expectations and guidelines, and write a post of the following supportive nature: “I agree with ...” or “I like how you ...” Supportive third-party student-to-student posts often went unacknowledged and, therefore, did not contribute to student engagement and ongoing meaningful interaction across students. Ultimately, two-thirds of student posts made to discussion boards in the fall and spring semesters can be characterized as contributing to student-to-instructor interaction, while one-third were supportive third-party posts that went unacknowledged.

Alternatively, in the summer section, the instructor made only three collective posts in response to the themes and common misunderstandings found in the original posts of students. Thus, the instructor did not interact with students at the individual level within discussion threads during this semester, and it can be seen in the number of student posts from the summer section that were coded as having Instructor as their audience, which is zero (Table 4). This does not imply that instructor-to-student interaction surrounding discussion post activities was absent. As we discuss below, the instructor provided comments and feedback at the individual level outside of the discussion threads. Similar to the fall and spring sections, a large majority (85%) of student posts in the summer were general responses to either the discussion prompt or one of the three themed instructor posts as seen in the Collective column of Table 4. However, since student responses to the instructor’s themed posts were Collective in nature, the posts generated Subsequent Response posts and engagement between students, unlike the fall and spring semesters. In some instances, students decided not to respond directly to the themed posts made by the instructor but instead to participate directly in an interaction taking place among other students. This style of participation was completely acceptable given the relatively ambiguous nature of the expectations and guidelines. Looking at the Individual Student and Subsequent Response columns of Table 4, roughly 15% of the student posts in the summer can be characterized as contributing to ongoing student-to-student interaction. While the number seems to

be a decrease from the fall and spring sections, the amount of student-to-student interaction actually increased in the summer section. This is because nearly all Subsequent Response posts contributed to student-to-instructor interactions in the fall and spring sections while all Subsequent Response posts in the summer contributed to ongoing student-to-student interactions.

Moving to the Content and Tone portions of Table 4, we found that discussion posts in the summer were much more likely to (a) contain social and/or personal content, (b) maintain a personable/casual tone, and (c) engage with the posts of other students. The Social/Personal content column in Table 4 displays a dramatic increase in social and/or personal content within discussion posts. In particular, about 20% of the posts in the summer semester contained social and/or personal content compared to 3% of the posts in the fall and spring. A similar pattern holds for the share of discussion posts that maintained a personable/casual tone, which increased from an average of 3% to 12% of the posts after the intervention. Lastly, there was a large increase in the number of discussion posts that contained an internal reference. Panel A shows that the average share of posts containing an Internal Reference increased from 3% in the fall and spring to 16% in the summer. This finding is significant in that it indicates that students were interacting with the posts of their peers and there was no indication of this occurring in the fall and spring. While coding the discussion threads, however, we noticed that the instructor also made internal references in their themed posts. We further investigated the nature of the internal references made within discussion posts to see if students were actually interacting with the content posted by their fellow classmates, or if students were merely parroting the internal references made by the instructor.

In the fall and spring sections, before the restructuring of discussion board activities, the participation of the instructor in discussion board activities could be characterized as one-on-one since discussion threads were mostly composed of isolated student-to-instructor interactions. However, the restructuring that occurred before the summer section changed the nature of instructor participation to be more social. In fact, the three themed posts made by the instructor during the summer semester would often cite different

students. In other words, the instructor would make internal references in their themed posts. Here is one example:

Most of you identified the destruction of old industries and the unemployment that results as one of the major costs of new innovations. As (Student 3) and (Student 12) noted, there are hopes that those who find their jobs swept away in the process of creative destruction will be able to move into another area of work ...

Interestingly, this behavior was replicated amongst students in their interactions with each other. For instance, one student wrote:

(Student 13) noted that Amazon has reduced the need for brick-and-mortar stores. Since more companies are doing business online now, I feel the government should help people who lose their jobs to pay for education or training in the technological or IT fields. (Student 12) and (Student 20) both mention how everything is turning to automation or digital ...

And another wrote:

Hi, (Student 2). I do not agree with you. I would agree with (Student 26)'s view instead. I think the government should help people ... who are unemployed by AI or IT reasons ...

As can be seen in the examples above, the students did not merely parrot the internal references of the instructor. Instead, they were more likely to reference the content of posts made by a wide variety of students, suggesting a higher level of engagement with the content posted by other students than in the previous fall and spring sections. While this example is anecdotal, it exemplifies our findings across all the internal references made by students in the discussion threads we analyzed; the internal references were almost always different than those given by the instructor. We see this result as emphasizing the role of the instructor as an interaction exemplar in online discussion board activities. Instructors can encourage the type of behavior they wish to observe through participating in that manner within discussion threads. Further, exemplar participation by the instructor may help students better understand how to participate and

interact in the discussion board activities when expectations and guidelines are structured to be purposefully ambiguous so as not to promote perfunctory participation.

Instructor Reflections

The instructor organized their reflections into the observed challenges and successes associated with the restructuring of discussion board activities. We will begin by discussing the observed challenges. First, the instructor found that the adoption of less rigid expectations and guidelines may have contributed to less active participation early in the semester:

... it quickly became clear that many students were defaulting to providing an answer to the prompt without directly or indirectly responding to their classmates. I provided thorough feedback to each student during the first two weeks of class, emphasizing that they needed to answer the discussion prompts but also respond to the ideas of a classmate. It was sometimes necessary to specify that such a response needed to go beyond stating agreement or disagreement.

This suggests that promoting meaningful interaction through purposefully ambiguous expectations and guidelines may need to be supplemented with thorough instructor feedback early in the semester to ensure that students are meeting participation expectations. However, it is important to continue to be consistent regarding expectations in feedback as the direction to “respond to the ideas of a classmate” may account for the overall fewer average number of posts per student in the summer semester. Also, as our findings from the coding exercise suggest, participation expectations may also be achieved through exemplar instructor participation. Second, restructuring the discussion board activities in a way that drastically reduced the extent of instructor participation made the quality of the discussions more variable. This is to be expected since a larger portion of the discussion was being driven by student-to-student interaction in the summer semester. However, the instructor found that the “follow-up questions [i.e., ‘themed’ posts] did provide a valuable opportunity to ‘rescue’ a conversation that was less dynamic than hoped.”

Moving on to the observed successes, the

instructor found that the restructuring of discussion board activities improved meaningful interaction among students:

[The new structure] seemed to promote greater engagement between students. On several occasions, students went out of their way to trade ideas back-and-forth, and in general, the conversations felt more like conversations. You could see the thread of the conversation developing in response to each follow-up, compared to the more scattered fragments of conversation that were common when students would respond individually to each other and to me.

This observation is confirmed by what we discussed previously in the coding findings, which suggested a large increase in student-to-student interaction and engagement. Second, the themed post format allowed the instructor to “extend the learning goals of each discussion” and “address a common misperception”:

The follow-up prompt could encourage students to delve deeper into [an] application by pulling out a particular nuance. On the other hand, it could ask students to engage critically with an alternative interpretation, especially if many students answered on one side of an issue ... My follow-up [could] focus on clarifying the misconception—without calling attention to particular students’ “incorrect” answers—and then trying to redirect students without discarding their original ideas.

Lastly, the instructor found that the restructuring of discussion board activities was a practical adjustment for a larger class size:

... responding to the class as a whole by posting questions based on the ideas of groups of students meant that I could maintain the level of thoughtful interaction that I tried to have with students even in a larger class.

This has important implications for the scalability of our findings across courses. Discussion board structures that accommodate larger class sizes while promoting meaningful interaction and community development are paramount given recent trends in

online enrollments (Lederman, 2018). Ultimately, we conclude that the instructor's reflections map to our findings discussed in the preceding section. Discouraging perfunctory participation in online discussion board activities through the use of more fluid and ambiguous guidelines and expectations can initially lead to a lower level of participation, which we observed through the decline in the average number of posts made by student per discussion board activity. However, through timely feedback and exemplar discussion participation the instructor can encourage meaningful student-to-student interaction within discussion board activities as was evidenced in the findings above.

Survey Results

A summary of the survey responses can be seen in Table 5, which displays the mean survey responses for each community module prompt by section and round. We list the prompts again here for reference:

- (P1)** I learn best when I feel connected to other students.
- (P2)** I learn best when I feel connected to the instructor.
- (P3)** My learning is improved when I can connect with classmates through discussions or other ways.
- (P4)** I do better in class when I know something personal about my instructor and fellow classmates (such as hobbies or pets).

We make a few observations here. First, on average, students do not internalize the benefit of connecting with other students in the online economics classroom. In the bottom row of Table 5 we find that, based on a Likert scale of 1–10, students seem to neither agree nor disagree that connecting with other students improves their learning and/or outcomes in the online economics classroom. This is indicated by the mean responses of 5.8, 5.4, and 5.1 to prompts P1, P2, and P3, respectively. On the other hand, however, students seem to agree that they “learn best when [they] feel connected to the instructor,” where we observe that the mean response to prompt P2 was 7.5 across all sections and rounds of surveys. Second, in the summer course, students consistently expressed lower levels of agreement with statements in favor of community early in the semester. This observation

comes from a simple comparison of the mean Early responses of summer students relative to the Early mean responses of fall and spring students in Table 5. Lastly, agreement with statements concerning community consistently increased over the semester for students in the summer section. Increased community was not necessarily true for students in the fall and spring sections, where average levels of agreement increased and decreased across different community module prompts.

We employed the simple DD regression model discussed previously to test whether the observations made above are statistically different from random variation. Panel A of Table 6 reports the coefficient estimates without section fixed effects while Panel B reports the coefficient estimates with section fixed effects. The qualitative conclusions drawn from the regression results do not change from Panel A to Panel B, though there are quantitative changes in point estimates and the estimated precision. First, as was observed in the raw means displayed in Table 5, students in the summer section expressed lower levels of agreement early in the semester. Early lower levels of agreement is evidenced by the consistently negative parameter estimate (δ) on the Summer variable, which is essentially an indicator variable for the Early round of the summer section. Second, for students in the summer Treated section, the level of agreement with community module prompts increased over the semester while it remained constant, or marginally decreased, for students in the fall and spring nontreated sections.

This result is evidenced by the marginally negative parameter estimates λ and the estimated average effect of time on the summer section ($\lambda + \beta$). This estimated difference in the change in the level of agreement across groups over the semester, β , is estimated to be positive across every prompt in Table 6.

We tested the statistical validity of this positive estimate through two tests. First, we employ a one-sided t-test on the null hypothesis that the DD parameter estimate (β) is less than or equal to zero ($H_0: \beta \leq 0$). We reject the null hypothesis at roughly the 10% significance level for all community module prompts except for the second, which states “I learn best when I feel connected to the instructor.” In fact, given that the students in the summer section experienced a reduced amount of instructor facilitation and

guidance within discussion threads, an estimate of the DD parameter that is closer to zero might be expected. Second, we employed tests where we assign “placebo treatment” to the fall and spring sections and estimate separate regressions under the assumption that the fall and spring sections were treated by the discussion board restructuring, respectively, while the summer section was not. We then performed an identical hypothesis test on the implied DD parameter estimates under alternative assumptions of treatment ($\hat{\beta}$ and β) and the test results are reported in the final two rows of Panel A and B. We are unable to reject the null hypothesis that the placebo DD parameter estimates are less than or equal to zero at conventional levels of confidence. In fact, the associated p-value never fall below 0.30. From our regression analysis, we conclude that the restructuring of discussion board activities had a marginally significant positive effect on student perceptions of community in the online economics classroom over the course of the semester, and specifically on their valuation of the benefits of interacting and connecting with their classmates.

LIMITATIONS AND FUTURE RESEARCH

This study was an initial step in employing and developing best practices for discussion board activities in an undergraduate economics class in order to address minimal meaningful interaction and community development in previous courses. Based on the intervention, we were able to improve student-to-student interaction and thus improve student perceptions of community, but the intervention was limited to one class in one semester. A structured intervention based on study findings and feedback from the instructor should next be implemented in additional classes to increase the sample size and implement the intervention with additional instructors. In addition, applying the identified discussion board structure to a variety of courses with diverse student populations and instructors will provide beneficial insight as to best practices for online discussions designed with an intent to create engagement among students.

CONCLUSION

Our results reinforce previous claims that properly implemented discussion boards can serve as a tool for promoting community (Bender, 2003; Block, et al., 2008; Clark-Ibanez & Scott, 2008;

Kasl & Yorks, 2016; Misanchuk, et al., 2000). The degree of community was found to be amplified by the restructuring of discussion boards in this upper-level, online economics course. This assessment is supported by the survey results and literature regarding community. Following modifications to the discussion board, the online History of Economic Thought course progressed along the community continuum from a foundational level of community, where students felt welcome and comfortable, to an advanced level of community that entails encouragement through guidance and engagement in rigorous discourse. In the summer semester, student-to-student engagement improved and the inclusion of both social/personal content and a personable/casual tone both increased as students were given the opportunity to interact.

This study finds that one way to develop community in the online classroom is through structuring discussion boards more optimally (see Table 1) in order to promote student engagement and to foster meaningful interaction. It was imperative for the instructor to create expectations for participation that were intentionally ambiguous to avoid perfunctory posts that were autonomous and hindered meaningful student-to-student interaction. In addition, the instructor needed to be less visibly engaged for student interactions to be at the forefront and for students be more reliant on their student-to-student interactions for success. At the same time, it was necessary for the instructor to be an exemplar and model their interaction expectations. Ultimately, increasing student engagement leads to more meaningful interactions that promote a sense of community in the online classroom.

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TABLES

Table 1. Discussion Board Structure and Community Development

Element of Discussion Board Structure	<i>Sub-Optimal</i>	<i>Optimal</i>
(1) Prompt	Non-thought provoking, closed-ended, and only one correct answer.	Thought-provoking, open-ended, and many correct answers.
(2) Expectations and Guidelines	No expectations and guidelines given. OR Expectations and guidelines are minimal or over-rigid with respect to interaction.	Expectations and guidelines are provided. AND Expectations and guidelines promote interaction and are purposefully ambiguous.
(3) Incentives for Participation	No incentive for actively participating and initiating interactions.	Active participation is encouraged through grade enhancement and/or encouragement.
(4) Instructor Facilitation and Guidance	Instructor guidance is completely absent from discussion. OR Instructor presence is overwhelming and hinders student-to-student interaction.	Instructor guides the discussion by instigating interactions between students, keeping the discussion on topic, and emphasizing main themes.
(5) Tone of Interactions	Discussions are too informal resulting in a less rigorous and stimulating discussion. OR Discussions are too formal resulting in the alienation of some students.	Tone is inclusive of all students AND Discussions are casual yet stimulating, resulting in a discussion that is engaging and accessible to all students.

Table 2. Enrollments, Participation, and Participant Class Level by Semester

Semester	Enrollment	Participants	Continuing Education	Class Level of Participants		
				Sophomore	Junior	Senior
Fall 2017	14	11	2	0	4	5
Spring 2018	15	14	6	1	4	3
Summer 2018	28	26	9	1	5	11

NOTE: Continuing education students are not identified by class level because they were not degree-seeking students at the university.

TABLES

Table 3. Community Module Prompts

P1	I learn best when I feel connected to other students.
P2	I learn best when I feel connected to the instructor.
P3	My learning is improved when I can connect with classmates through discussions or other ways.
P4	I do better in class when I know something personal about my instructor and fellow classmates (such as hobbies or pets).

Table 4. Coding of Discussion Threads

Discussion Thread	Participating Students	Student Posts	Average Posts Per Student	AUDIENCE			COMMUNICATION		
				Instructor	Individual Student	Collective	Original	Response	Subsequent Response
FALL DT1	9	26	2.89	34.6%	30.8%	34.6%	34.6%	23.1%	42.3%
FALL DT2	9	22	2.44	36.4%	22.7%	40.9%	40.9%	22.7%	36.4%
SPRING DT1	14	40	2.86	27.5%	35.0%	40.0%	35.0%	30.0%	30.0%
SPRING DT2	11	33	3.00	30.3%	39.4%	33.3%	33.3%	33.3%	33.3%
SUMMER DT1	21	40	1.90	0.0%	12.5%	87.5%	52.5%	37.5%	10.0%
SUMMER DT2	20	46	2.30	0.0%	19.1%	78.7%	40.4%	38.3%	17.0%

Discussion Thread	CONTENT				TONE				
	Resources	Social/ Personal	Question	Answer	Internal Reference	External Reference	Professional	Personable/ Casual	Inappropriate
FALL DT1	0.0%	7.7%	3.8%	100.0%	0.0%	0.0%	100.0%	3.8%	0.0%
FALL DT2	0.0%	0.0%	4.5%	100.0%	4.5%	4.5%	100.0%	0.0%	0.0%
SPRING DT1	5.0%	0.0%	7.5%	92.5%	0.0%	0.0%	100.0%	5.0%	0.0%
SPRING DT2	3.0%	3.0%	12.1%	90.9%	6.1%	3.0%	100.0%	6.1%	0.0%
SUMMER DT1	0.0%	15.0%	0.0%	97.5%	20.0%	0.0%	100.0%	12.5%	0.0%
SUMMER DT2	2.1%	27.7%	8.5%	91.5%	12.8%	10.6%	97.9%	12.8%	0.0%

NOTE: Table includes only the discussion posts made by students. Therefore, we leave out the "MESSAGE POSTER" portion of the coding rubric since it would only indicate that 100% of the posts were made by students. We have shaded the cells that are referenced in the findings.

TABLES

Table 5. Mean Responses to Community Module Prompts by Section and Round

Semester	Round	(P1) "I learn best when I feel connected to other students."	(P2) "I learn best when I feel connected to the instructor."	(P3) "My learning is improved when I can connect with classmates through discussions or other ways."	(P4) "I do better in class when I know something personal about my instructor and fellow classmates."	Obs.
<i>Fall</i>	Early	6.20 (2.04)	7.70 (1.83)	5.60 (1.78)	5.00 (2.11)	10
	Late	7.00 (2.45)	8.50 (1.00)	3.75 (2.87)	3.25 (3.95)	4
<i>Spring</i>	Early	6.45 (3.36)	8.58 (1.62)	6.08 (3.23)	7.25 (3.17)	11
	Late	5.70 (3.40)	8.30 (1.64)	5.80 (3.16)	4.80 (3.55)	10
<i>Summer</i>	Early	4.86 (2.42)	6.45 (2.52)	4.91 (2.88)	4.00 (3.10)	22
	Late	6.11 (2.28)	7.37 (1.92)	5.63 (2.29)	5.68 (2.91)	19
ALL		5.80 (2.64)	7.52 (2.10)	5.41 (2.69)	5.12 (3.18)	76

NOTE: Standard errors in parentheses.

TABLES

Table 6. Estimated Impacts of Treatment and Round on Student Responses to Community Module Prompts

	(P1)	(P2)	(P3)	(P4)
<i>Panel A: Without section fixed effects</i>				
<i>Summer</i> (δ)	-1.29 (0.80)	-1.70 (0.64)	-0.99 (0.82)	-2.18 (0.89)
<i>Round</i> (λ)	-0.26 (0.77)	0.18 (0.48)	-0.65 (0.80)	-1.87 (0.90)
<i>Summer</i> \times <i>Round</i> (β)	1.32 (1.00)	0.80 (0.72)	1.48 (1.04)	3.58 (1.24)
<i>Constant</i> (α)	6.33 (0.60)	8.18 (0.37)	5.86 (0.56)	6.23 (0.62)
$H_0: \beta \leq 0$ (p-value)	0.096	0.136	0.079	0.003
<i>Reassigning treatment tests:</i>				
<i>Fall</i> – $H_0: \beta \leq 0$ (p-value)	0.391	0.342	0.956	0.865
<i>Spring</i> – $H_0: \beta \leq 0$ (p-value)	0.910	0.909	0.685	0.994
<i>Panel B: With section fixed effects</i>				
<i>Summer</i> (δ)	-1.44 (0.85)	-1.42 (0.74)	-0.44 (0.86)	-1.09 (0.97)
<i>Round</i> (λ)	-0.21 (0.79)	0.09 (0.48)	-0.82 (0.83)	-2.21 (0.93)
<i>Summer</i> \times <i>Round</i> (β)	1.26 (1.01)	0.88 (0.72)	1.65 (1.06)	3.92 (1.27)
<i>Constant</i> (α)	6.49 (0.66)	7.90 (0.52)	5.31 (0.62)	5.13 (0.73)
$H_0: \beta \leq 0$ (p-value)	0.109	0.113	0.063	0.002
<i>Reassigning treatment tests:</i>				
<i>Fall</i> – $H_0: \beta \leq 0$ (p-value)	0.390	0.350	0.956	0.865
<i>Spring</i> – $H_0: \beta \leq 0$ (p-value)	0.925	0.936	0.675	0.992

NOTE: Standard errors in parentheses are clustered at the student level. Nontreated sections refer to the fall and spring sections. Section Fixed Effects are, essentially, semester fixed effects. In the "Reassigning treatment tests" rows we estimate separate regressions under the assumption that the fall and spring sections were treated by the discussion board restructuring, respectively. We then tested the null hypotheses $\beta_f \leq 0$ and $\beta_s \leq 0$ test on the DD parameter estimates under these alternative assumptions. Though not reported here, we tested the inclusion of a number of controls—grade in the course, class standing, sex, and whether the student has declared a major in economics—and found that the results are robust to their inclusion in the model.