Southwestern Business Administration Journal
(SBAJ)
ISSN: 1554-7892
Volume 13 Issue 1&2, 2013, pp. 23-46

PROMOTING CRITICAL THINKING IN ONLINE DISCUSSION THREADS: *LESSONS LEARNED TEACHING ECONOMICS*

Grace Onodipe, Georgia Gwinett College, Lawrenceville, GA

M. Femi Ayadi, University of Houston-Clear Lake at the Texas Medical Center, Houston, TX

ABSTRACT

This study investigates factors that promote substantive posts and higher order critical thinking in online discussions. The authors compared weekly discussion threads from two online Principles of Macroeconomics courses. One class was considered a low-structure class while the other class was considered a more structured class. Students' posts were coded following the Gilbert and Dabbagh (2005) coding system. The codes were mapped to Bloom's Taxonomy. A comparison of means indicate that there was an increase in mean substantive posts from 72 percent in 2008 to 89 percent in 2011. There was an increase in the percentage of posts in higher levels of critical thinking from 11 percent in 2008 to 60 percent in 2011. Analysis of student and instructor posting patterns revealed that structured instructor posts and having a "By Wednesday" requirement promote meaningful online discussions and increased substantive student posts in the higher order critical thinking category. This approach links substantive and quality students' posts to students' understanding of the core learning outcomes for the course using Bloom's taxonomy.

Keywords: Online discussion, meaningful posts, participation, critical thinking, core learning outcomes.

INTRODUCTION

Fully online courses have become very popular and this popularity is expected to continue into the future. Additionally, face-to-face courses are incorporating asynchronous learning elements into their courses, especially online discussion board components, to augment or altogether replace in-class discussions. The online discussion forum is a major interactive piece where students interact with the instructor, with each other, and with the course content. Strengthening and structuring this discussion piece can greatly increase student learning and improve the utility of online learning.
The purpose of an educational experience is to structure the experience to achieve defined learning outcomes (Garrison and Cleveland, 2005). Although online discussion has the potential to foster higher levels of thinking (Black, 2005), the actual quality of discussion is not always satisfactory and students' cognitive engagement has become a major concern (Bai, 2009). The quality and level of the discussion is usually inadequate. Studies have shown that most of the postings to online discussion threads consisted of sharing personal experiences and offering personal opinions without any analysis or without any actual learning occurring in these forums. There is usually little evidence of critical thinking and in-depth discussion that demonstrates understanding of the core learning outcomes of the course (Christopher, Thomas, and Tallent-Runnels; 2004). Nussbaum et al (2002) observed that students simply repeat points that other classmates have made rather than adding to a discussion through disagreeing, framing counterarguments, or providing examples. There is therefore a need to make online discussion thread assignments more organized and more structured.

In this study, we examine whether better structuring of online discussion questions by the facilitator can lead students to contribute meaningful and substantive discussions. We also examine whether providing guidelines for student posts can influence critical thinking and promote higher level learning posts. We compared one course where very little structure and guidelines were provided,

with another subsequent course where students were provided guidelines and structure. Although much has been written about effective online discussions and promoting more meaningful learning experience within discussion threads, this paper contributes to the literature by demonstrating how to promote and measure critical thinking and higher order learning though substantive discussion posts. We use Akin & Neal's (2007) CREST+ model to demonstrate writing effective online discussion questions. The model covers the cognitive nature of the question [C], the reading basis [R], any experiential [E] possibility, style and type of question [ST], and ways to structure a good question [+]. Further, we use Gilbert and Dabbagh's (2005) template to code students' posts and mapped them to Blooms taxonomy, linking the content of substantive students' posts to learning outcomes, and thus providing another way of assessment of competency-based learning. This assessment is a requirement from accrediting agencies such as the Association to Advance Collegiate Schools of Business (AACSB). Finally, this paper provide samples of specific discussion thread initial and follow up questions per subject (or content area) to provide economics instructors ideas to begin to lead the discussion thread successfully.

PRIOR RESEARCH ON ONLINE DISCUSSION THREADS

A review of the literature reveals that the asynchronous discussion thread is an important pedagogical tool that enables groups that are separated in time and space to engage in the active production of shared knowledge (Gunawardena, Low and Anderson, 1997). From an access perspective, participants are able to maintain engagement in a community of learners when and where they choose (Garrison and Cleveland-Innes, 2005). The asynchronous format gives students more time to think about the topic being studied and to research more about it if they need to. They can respond to posts made on the forum after they have had time to think about the topic and read what others have already contributed to the discussion. It is easy for students to turn to outside resources to get more information about the topic being discussed and to be

able to support their argument with scholarly work (Al-Shalci, 2009). Research has found that students did the extra research before making a comment because they did not want to sound unintelligent in front of their colleagues, and they felt that they did not have enough background knowledge in the subject matter (Du, Zhang, Olinzock, & Adams, 2008).

Online discussions provide a means for interaction among students and the instructor about course content as well as an opportunity for students to develop critical thinking skills (Olt, 2009). The asynchronous discussion thread is best used as a forum where students can apply the key course concepts to real life events as well as their own experience. This works exceptionally well for Principles of Economics courses where students have ample opportunities to discuss current news events and evaluate work/life experience on the discussion board while utilizing economics concepts within each post to demonstrate their new found economics vocabulary.

Other benefits of asynchronous discussions include that it provides students with an equal opportunity in participation and a chance for all voices to be heard (Vonderwall, Liang, & Alderman, 2007). According to Garrison and Cleveland (2005), reflective and collaborative properties of asynchronous, text-based online learning are well adapted to deep approaches to learning. However, it is the structured kind of interaction, where the facilitator takes leadership in facilitation, which supports this kind of high level of learning. What can instructors offering online courses do to promote this critical thinking in online discussion forums? As Glaser (1941) stated, unlike wine, critical thinking does not improve as we age, nor does it increase as we accumulate more information. Therefore, the job of facilitators is to increase students' critical thinking with deliberate instruction.

Teaching students how to engage in higher-order thinking when responding to online discussion threads can be achieved. Using more structured online interaction, students can be taught to go beyond simple exchange of information, and foster higher level of cognitive thinking (Garrison and Cleveland-Innes, 2005). Bai (2009), showed that to cultivate students' critical thinking, it is helpful to have students be aware of the characteristics of accepted responses

so that they will deliberately think and reflect in a critical way when responding online.

Research in online education consistently finds that high and consistent interaction levels between students and the professor, and high interaction levels between the students themselves, is often seen as a positive variable (Akin & Neal, 2007). The most common form of participation is student engagement in discussion forums established by the instructor. Interaction does not just occur but must be intentionally incorporated into the design of the class, and facilitated discourse is critical to creating a community of inquiry (Anderson, 2004; Bullen, 1998; Easton, 2003).

Given the importance of student participation in online learning, online instructors need to be able to produce solid educational discussion questions that engage the students in learning course concepts. As Hunkins (1989) stated, "Questions and thought coexist". Good questions must also be sound in terms of learning theory, be big enough to engage online classes with possibly 30 or more learners, and long enough to last a module. It is important for faculty to build community within the classroom, especially in fully online courses where there is no face-to-face interaction. This would increase the level of participation of students in discussion threads. It is also important to allow students build community among themselves. High participation and student engagement leads to cognitive presence, the extent to which learners are able to construct meaning through sustained communication and engage in critical thinking. (Kanuka & Garrison, 2004; Garrison, 2002).

Gilbert and Dabbagh (2005) examined the impact of facilitator guideline, posting protocol and online discussion evaluation rubric on students' meaningful discourse in asynchronous online discussion. This study reports that evaluation criteria, specifically timely and even discussion contributions, had positive influence on students' meaningful discourse. Swan, Schenker, Arnold and Kuo (2007) also found that students participated more actively in online discussion and with greater depth after they were informed of evaluation criteria of online behaviors.

King (1995), demonstrated that teaching students how to ask good questions can improve their critical thinking skills, help to improve the quality of postings and keep the discussion thread

going. Structure (design) and leadership (facilitation and direction) were found to be crucial for online learners to take a deep and meaningful approach to learning, as simple interaction without these key elements is not enough (Garrison and Cleveland-Innes, 2005). Instructors who ask specific questions in response to student postings can expect to encourage richer online dialogue (Roper, 2007). There should be a variety of questions asked – questions asking students to give their opinion or to relate their experience with the issue being discussed; questions to evaluate their work or the work of others; questions to take sides on an issue being discussed and explain their reason for their decision while trying to convince others to see their point of view; have students write the questions and have their colleagues respond to them (Akin & Neal, 2007).

Bloom (1956), identifies three domains of educational skills: Cognitive, Affective and Psychomotor. Bloom further identified six levels within the cognitive domain, ranging from the simple recall or recognition of factual material, the lowest level, to complex and more abstract levels such as decision making and evaluation which are the highest order level of thinking. Bloom also found that over 95% of what students encounter in educational classroom assessment require them to think only at the lowest level, the recall of information or what is known as declarative knowledge. Blooms Taxonomy was created to motivate educators to focus on all domains of learning.

RESEARCH QUESTIONS

What factors promote meaningful discussion and support critical thinking in online discussion threads? This study sought to answer the following research questions:

1. Does using more specific and meaningful discussion questions influence critical thinking in online discussion?
2. Does placing more structure on Facilitator Questions influence student participation in online discussions?
3. Does including a "By Wednesday" Requirement increase participation in online discussions?

Hypotheses

The research questions led us to three testable hypotheses. They are

(1) increasing the structure of discussion board assignments increases frequency and quality of student posts We think that the level of critical thinking in online discussion threads is greatly improved from not substantive to substantive and more specifically from lower order to higher order level of thinking; (2) Improved Facilitator presence in the form of Comments and Questions increases substantive student posts. (3) Having a "By Wednesday" Post requirement improves student posting pattern. It skews posting toward earlier in the week and allows for more interaction throughout the week.

METHODS

Data Source

Two Principles of Macroeconomics online courses were used for this study, one taught in fall 2008 and the other taught in spring 2011. Both courses were taught by the same instructor, and were the same except for improvement in the structure of the discussion board in 2011. The course is taught to undergraduate students as a requirement for a bachelor's degree for Business and non-Business majors. The goal of this class is to expose students to some of the fundamental principles of macroeconomics such as GDP, unemployment, inflation, monetary and fiscal policy. Other graded components of the course include weekly graded quizzes, end-of-chapter homework assignments, a midterm exam in Week 4 and a final exam in Week 8. The course uses eCollege as the platform for teaching the online course similar to BlackBoard or WebCT and it is a Master course developed by a Faculty member of the university and used to facilitate all sections of the course offered each session. Discussion posts for all eight weeks were reviewed in both classes.

2008 Course

The discussion thread assignments for the class in 2008 could be described as being with low structure. The students responded to the same question each week: to find a newspaper article that deals with economics concepts being discussed this week and post a brief summary of the article and their analysis, highlighting key economics concepts obtained from the article.

Students were required to post their selected news publication by Friday of each week. The duration of each discussion thread is one week (Monday to Sunday). For full credit, students were required to review three of their classmates' postings and respond to them. However, specific guidelines that explain the depth of responses were lacking. This allowed for non-substantive responses.

2011 Course

For the 2011 session, the discussion component was given more structure. Each week, students were given a specific initial discussion question which involved applying key concepts from the class to their work/life experience or locating and interpreting economic data or commenting on current events in the economy using credible sources. This allowed for direct application of course concepts to the discussion threads and was designed to draw out a variety of response from students. The students were provided with a document that outlined what a substantive post means as outlined in the paragraph below.

In this study, we have defined a substantive post in a discussion thread as a post that demonstrates the student understands a particular key concept pertaining to that week or previous weeks of the course. The student can do this by relating the key concepts in the class to a real world event or personal work or life experience (in other words, apply or integrate prior knowledge or experience to demonstrate understanding of a new concept), answering a question posed by another student or the instructor, clarifying a key concept by using student's own words, using relevant examples to demonstrate understanding of weekly principles defined in the Core Learning Outcomes, refers class to relevant credible Internet source or textbook chapter to buttress a point or give further explanation of key concept, respectfully disagreeing with another students viewpoint and providing basis for divergence, asks a relevant thought-provoking question.

Akin & Neal's (2007) CREST+ model can be used for writing effective online discussion questions. This is a model which any online instructor of Principles of Economics can apply. The model covers the cognitive nature of the question [C], the reading basis [R],

any experiential [E] possibility, style and type of question [ST] , and finally ways to structure a good question [+]. This model encourages students to participate in online forum discussions, provides a template for new online faculty to use in creating effective discussion questions, and promotes a higher level processing of the material. This study uses the CREST+ model to create effective, useful and educational discussion questions in the 2011 course.

CONTENT ANALYSIS AND CASE STUDY ANALYSIS

Content analysis and case study analysis methodology were used to examine students' posts in these two classes to see how posting patterns changed. Students' posts were coded following the Gilbert and Dabbagh (2005) coding system. The codes were mapped to Bloom's Taxonomy. This approach links substantive and quality students' posts to students' understanding of the core learning outcomes for the course.

Bloom's Taxonomy

Bloom's Taxonomy was used as a guide to demonstrate if students thinking progressed towards higher order levels from the beginning of the course to the end of the course and when comparing the 2008 course to the 2011 course. If left on their own, students would naturally remain on the Knowledge/Comprehension phase which is the lowest level of thinking. It's easier for students to just absorb information, like they do on YouTube, howto.com or Wikipedia. It is a passive way of learning, and students start out being passive consumers of information. Knowledge, Comprehension, and Application are considered Lower Levels of Thinking. These types of posts meet the definition of substantive, however, the goal is to foster higher order thinking in the Analysis, Synthesis and Evaluation phases. In this paper, we sought to do just that in a Principles of Macroeconomics class.

Coding Posts

Table 1 shows the mapping of Bloom's taxonomy to Gilbert and Dabbagh's (2005) coding system. Table 2 defines and explains

how the discussion posts were assigned to the different codes, and Table 3 provides samples of coded students' posts. We analyzed the 2008 discussion thread posts (PRE) and the 2011 discussion thread (POST) posts using this mapping.

Table 1: Mapping Blooms to Gilbert and Dabbagh

Bloom's Taxonomy	**Gilbert & Dabbagh**
Analysis, Synthesis, Evaluation	MI
Application	AE
	RW
Comprehension	PK
	CC
Knowledge Level	RC

Table 2: Coding online discussion posts

Code	**Name**	**Definition**
MI	**Making Inferences**	Going beyond information given. Beyond comprehension, analysis, synthesis, evaluation-adding or constructing new knowledge
AE	**Abstract Example**	Use of analogies, metaphors or philosophical interpretations to support one's understanding of a concept or principles
RW	**Real World Example**	Personal experience, professional/academic experiences. Providing examples that demonstrate the application of knowledge to a real word context
PK	**Prior Knowledge**	Prior knowledge and outside resources, e.g. learner uses prior knowledge or outside resources to support a statement or an understanding

CC	**Content Clarification**	Personal interpretation of content or content knowledge comprehension, e.g. paraphrasing concept or principles in one's own words
RC	**Reading Citation**	Citation of weekly readings, e.g. learner specifically cites article or chapter when making a point.
NS	**Not Substantive**	Students post does not include any of the above, and does not relate to the week's learning objectives

Table 3: Coded Sample Student Posts

Code	Example Post
NS	*"Speaking of kids, my 11 year old has been hounding me for using too much water. They are teaching the children in schools about water conservation. My kids are thinking more about how long their showers are and about leaving the water running while brushing their teeth."*
RC	*"The law of demand states that when price drops, demand will rise or when price rises, the demand falls. About 3 years ago, the price of whole bean coffee was $12.50 per bag. Yesterday while at the grocery store the price dropped to $6.50 per bag. I bought 2 bags even though I am spending .50 cents more, I am receiving more of the product. I figured this was a pretty good deal considering the price difference over the course of 3 years. 3 years ago I would only purchase 1 bag of whole bean coffee because 2 bags were $25.00. The law of demand without even knowing it was a major factor when I decided to purchase the item.* *So I say stock up while you can…here is an article I found regarding coffee: http://www.inquisitr.com/152643/heavy-rain-affecting-coffee-prices/"*
CC	*"A store that increases the price of its shoes from $50 to $68 is expected to see a change in quantity demanded not a change in demand because it is only a change in price that has occurred. This is essentially what the Law of Demand states. Some of the determinants that can cause a change in demand are determinants such as; consumer taste, income, price of related goods, consumer expectations, and number of buyer."*
PK	*"Two ways to decrease gasoline price are to decrease demand and increase off-shore drilling. I am for reducing the demand for gasoline. I am not for off shore drilling because the concerns for wild life are just too large a trade-off (recent major Gulf spill)…. Not to mention the cost of potential spills would end up causing billions in cleanup cost that would generate back to increase in production and there goes the cycle again... "*
RW	*"There are many stores that have very little marketing strategy outside of discounting the price of their products. Grocery stores do this all the time. I have seen people with a shopping cart full of Gatorade because it was 10 for $10. The mobs of people shopping the day after Thanksgiving and Christmas are*

Code	Example Post
	excellent examples of that. "
AE	*"As George Bush said while he was still president, America is addicted to oil. This statement price inelasticity written all over it. I think that statement is true because even when price increases, how many of us cut back on our consumption of oil? "*
MI	"*If I understand the text so far, price elasticity and inflation/taxes are two different subjects. Price elasticity is the* ***measure of change*** *in quantity demanded for or supplied of a product. There is Price Elasticity of Demand and Price Elasticity of Supply. Inflation on the other hand is merely a rise (across the board) of most prices in the economy - which will affect demand and supply of products and resources, but inflation is not a measure like price elasticity is. Inflation and taxes are changes in prices, price elasticity measures how the market will now respond to those changes in prices.*"

RESULTS

Table 4 provides descriptive statistics of the data. Class size ranged from 18-20 from 2008 to 2011. Total number of student posts ranged from 78 to 91 posts in 2008 and 81 to 109 posts in 2011. Average number of substantive posts for all weeks was 3.35 in 2008 and 4.1 in 2011, but in 2011, the average number of substantive posts was never below 3.6. It went as low as 1.8 in 2008. This shows that students went above and beyond the minimum required number of posts, an indication of interest in class discussion.

eCollege tracks the time spent in each component of the course. We found that the time spent in discussion thread was the highest of all other components of the course, as high as 197 minutes (over 3 hours) per week in 2011 class. Caution must be exercised in interpreting this data because students may log into the discussion thread while attending to other tasks. Also, some students type up their responses separately in MS Word in order to spell check before logging on to copy and paste onto the discussion board.

Table 5 provides the results of a simple comparison of test of means for several variables. The results indicate that there was an increase in percentage of substantive posts (weekly) from 2008 to

2011. The percentage substantive posts for all weeks increased from 72 percent in 2008 to 89 percent in 2011. Further, there was an increase in the percentage of posts in higher levels of critical thinking from 2008 to 2011. Percentage of students' posts in higher level order of critical thinking increased from 11 percent in 2008 course to 60 percent in the 2011 course across all 8 weeks. In both cases, these differences were statistically significant. These comparisons suggest that improving the structure of discussion board questions increased quality of the students post. The average number of student posts per week increased from 4.66 in 2008 to 4.71 in 2011, however, this difference was not statistical significant.
Figure 1 compares the type of posts contributed by students in all weeks in 2008 and 2011. Twenty eight percent of student posts in 2008 were not substantive compared to only eleven percent in 2011. The 2011 substantive posts were more skewed to the higher order levels of thinking (RW to MI) when compared to the posts in 2008 which were more RC and CC posts.

Further analysis of the types of posts comparison between the two years confirms that the students in 2011 demonstrated higher order thinking skills - 60% of posts were higher order, and 29% lower order, and less than 11% not substantive. In 2008 however, only 11% were higher order posts, 61% lower order and 28% were not substantive.

The 2008 class had a "by Friday" requirement while the 2011 class had a "by Wednesday" requirement. Figure 3 in the appendix shows that having an earlier requirement for students to contribute an initial post to the threads increased participation.

Finally, though not a focus of this study, we looked at the possible difference in class outcomes. The average final grade in the 2008 course was 86 percent, while it was 82 percent in the 2011 course. However, this difference was not statistically significant.

Table 4: Descriptive Statistics **2008 and 2011**

2008	ALL WEEKS	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
				Number of Students = 18 Male = 10 Female = 8					
Total # of Student Responses	671	82	82	90	78	91	82	78	88
Average # of Student Responses per week	4.66	4.56	4.56	5.00	4.33	5.06	4.56	4.33	4.89
Average # of Substantive Student Responses	3.35	2.83	1.78	4.67	2.50	4.33	3.89	2.67	4.17
% Substantive	72%	62%	39%	93%	58%	86%	85%	62%	85%
% of Posts in Higher Levels (RW to MI)	11%	17%	17%	9%	17%	4%	10%	8%	10%
Average Time Spent on DB (minutes)	158	179	166	188	162	182	140	133	112

2011	ALL WEEKS	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
	Number of Students = 20 Male = 10 Female = 10								
Total # of Student Responses	753	109	88	81	102	85	97	85	89
Average # of Student Responses	4.71	5.45	4.4	4.05	5.1	4.25	4.85	4.25	4.45
Average # of Substantive Student Responses	4.10	4.55	4.15	3.7	4.3	3.8	4.6	4.1	3.6
% Substantive	89%	83%	94%	91%	84%	89%	95%	96%	81%
% of Posts in Higher Levels (RW to MI)	60%	63%	57%	69%	61%	52%	64%	60%	55%
Average Time Spent on DB (minutes)	164	185	197	186	157	193	143	123	129

Table 5: Summary statistics of a T-Test (N=8)

T-test					
	2008		2011		
Variable	M	SD	M	SD	*p*
Total # of Student Posts					
Average # of Student Posts/wk	4.66	0.28	4.7	0.48	0.384
Mean # of Substantive Student posts/week	3.35	1.04	4.1	0.38	0.038*
% Substantive	72	18.86	89	5.86	0.0105*
% of Posts in Higher Levels (RW to MI)	11	4.85	60	5.41	0.0000***

*p<.05; **p<.01; ***p<.001

Figure 1: Type of Student Posts

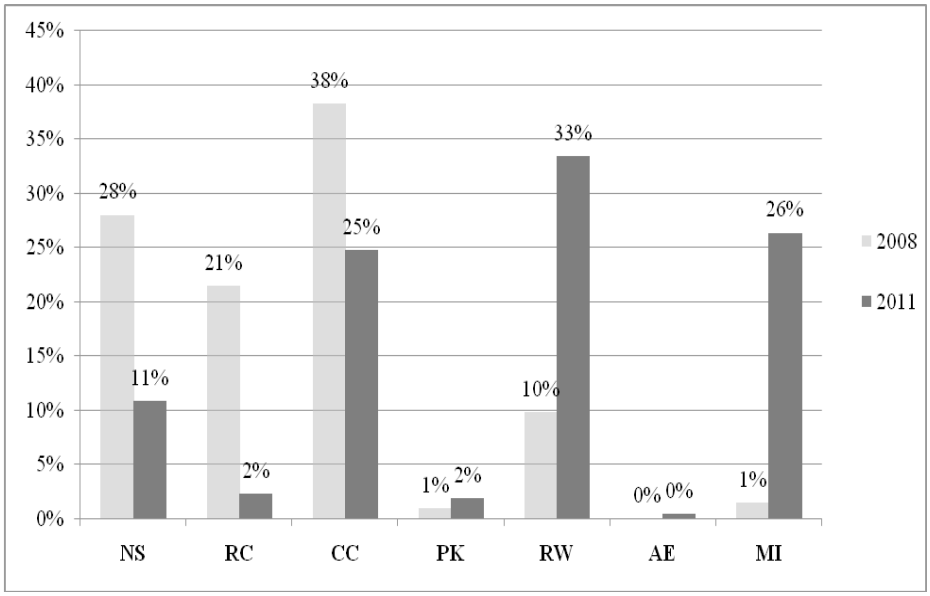


Figure 2: Not Substantive (NS) vs. Lower Order (LO) vs. Higher Order (HO) Posts.

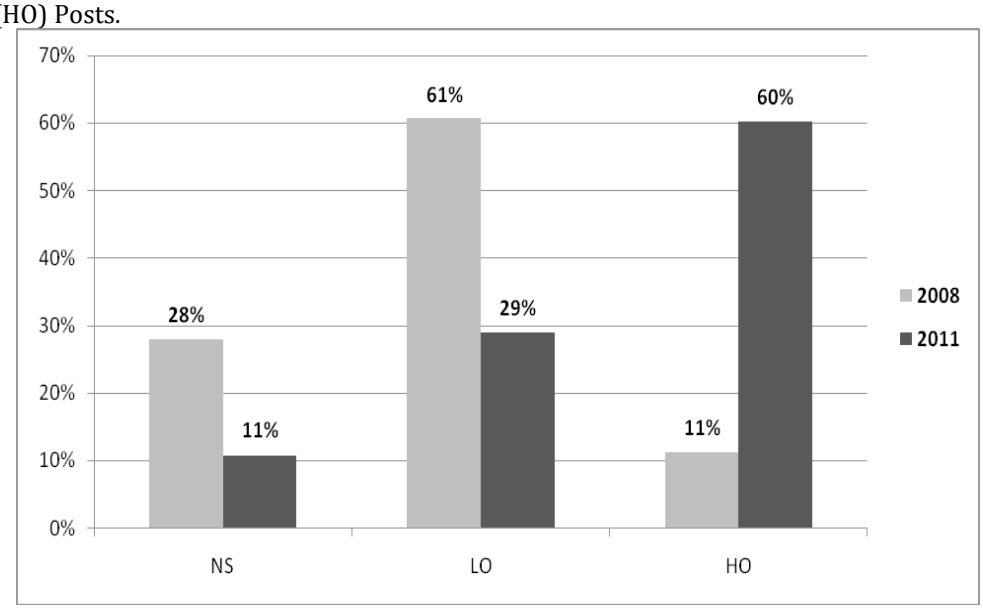
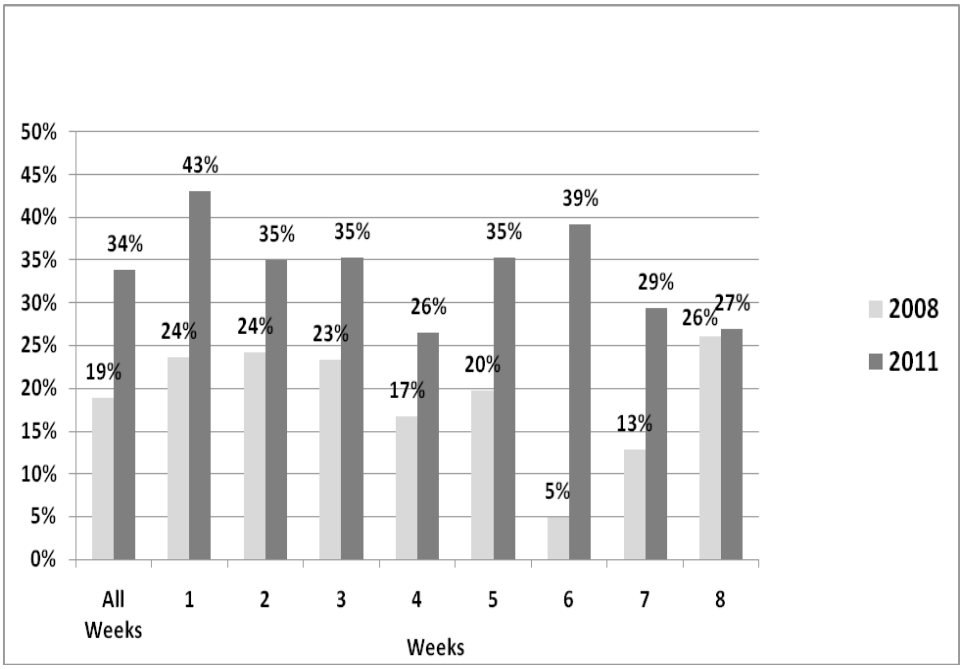


Figure 3: "By Wednesday" Requirement



RECOMMENDATIONS

Here are some recommendations for Instructors of online discussion threads and for course developers of online courses, specific to Principles of Economics courses.

Recommendation for Course Development

Given the amount of time and effort students will be putting into discussion threads and the learning accomplished in these threads, enough points need to be awarded to this component of the course to give students the incentive to make it worth their time. At least 25% of the final course grade should be awarded to asynchronous online discussion assignments. This would make the amount of work proportionate to the weight given to the assignment. Imposing "unrealistic requirements or deadlines, such as posting 10 substantive posts within one week or posting initial post by Monday, set students up for failure (Olt, 2009). A policy outlining the number

of substantive posts that are required to meet frequency requirement is important.

It is also important to have an initial post deadline policy, say by Wednesday, to ensure that students show up on the discussion thread early in the week, rather than on Sunday evening, which will not allow for a thriving discussion.

Recommendations for Instructors

Instructor involvement is indispensable in the online discussion forum. The recommendation is that the Instructor participates substantively at least 3 days a week by asking direct questions, addressing students directly by name, utilizing good follow up questions, and generally guiding the students learning. Questions must be relevant and relate course topics to real life or current events. It is advisable for the Instructor to have a Word Template document for each week with posts that can be modified and recycled from session to session. Posts need to be customized and personalized before posting to the threads. Some examples of standard posts that the bank must include are:

Day 1 post – Welcome Post, Spark off Question – easy low hanging fruit to get things started that the instructor can build on.

Day 2, 3, 4 – Read a few student posts and make substantive responses re-directing students to the key concepts. Alternate students from day to day, so that you respond to several students and not the same student each time, just as you wouldn't be calling on a particular every time in the face-to-face environment; do not overlook students who make minimal participation in class discussion. Ensure talkative students do not dominate the discussion.

Day 5 – or late in the week, post a Recall Core Learning Objectives Post

Day 7 – Wrap up post

Discussion questions need to be discussable questions. Expect one student's response to differ from another's because they have different experiences. Don't post questions that have just one right answer and have all students simply post their responses (e.g. assign an end-of-chapter question to students to calculate real GDP).

Lead by example. Instructors can be cheerleaders, but must follow up "Excellent Post, John" responses with something more

substantive. At the start of the class, explain to students what a substantive post looks like – perhaps give them "Generic Question Stems" (See King, 1995) to use to generate their own questions; too much copy and paste from website is not appropriate; use only credible sources, etc.

Move away from Definition type questions, or summarize an article, to asking students to think through their assumptions, identify the effect of certain policies on different sectors, clarify the meaning of a phrase from their post, justify their course of action in certain situations, etc.

Recommendations for Questions using CREST+

Facilitator Question	**Concepts/CREST+**
Thanksgiving is just around the corner and with it comes … Black Friday shopping! How many of you will go out in the cold and camp out at Best Buy as early as 9:00pm on Thursday to get that laptop for $150? Use the concept of Opportunity Cost to explain your decision making.	Opportunity Cost Spark Off Question – Day 1 **C**ognitive
Actually, a price ceiling would cause a shortage in the market …. Class: What about Price Floors? Are you for a price floor such as Minimum Wage? What do you think?	Market Disequilibrium/ Price Controls **T**ype of Question – Follow Up Question Day 2 - 7
Class: Welcome to Week 2! This week, we will be discussing the concept of Elasticity. Let's get right into it. What is Elasticity? Why is it an important piece of information to have, as a business manager?	Elasticity (Microeconomics) Spark Off Question/Welcome Post Day 1 **C**ognitive
Class: Please read the following article on Free Trade. After reading the article, comment on another student's post and show how his/her arguments contrast the arguments outlined in the paper.	Comparative Advantage/Free Trade **R**eading Citation Day 2 - 7
Think of a career, education, or personal, or family decision you made recently. Identify the opportunity cost involved with your decision? Identify the implicit and explicit costs.	Opportunity Cost **E**xperiential Question
Question 1: Class: Go to the following Federal Reserve Board Web site: www.federalreserve.gov/BIOS From your review of the biographies of the members of the Board of Governors, what strikes you about the composition of the Board (re: age, gender, education, previous employment, ethnic background, etc.)? Question 2: Now, do you think the Fed has enough qualified members to be independent from political authority?	The Federal Reserve and Monetary Policy **S**tyle of Question (Post Building) Day 2 - 5

Facilitator Question	Concepts/CREST+
Class: This week, our goal is to learn 1, 2, 3. Here are the learning objectives. Have we touched on all these topics so far? What's missing? Do you have any questions from the readings you would like to discuss?	**T**ype of Question - Evaluation Day 5
Provide clear directions and reminders (dates, Class: Are you for/against free trade? Argue for or against. Then select a student who has taken the opposite side of the argument and defend your argument.	**+** Structuring the Question
Class: We have come to the end of Week 2 Class Discussion. This week, we learned …. Continue to post to the threads if you still have some lingering thoughts until midnight….	Wrap Up Post Day 7

Suggestions for Future Research

There are several unobservable factors that could affect students' participation – for instance social life, work, work/class load, personal commitments/family obligations, etc. Unfortunately, our data was not able to control for these. It is also noted that when a course has multiple sections, the first sections filled (e.g. sections A and B) have the best students. Subsequent sections such as Sections C, D, or E are not likely to have as good a quality of students. For our study, the 2008 course was a later section F while the 2011 course was a Section A course. It is possible that there were relatively better quality students in the 2011 crop than the 2008 section.

It is also possible that students nowadays have a higher willingness to participate in online class discussions than several years ago, so the increase in participation from 2008 to 2011 may reflect this. Further, with more students taking more online courses they are more used to the format of online discussion and this could also contribute to participation rate. However, the more striking result from the study and one that we feel is more critical is the increase in higher order thinking from low order to high order which we feel is greatly helped by the increase in structure and instructor participation.

The percentage of the discussion in the final grade for both classes was just 12 percent of the overall. This may not have been a significant portion of the grade to motivate students. Subsequent classes are now being changed such that the discussion board piece

will constitute 20 percent of the final grade. We believe that this will further motivate and improve the content and quality of online discussions.

Overall, the study did not have sufficient other demographic variables to enable us to conduct a regression analysis to control for both observable and unobservable factors. Future studies will reflect this. Future research on this issue will compare two sections occurring at the same time to control for the state of the economy.

CONCLUSION

Analysis of student and instructor posting patterns revealed that structured instructor posts and having a "By Wednesday" requirement promote meaningful online discussions and increased substantive student posts in the higher order critical thinking category.

REFERENCES

Akin, L., & Neal, D. (2007). CREST+ Model: Writing effective online discussion questions. *Journal of Online Learning and Teaching 3*(2) Retrieved from http://jolt.merlot.org/vol3no2/akin.htm

Allen, E. and Seaman, J. (2010). Learning on Demand: Online Education in the United States. http://www.sloanconsortium.org/publications/survey/pdf/learningondemand.pdf

Al-Shalchi, Olla Najah, (2009). The Effectiveness and Development of Online Discussions. *MERLOT Journal of Online Learning and Teaching* 5 (1). http://jolt.merlot.org/vol5no1/al-shalchi_0309.htm

Anderson, T. (2004). Teaching in an online learning context. In Anderson, T., & Elloumi, F. (Eds.), *Theory and Practice of Online Learning* (chapter 11). Athabasca University.

Bai, H. (2009). Facilitating Students' Critical Thinking in Online Discussion: An Instructor's Experience. *Journal of Interactive Online Learning* 8(2): 156-64. (Summer)

Berge, Z.L. (1999). Interaction in post-secondary web-based learning. *Educational Technology* 39(1): 5-11

Black, A. (2005). The use of asynchronous discussion: Creating a text of talk. *Contemporary Issues in Technology and Teacher Education* [Online serial], *5*(1). http://www.citejournal.org/vol5/iss1/languagearts/article1.cfm

Bloom, B.S. (1956). *Taxonomy of educational objectives: the classification of educational goals: Handbook I, cognitive domain*. New York: Longmans, Green.

Bullen, M. (1998). Participation and critical thinking in online university distance education. *Journal of Distance Education, 13*(2).

Christopher, M. M., Thomas, J. A., & Tallent-Runnels, M. K. (2004). Raising the bar: Encouraging high level thinking in online discussion forums. *Roeper Review* 26:166-171.

Du, J., Zhang, K., Olinzock, A., & Adams, J. (2008). Graduate students' perspectives on the meaningful nature of online discussions. *Journal of Interactive Learning Research* 19: 21-36.

Easton, S. (2003). Clarifying the instructor's role in online distance education. *Communication Education 52*(2): 87-103.

Garrison, D. R., & Cleveland-Innes, M. (2005). Facilitating cognitive presence in online learning: Interaction is not enough. *The American Journal of Distance Education* 19: 133-48.

Gilbert, P. K., & Dabbagh, N. (2005). How to structure online discussion for meaningful discourse: a case study. *British Journal of Educational Technology* 36:5-18.

Glaser, E. M. (1941). *An experiment in the development of critical thinking*. New York, NY: Teachers College of Columbia University, Bureau of Publications.

Gunawardena, C. N., Lowe, C. A. & Anderson, T. (1997). Analysis of a global online debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. In Seidman R.H. (Ed). *Journal of Educational Computing Research* 17 (4): 397-431.

Hunkins, F. P. (1989). *Teaching thinking through effective questioning.* Boston: Christopher Gordon Publishers.

King, A. (1995). Designing the instructional process to enhance critical thinking across the curriculum; Inquiring minds really do want to know: Using questioning to teach critical thinking *Teaching of Psychology* 22 (1):13-17

Mandernach, B.J, Gonzales R. M., Garrett A. L. (2006). An Examination of Online Instructor Presence via Threaded Discussion Participation *MERLOT Journal of Online Learning and Teaching* 2 (4) December.

Nussbaum, E., Hartley, K, Sinatra, G, Reynolds, R, Bendixen, L, Picciano, A. (2002). Enhancing the Quality of On-Line Discussions. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

Olt, M. R. (2009). Seven Strategies for Plagiarism-proofing Discussion Threads in Online Courses. *MERLOT Journal of Online Learning and Teaching* 5(2):222-28

Roper, A. R. (2007). How students develop online learning skills. *Educause Quarterly* 1:62–64.

Swan, K., Schenker, J., Arnold, S., & Kuo, C. (2007). Shaping online discussion: Assessment matters. *E-mentor*, *1*(18). Retrieved from http://ementor.edu.pl/_xml/wydania/18/390.pdf

Vonderwall, S., Liang, X., & Alderman, K. (2007). Asynchronous discussions and assessment in online learning. *Journal of Research on Technology in Education* 39 (3): 309 – 28.

About the Authors:

Grace Onodipe is Instructor of Economics at Georgia Gwinett College where she teaches economics and business statistics. Her teaching experience spans well over a decade. She can be reached at graceonodipe@yahoo.com. She is the corresponding author.

M. Femi Ayadi is Associate Professor in the Healthcare Administration Program at the University of Houston Clear Lake, where she teaches health economics and public health. She can be reached at ayadim@uhcl.edu