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Raising the Bar: Encouraging High Level Thinking in Online Discussion Forums

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Raising the Bar: Encouraging High Level Thinking in Online Discussion Forums

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Abstract
More universities are offering online instruction for students though we know little about effective online learning. Some have found online instruction increases student participation while others have reported that students prefer the traditional face-to-face format This study of gifted education graduate students follows the expectation that online students ought to have time to be more thoughtful with online course interactions as compared to the time-constrained interactions in a face-to-face course. Researchers evaluated students' thinking levels (as per Bloom's Taxonomy) in the online discussion forums required by a graduate course in gifted education. Results indicate there was no relationship between the level of the prompt and the level of the responses. Higher level prompts did not necessarily generate higher level responses. The research-developed Rubric for Evaluation of Online Discussions can be used both as an instructional guide and as an evaluation rubric to assess the level of online discussions.

Currently, university faculty members are being encouraged to develop online courses. Some 1.6 million students were enrolled in 54,470 different distance education courses in 1997–98 (Web-Based Education Commission, 2000). Distance education programs, including online courses, increased by 72% between 1994 and 1998, with more institutions planning to add distance education courses in the coming years. The use of Internet resources as part of the syllabi in college classes increased from 15% to 40% between 1996 and 1999 (Moe & Blodgett, 2000).

Although teachers and students have used various types of technology through the years, the introduction of each new technology requires an adjustment in the teaching and

learning environment (Handy, 2000). Classrooms have added computers that students and teachers use for word processing, calculations, record keeping, and presentation preparation. Students research and share information and build relationships online. Some universities offer online courses or entire online degrees. With this increased use of the Internet and online courses, teachers and professors must develop effective online educational experiences.

Online teaching and learning presents new challenges for faculty, students, and administrators in colleges and universities (Levin, 1997). They must be assured that the use of technology will enhance the teaching and learning experience. Certainly, faculty members require additional support and time to develop new online learning experiences and to determine that significant learning takes place. Students, as well, need time to develop the necessary computer skills and content knowledge to produce quality work. Nevertheless, teaching and learning in online courses should, theoretically, compare equivocally with campus-based courses.

Literature Review

Online Learning

This research study connects with other studies in online learning and Bloom's Taxonomy. Distance education packed as correspondence courses has existed since the 1800s (Romeo, 2001), but recently the direction of distance education has turned to the asynchronous learning environment of the Internet where students can choose their own time and place for learning. Asynchronous learning can substitute for campus-based courses or serve as an additional component to the traditional classroom meetings.

Several studies demonstrate the advantages of online learning environments. Romeo (2001) discovered graduate students valued the convenience of distance learning and the opportunity to develop more in-depth relationships than possible in a weekly class. Hammond (2000) found learners liked online discussions that included exchange of personal information, sustained reflection on course offerings and other learners' writings, and learning from a combination of practical experiences and theoretical insights that occurred as a result of participation. Other advantages included increased access to the professor, an overall increase in student participation, and an improved ability to apply the course material to new contexts and to make connections between diverse ideas and information (Smith, Smith, & Boone, 2000).

Disadvantages of online distance learning emerged through other studies. A study by Anderson and Kanuka (1997) reported some participants found the limited social interaction and negotiated meaning of the online learning environment less satisfying than the face-to-face format. Two studies found a lack of flow in dialogue limited the strength of the discussion provided (Dozier, 2001; Romeo, 2001). Dozier noted online discussion lacked the simple interactions (facial expressions and gestures) that occur in face-to-face contact and lacked self-reflection. Romeo established that students experienced an overwhelming amount of difficult-to-manage e-mail responses. Some students in Romeo's study were intimidated by having to put their thoughts in writing.

With online courses becoming more common in the university setting, concerns have emerged regarding the validity of this learning environment. One issue that must be addressed in relation to online discussion forums regards the actual learning that occurs in this environment. As Kanuka and Anderson (1998) suggest, the "structures, motivations, and applications of online interaction" (p. 1) facilitate increased understanding of this communication medium.

Althaus (1997) conducted a study to examine whether supplementing a face-to-face discussion with computer-mediated discussions would enhance academic performance. Through student evaluations and grades in a correlational study with undergraduates, Althaus learned that because online discussions do not occur in real time, they avoid some of the undesirable characteristics of face-to-face discussions in the classroom. Students can log on and join the discussion when it is convenient, and have more time to read messages, reflect on them, and compose thoughtful responses. Althaus also found that students who were actively involved in the computer-mediated discussions earned higher grades than other students. Mikulecky (1998) compared class discussions in web-based and campus-based versions of a graduate course on adolescent literature with 40 graduate students. In the discussions, Mikulecky found: a) rich descriptions of situations; b) thoughtful responses to fellow students, including suggestions for further professional development; c) comments to link or spur and synthesize new thoughts; d) sharing of experiences and support to others; and e) occasional debate.

Some studies suggest interactive, online technology enhances the learning process. Durham (1990) found online discussions allowed an exchange of ideas and an increased sensitivity to other students' comments. Students had more time to process information and format their responses or postings through an online discussion than they would usually have in a face-to-face setting (Gorski, Heidlebach, Howe, Jackson, & Tell, 2000; Zvacek, 1999). This environment allows educators to "interact, collaborate, exchange ideas, and engage in dialogue" (Gorski et al., p. 38). As the theoretical and practical aspects of education were discussed, students were challenged to think about the resulting issues in deeper, more complex ways. Students had significantly more participation in the online discussion than in the traditional classroom in a study by Smith, Smith, and Boone (2000).

Other researchers found the "online discussion forum did not always provide increased learning. Students construct knowledge through social interchange that the online discussion forum should furnish, but the online postings in one study had only limited social interchange (Gunawardena, Lowe, & Anderson, 1997). Romeo (2001) found that respondents often merely shared stories and reflections but did not reach the higher levels of thinking.

Online discussions can serve as a support to the classroom experience when they allow students to discuss course topics, develop understanding through debate, and share different perspectives and interpretations (Light, 2000). Therefore, university faculty must study the use of such technologies in order to determine their validity and usefulness for the learning community.

Levels of Thinking

Benjamin Bloom's (1994) work in the area of cognitive development encourages the use of complex thinking in educational experiences. Bloom's Taxonomy of Learning lists six hierarchical levels of thinking: knowledge, comprehension, application, analysis, synthesis, and evaluation. These levels build upon each other as the learner gains knowledge and expertise, therefore leading the student to complex understandings and knowledge. Anderson and Krathwohl's (2001) revision of this work simplifies this taxonomy, making it easier to interpret. In their revision the Knowledge Dimension includes four major types of knowledge: factual, conceptual, procedural, and metacognitive knowledge. The Cognitive Process Dimension includes the following categories in a hierarchal fashion with the first being the lowest level: remember, understand, apply, analyze, evaluate, and create. These dimensions were utilized in this study to create the rubric for evaluating online discussions.

Purpose of the Study

Interest in this study emerged from our use of an online discussion forum as an adjunct to class instruction and our desire to facilitate graduate students' use of complex thinking. University faculty in a variety of disciplines sometimes find that graduate students have limited experiences and opportunities to analyze, evaluate, and synthesize information from research and literature (Anisfeld, 1987; Chamberlain & Burrough, 1985; Froese, Gantz, & Henry, 1998; Makosky, 1985). Because Althaus (1997) found that higher grades resulted with increased discussion, this discussion is critical to the course. In addition, Romeo's (2001) finding suggests that discussion in online classes showed mainly lower level thinking. A method to enhance this thinking in online classes is warranted.

This study attempts to analyze the level of thinking used in a graduate online discussion forum according to Bloom's Taxonomy. In order to evaluate the effectiveness of online discussion forums used as an addition to the classroom environment, this study seeks to answer the following questions:

1. What levels of thinking are exhibited in a graduate course-required, online discussion?
2. What is the relationship between the thinking level of the prompt and the thinking level of the related responses?
3. How do thinking levels in discussion prompts and responses change over the course of the semester?

Methods

Participants

This study involved 10 graduate students (3 middle school teachers and 7 elementary school teachers) working toward master's degrees in Gifted Education at an off-campus educational site of a small, private university in west Texas. The university enrollment includes approximately 2,500 undergraduate and graduate students. The off-campus site offers graduate programs for practicing area teachers who want to develop knowledge and skills for working with gifted students. Eight of 10 students enrolled in this course had taken other gifted education courses, and four had recently been assigned to teach in a pull-out gifted program. Two of the 10 students were seeking an endorsement in gifted education and eight were seeking a master's in education focused on gifted education. Students' (1 male and 9 females) classroom teaching experience ranged from 1 to 10+ years, with a mean of 7 years of experience.

Course Description and Procedures

This graduate course, focusing on the social and emotional needs of gifted learners, is one of a series of five courses required for adding a gifted education endorsement to the Texas teacher certificate. Students gathered for three face-to-face weekend class meetings (8 hours each). One course assignment required students to participate in a weekly online forum to discuss issues and insights related to assigned readings and study. Each class member posted one prompt for discussion during the semester. Classmates responded according to the course guidelines (see Appendix). The professor/researcher did not participate in the threaded discussion, allowing the discussion to focus on the thinking of the participants without the influence of the professor's comments.

Blackboard.com, a web-based online course management system, allowed the instructor to set up and manage threaded discussions as structured online conversations in which people post comments or questions and respond to others' comments in an asynchronous environment (as discussed by Ko & Rossen, 2001). The postings and replies, saved in a hierarchical order, allowed students to follow the flow of the discussion. With Blackboard.com, each response is dated and labeled according to the student's name.

The threaded-discussion forum provided some advantages to the learning and research environment. Because the threaded discussion forum was located on Blackboard.com, a secure site, only the students and instructor for the course had access to the discussion board through the use of a user name and password. The students accessed the site through the Internet; therefore they could visit the site from home or school. Because the forum used an asynchronous format, the students could also respond at a time most convenient for them. This format also gave students extra time to read and process the material in the text and to consider the prompt carefully before responding. Additionally, the Blackboard.com management system provided an automatic creation of text-based, dated archives of the online discussion, allowing the researcher to have verbatim copies of the discussion without having to perform transcriptions.

Data Analysis

After the completion of each online discussion forum, the researcher selected, grouped, and printed the set of prompts and responses for that week to facilitate analysis. A rubric was developed to assist in the analysis of each piece (see Table 1). The rubric, based on Bloom's Taxonomy of Learning (Bloom, 1994), defined three levels of responses: Low (Knowledge and Comprehension); Medium (Application and Analysis); and High (Synthesis and Evaluation). A list of process and behavior-oriented descriptors defined the levels of thinking required at each level and facilitated transcript analysis. Ultimately, each prompt and response was rated a one (low), two (medium), or three (high). Students did not see this rubric.

Table 1. Rubric for Evaluation of Online Discussion Prompts arid Responses

Levels of Thinking	Points	Process Verbs	Behavior Descriptors
Low: Remember or Understand	1	Explain, list, describe, recall, define, identify, show, restate, summarize, list, demonstrate, illustrate, explain	Behaviors that emphasize recall or memory or indicate a literal understanding
Medium: Apply or Analyze	2	Organize, classify, relate, prioritize, discuss, group, model, apply, compare, contrast, distinguish, categorize, take apart, combine	Behaviors that require students to use what they have learned in a new way or that break down knowledge into its component parts
High: Evaluate or Create	3	Extend, design, reconstruct, reorganize, create, develop, speculate, propose, predict, generate, interpret, judge, justify, critique, evaluate, use criteria, dispute	Behaviors that combine elements of learning into a new whole or that assess the value of particular ideas or solutions

Adapted from: Anderson, L. W., & Krathwohl, D. R. (Eds.). (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives.* New York: Longman Publishers.

An essential element in naturalistic inquiry is the validation of analyses drawn from data. This study used peer reviewing and debriefing to validate the ratings of the online responses and prompts. Peer reviewing and debriefing builds credibility for the study because it allows "a peer who is a professional outside the context and who has general understanding of the study to analyze materials, test working hypotheses and emerging designs, and listen to the researcher's ideas and concerns" (Erlandson, Harris, Skipper, & Allen, 1993, p. 140). Using the rubric developed for analysis, two colleagues analyzed the first two online discussion forums. In each, two of the three raters were in agreement. Their ratings were compared to the researcher following a systematic organizational structure developed according to the guidelines of Lincoln and Guba (1985). An analysis matrix was created to display the ratings of the first two threaded discussion forum responses along with marginal notes. A second matrix showed the researcher's ratings of the responses for all the threaded discussions. These matrices helped to develop a variety of graphs to compare the level of thinking found in each prompt and response. While this study was qualitative in nature, the graphs allowed the researcher to compare the level of each prompt to

the level of the responses. They also showed changes in the levels of thinking in the student responses over time.

Results

Responses in the online discussion forum were analyzed according to the research questions of this study. Therefore, the results of the study will be shared in relation to the research questions. All participants in the study were assigned pseudonyms prior to the data analysis in order to assure confidentiality.

The first question sought to investigate the levels of thinking exhibited in the online discussion forum of this graduate class. The majority of the responses fell in the medium level of thinking, showing application and analysis in the responses. Many of the responses applied the knowledge gained from the readings and class activities to the participants' elementary or middle school classes or their district. For example, in response to a prompt regarding the identification of gifted children, Denise felt that her district had an effective means of identifying gifted learners. Note her use of *compare* and *contrast* as she connects *component parts* (her previous experience with new text information):

> After looking over and analyzing my district's identification process, I've come to the conclusion that they do have in place effective means for identifying academic giftedness. The Teacher Observation and Student's Self Analysis forms also include criteria that would involve social/emotional issues.

Denise then continued to explain in more detail how each of those instruments support accurate identification of gifted children. Following the same prompt, Amy analyzed various definitions of giftedness developed by theorists and *compared* them to the procedure used in her district. Note the way in which she now *distinguishes* the definition of giftedness:

> My definition of giftedness is eclectic and seems to include a bit of all researchers and the federal definition. Giftedness is the ability to learn at a faster rate in areas such as knowledge, art, music, and/or leadership. Giftedness depends upon specific characteristics, behaviors, and personality unique to an individual. One gifted person does not equal another. How could it have a specific definition?

A pattern emerged in the level of thinking evidenced in the responses. Amy, Cheryl, Frank, and Ginger used higher levels of thinking overall than did the other respondents (see Figure 1). All of their responses fell in the Medium or High range. These students were able to synthesize and evaluate with more regularity than the other students were. For example, Frank evaluated the effectiveness of most gifted identification processes in relation to the various theorists we had studied. Note the way in which Renzulli and Witty helped Frank *evaluate* or *critique* his thinking about organizing learning for gifted children:

> I found it very interesting that Renzulli and Witty both look at giftedness as a set of behaviors as opposed to the traits children possess. This leaves me asking

> myself the question, how do I fashion my classes to allow not only for the children who will perform, but as well as for the students that do not make use of an "outlet" for the traits they possess? This is not a question I look to find the answer to, but to use as a guide as I prepare for my learners.

Cheryl provided a depth of understanding throughout her responses. She was able to *extend* her understandings to *create* new connections between what she was reading and her past experiences as a teacher.

> I appreciate the fact that Delisle differentiates between "teenagers" and "adolescents." The term adolescent is more encompassing and includes the strange little people I affectionately call "sixth graders." Even at the tender ages of 11 and 12, these pre-teens are pulling away from dependency on adults and redefining themselves in terms of their peers. I am not even sure that they are cognizant of my presence in the classroom, as they seem enthralled in their own goals and agendas.

Three of the students tended to use lower levels of thinking in their responses, focusing on comprehension and application. They often merely paraphrased the chapter rather than analyzing the information. Note the way in which Lynn *restates* the text language to explain her understanding of underachievement:

> I haven't really seen any underachievers or non-producers in my class thus far, but I do after reading see how my perception of what an underachiever would actually be—a non-producer as the text states. I found the chart that compared non-producers to underachievers very helpful.

In another discussion forum, Evelyn *recalled* or *paraphrased* parts of the chapter to explain gifted students' intense emotional feelings.

> I think it is very important to use Whaley's strategies in the classroom. First of all, it would definitely benefit all students to learn how to create active solutions to resolve their feelings of helplessness.

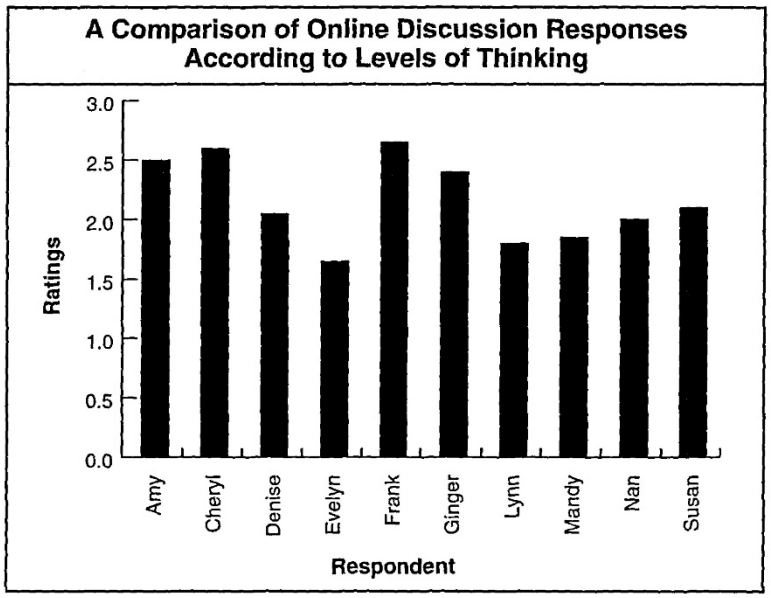

Figure 1

The second question in this study sought to determine if there was a relationship between the level of thinking found in the prompt and the level of thinking found in the responses to that prompt. In order to evaluate this relationship, the level of thinking found in the responses was averaged to determine a mean score for the responses to a particular prompt. These mean scores were then compared to the level of thinking in the prompt (see Figure 2). No pattern emerged to answer this question. Although the discussion over text chapter eight showed the highest level of thinking in the prompt and in the mean of the level of the responses, the remainder of the prompts and responses did not follow a similar pattern. Though the level of the prompts rose, the level of responses did not rise.

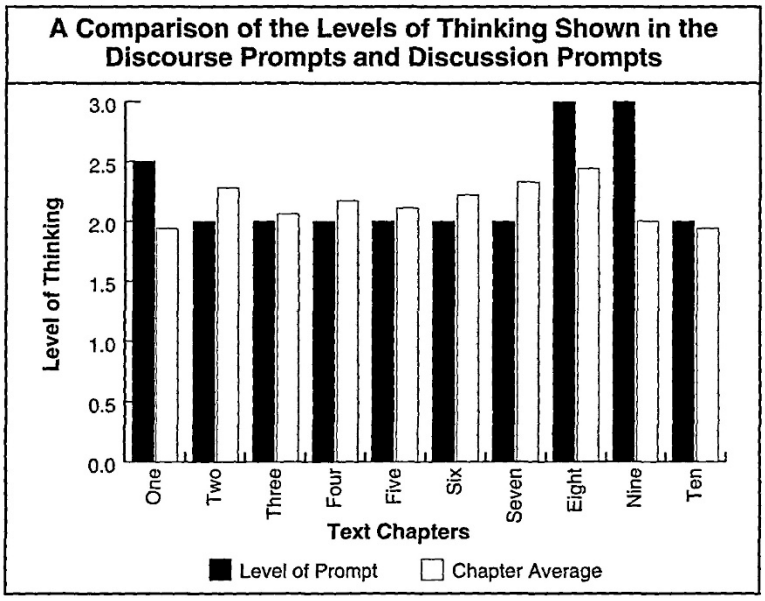

Figure 2

The third question sought to determine how the level of prompts and responses changed over the course of the semester. We assumed that as students learned more about a topic, they would be able to discuss issues related to that topic in more depth. Regardless of that assumption, no pattern of change in the level of thinking occurred over the course of the semester (see Figure 2). Most of the prompts and responses were rated at the medium level of thinking on the rubric with little variance, so no change was apparent. When the level of prompt was analyzed as medium, the responses ranged from high to low. In 6 of 10 chapter discussions, the average thinking level in the response matched the medium level of the prompt.

Discussion

The participants in the online discussion forum in this study were able to analyze and apply knowledge in their responses. On a regular basis, they could use what they learned in a new way by making connections to the classrooms, schools, and districts in which they teach. Real learning happens when individuals can see connections and make changes in their own environment. Analytical thinking requires the learner to break apart new material to make it more understandable. Therefore, these students were learning above the lowest levels of *remember and understand*.

Some of the participants responded to the new material learned in this course at high levels. They could combine the elements of what they were learning with their prior knowledge to create new ideas and perceptions. At times, they were also able to evaluate practices and experiences in the educational setting in relation to the information they learned. Although the professor's goal for this course was for all the students to reach this

highest level of thinking, perhaps this target was unrealistic. Not all the students in the course had the prior knowledge or experiences with which to make these kinds of connections.

Further research is needed in the area of online discussion forums to determine answers to the last two questions in the study. No conclusive results were found to determine the relationship between the level of thinking in the prompt and the level of the responses because there was little variation in the level of the prompts. Perhaps the prompts need to be structured at different levels to see if the levels of responses change with the level of the prompts. The prompts could also be designed to grow in complexity over the semester to encourage growth in thinking.

Possibly, more direct guidance from the professor would have encouraged the development of higher levels of thinking in the responses. Because the professor did not participate in the discussion forum, no encouragement was present. The professor might have guided and facilitated the discussion forum to add information or ask follow-up questions to ensure a depth of understanding or synthesis and evaluation of the topics discussed. These changes might lead to more conclusive results in future studies.

Conclusion

With the increased availability of Internet access, many university courses have begun to include a requirement that students participate in online discussion forums based on the assigned readings and applicable course content. This practice has been met with both positive and negative responses from professors and instructors in the auricular setting. Although an interactive online process allows for communication among students, one concern that has been voiced is the possibility of these discussions encouraging a lower level of thinking and discourse than the discussion that occurs in the traditional classroom setting. Clearly, this analysis encourages the expectations of high levels of thinking in online discussions. Perhaps this study, along with future studies regarding the use of online discussion forums, will lend support to the use of this type of technology more effectively in the university curriculum. In addition, we believe that the results of this study will apply to gifted learners in K–12 online classes as well as in face-to-face classes.

Implications

It is no longer reasonable to dismiss the thinking and learning possibilities provided by online discussions. Clearly, students in this study took considerable responsibility in connecting their reading and thinking. While the study results are mixed, this connection may be the most valuable component of this study.

Perhaps, the Rubric for Evaluation of Online Discussions could be used both as an instructional guide and as an evaluation rubric. These study results may be related to the fact that students in this study did not have the benefit of the evaluation rubric used by the researchers to determine the levels of thinking in online discussion forums. Students' use of the rubric might further guide their understanding of high level prompts and discussions.

Additionally, the course instructor might follow this same rubric to encourage students to extend their thinking and discussion to the synthesis and evaluation levels. Thus, this research points to the importance of interactivity in course discussions (as opposed to single postings chapter by chapter) and the responsibility of the online instructor to nudge and encourage the construction of knowledge—just as she or he might in a traditional, face-to-face classroom. The advantage of the asynchronous online format is that students have an opportunity to take whatever time necessary to connect their thinking to the highest levels.

Author Information

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Appendix

Online Discussion Guidelines

This class involves thinking and discussing social and emotional issues of gifted learners, so we, as professional educators, need to process and respond to those issues as much as possible. Therefore, a requirement of this course includes a weekly on-line discussion through *Blackboard.com*.

Once this semester you will be responsible for starting the discussion with a prompt related to your assigned chapter. Begin the prompt by briefly discussing a portion of the chapter you read that led you to this prompt. Then, set up the prompt by guiding the other students' thinking and asking a few questions to encourage their response. Your prompt should be posted using the "Start a New Thread" link. The subject line should be a two to three word subject of your prompt. Your prompt should be posted by midnight on Tuesday prior to the due date for the class's response.

During the remainder of the semester, each member of the class will respond to the posted prompts. One week there will be two prompts, so you are going to respond twice that week. Your prompt is due by midnight of the date on the schedule for the chapter being read. You will need to read the chapter prior to responding to the prompt. Your response should be about the length of a typewritten page. You may want to type offline and then copy and paste it to the discussion site, so you don't get kicked offline.

I will be looking for depth and application and synthesis of the knowledge gained in your readings and experience. You will be graded according to the following: Responding on time, 70 points; Depth of response, 30 points.