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TEACHER-READY RESEARCH REVIEW

Research Based Practices for Improving the Effectiveness of
Asynchronous Online Discussion Boards

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Asynchronous online discussion boards are an effective tool for developing and enhancing critical thinking skills and writing in online as well as in-person courses. In this teacher-ready research review, we examine the literature on the benefits of implementing asynchronous online discussion boards as a way of fostering critical thinking and writing skills in psychology courses. We subsequently discuss some of the challenges associated with online discussion boards and offer solutions to address them. One of the primary challenges is the lack of participation or high-level participation of students. To address this challenge, we outline strategies for communicating the purpose and value of the discussion, setting clear expectations for responses, and designing a structure for the discussion. We also review best practices for designing effective question prompts, innovative approaches to discussion questions, and strategies to engage students in the discussion. Sample question prompts for psychology courses as well as a grading rubric for the discussions are provided. Finally, the role of the instructor in facilitating the discussion and techniques for doing so effectively are discussed.

Keywords: asynchronous online discussion boards, critical thinking, discussion facilitation, question prompts, Socratic questions

“For this feeling of wonder shows that you are a philosopher, since wonder is the only beginning of philosophy”

(Plato, *Theaetetus*, 155d, trans. 1997)

Socrates, an early Greek philosopher and teacher, is known for teaching his students by engaging them in guided discussions. He believed students learned better when they arrived to conclusions on their own rather than when the teacher provided them with the information (Paul & Elder, 2016). This method of teaching

continues to be implemented today and has been extended to the online environment. Asynchronous online discussion boards are an effective tool for actively engaging students in discussions in online as well as in-person courses, thus extending the opportunity for discussion outside of the classroom (Chadha, 2017; Lo, Johnson, & Tenorio, 2011). The unique feature of asynchronous online discussions, as opposed to traditional in-class discussions, is that students can respond to the questions, and to each other, at their own pace without the constraint of time and place (Thompson, 2006). This feature affords students more time to reflect on their answers and support their arguments with evidence, which develops critical thinking and writing skills (Arend, 2009; Szabo & Schwartz, 2011). Yet, this is not always easily achieved in online discussion boards. Instructors often find it challenging to construct question prompts which will lead to high-level responses from

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students. Once a conversation has been initiated, instructors can also find it challenging to sustain the conversation without dominating it (Dennen, 2005; Rovai, 2007; Thompson, 2006).

Fortunately, there are many techniques that psychology instructors can utilize to elevate the quality of students' responses and effectively utilize the asynchronous discussion board in their courses. In this teacher-ready research review, we summarize the literature on the benefits and challenges associated with incorporating the asynchronous discussion board in online formats as well as embedding it within in-person courses. We offer research-based practical suggestions for improving the effectiveness of this teaching method in psychology courses. Specifically, we review strategies for communicating the purpose of the discussion board and setting clear expectations for the responses, setting the structure for the discussion, creating effective question prompts, and techniques for facilitating the discussion.

The Asynchronous Discussion Board as a Tool for Promoting Content Knowledge, Writing, and Critical Thinking Skills

In asynchronous online discussions, students engage in a conversation about a topic related to the course content by providing initial responses to a question posed, responding to ideas shared by others, and by additional contributions. The unique feature of asynchronous online discussions, as opposed to traditional in-class discussions, is that students can respond to the questions, and to each other, at their own pace without the constraint of time and place (Thompson, 2006). Online discussions can be effectively used in both introductory and advanced courses (Chadha, 2017). Asynchronous discussion boards are a crucial element of online courses as they provide students with an opportunity to interact with one another, but this teaching method can also support learning in traditional in-person classes (Lo et al., 2011). The popularity of discussion boards has been made possible through their availability in most Learning Management Systems which are widely used in higher education (Dahlstrom, Brooks, & Bichsel, 2014).

Incorporating an online discussion board within an in-person class can extend the discussion outside of the classroom, thus providing students with

the opportunity to be more engaged with the material and more connected to other students and the professor (Rovai, 2002; Yang, 2008). Given limited class time, this teaching tool, which can be used prior to or after a class session, can help students achieve the course learning outcomes by engaging them in meaningful work throughout the week in between class sessions. Lo et al. (2011) found that adding an online component to a traditional face-to-face course increased student satisfaction with the course and facilitated the development of critical thinking skills. Alzahrani (2017) utilized an online discussion board as a supplement to in-person discussions and found that students in the sections that incorporated the online discussion board performed better on the final exam than students in sections that did not incorporate it.

Another advantage of online discussions is that they provide students with the opportunity to learn from their peers by reading others' responses to posts as well as following the discussion threads in response to their own posts (Xie, 2013). Exposure to peer responses is also associated with an increase in the negotiation of meaning (Eryilmaz, Thoms, Mary, Kim, & van der Pol, 2015). Researchers have found that having access to peer responses can help students improve their self-efficacy (Huang, 2017). Although the benefits of peer learning are not unique to online discussion boards, and there has been much research on the benefits of incorporating peer-to-peer learning within the classroom (Topping, 2005), the discussion board is a convenient tool for facilitating peer-to-peer learning. For example, results of a study conducted by Eryilmaz et al. (2015) showed that when students were required to highlight, increase the font size, and select the levels of importance of key points made by their peers in an online discussion board, they spent more time negotiating the meaning of the information compared with an instructor-led or a control group who did not utilize these functions. Xie (2013) required students to rate one another's posts and tracked the number of replies students received to their posts. The ratings and replies students' received from peers significantly predicted their feelings of competence and intrinsic motivation. In another study, Cathey (2007) utilized the discussion board specifically for the purpose of peer review. Students taking a Social Psychology course posted an essay in the online

discussion forum and then peers provided feedback on the essay. Students reported that reading the essays of classmates helped them improve their own writing skills and that they learned as much from commenting on classmates' essays as they did from writing their own.

The asynchronous discussion boards also provide students with the opportunity to practice their writing skills frequently and in a less intimidating manner than writing term papers (Foushée, 2018). In addition, because discussion posts tend to be shorter than APA style papers, they enable students to practice writing in a succinct manner which is a skill they will need in the professional world (Warnock, 2009). This advantage is not unique to online discussions. Drabick, Weisberg, Paul, and Buber (2007), for instance, found that incorporating short written assignments in their in-person introductory psychology course improved students' conceptual learning. However, online discussion boards are another useful tool that instructors can use to help psychology students develop their writing skills.

Another advantage of online discussions is that they can involve more introverted students as well as students high in the personality trait of neuroticism who tend to be intimidated about participating in-person (Amichai-Hamburger, Wainapel, & Fox, 2002; Caspi, Chajut, Saporta, & Beyth-Marom, 2006). For example, Caspi et al. (2006) compared students' self-reported levels of participation in online and in-person courses and found that although the extroverted students reported participating more in-person, the introverted and neurotic students reported participating more online. Similarly, Amichai-Hamburger et al. (2002) found that introverted students reported that the online discussions provided a better match for their "real-me" than the in-person environment.

Perhaps one of the greatest benefits of asynchronous discussion boards is that they provide students with the time necessary to reflect on their answers and formulate coherent arguments (Arend, 2009). Students have more time to backup their claims with supporting evidence, which leads to more substantive responses. In one study, researchers compared student dialogue in face-to-face and online discussions and found that the quality of critical thinking in the online discussions was greater than the face-to-face discussions in terms of students' tendency to justify their ar-

guments with evidence (Guiller, Durndell, & Ross, 2008). In another study conducted with students in an Educational Psychology course, students in a course that required participation in online discussions, as compared with students who completed reflection papers, showed an increase in critical thinking skills throughout the semester (Szabo & Schwartz, 2011). This was measured by a rubric that was developed to align with Bloom's (1956) taxonomy.

It is important to note that online discussion boards are not inherently better than in-person discussions at fostering critical thinking skills. Some studies have shown that instructors' level of interactivity is a greater predictor of students' critical thinking skills than the mode of instruction. Goode et al. (2018) found this to be the case when comparing online and hybrid courses. Mandernach, Forrest, Babutze, and Manker (2009) found that the instructor was a more important factor than modality when comparing online to face-to-face courses. The benefit of online discussion boards compared with in-person discussion is that students have added time to construct their responses. Student performance is also increased in in-person courses as a function of time; longer wait time between student answers and the instructor's questions is related to greater student performance (Ingram & Elliott, 2016). The advantage of asynchronous online discussion boards is that the added time is already built into the asynchronous platform (Arend, 2009).

In short, online discussion boards are a useful tool for engaging more students in the discussion, improving students' writing skills by providing students with more opportunities to write short low-stake responses and increasing students' exposure to peer responses. The greater time afforded to students to compose their responses and search for available resources is also a reason for why online discussion boards are successful at developing students' critical thinking skills. Although these benefits are not unique to online discussions, the online discussion board is a useful vehicle for achieving these goals.

Challenges Associated With Asynchronous Discussions

One of the greatest challenges of online discussions is low student participation and engagement (Caspi et al., 2006). There are many reasons why

students either do not contribute at all to online discussions or contribute in a shallow manner (Hew, Cheung, & Ng, 2010). Several studies have shown that students do not participate when they are confused about the instructor's expectations of them or do not understand the purpose and value of the discussion (Balaji & Chakrabarti, 2010; Kim, 2013; Lee, 2013; Yeh & Van Buskirk, 2005). Students are also less likely to participate when there are no clear deadlines for posting and when the discussion is not factored into the course grade (Dennen, 2005; Pena-Shaff & Altman, 2015).

In one study conducted by Pena-Shaff and Altman (2015), Educational Psychology students were randomly assigned to either a structured or less structured online discussion condition. In the structured condition, follow-up questions were used and follow-up answers counted toward the grade. In the less structured condition, all of the questions were posed in the discussion prompt. Not surprisingly, students in the less structured condition tended to only make contributions in the first couple of days after the discussion question was posted, whereas more sustained conversation was found in the structured condition. Students were also more likely to respond when they were required to do so.

The initial question prompt the instructor poses is another important factor in student engagement (Bradley, Thom, Hayes, & Hay, 2008; Howell, LaCour, & McGlawn, 2017). This is especially the case when the initial discussion prompt calls for a single fact-based answer, because once this question has been answered there isn't much room for subsequent contributions (Dennen, 2005; Ertmer, Sadaf, & Ertmer, 2011). As a result, students often repeat content or ideas which have already been discussed, simply reiterate their agreement with comments made by a classmate without demonstrating critical thinking skills (Toledo, 2006), or opt not to participate because of not knowing how to add value to the conversation (Hew et al., 2010).

Poor discussion board management by the instructor can influence the quality of students' responses (Arend, 2009). One of the challenges that instructors often face is how to elevate the quality of online discussions without dominating the conversation as too much intervention by the instructor can interfere with students' knowledge building (Dennen, 2005; Rovai,

2007; Thompson, 2006). In addition, instructors should be cautious about sharing their opinion as this can stifle conversation (Arend, 2009).

Lower levels of participation are also likely when students do not feel connected to or valued by their classmates or instructor (Garrison, Anderson, & Archer, 2001; Rovai, 2007; Vonderwell, 2003). As a result, students are less likely to contribute to an online discussion when other students or the instructor do not show interest in their comments (Hew et al., 2010). For example, Naranjo, Onrubia, and Segués (2012) used a case study approach in an Educational Psychology course to determine variables that impacted student participation in online discussions. Results indicated that students were less likely to make significant contributions when others in the class did not respond to their post.

In addition to feeling disconnected, students might also find it more difficult to express their emotions online. Gao, Zhang, and Franklin (2013), for instance, note that the lack of emotional cues is one of the challenges associated with online conversations and that this is one of the reasons for less meaningful and effective communication in online conversations. Wang and Woo (2007) report that students found face-to-face discussions to be more authentic than online discussions. The researchers attribute this to the fact that in the face-to-face discussions students could see each other's facial expressions and could clarify any misunderstandings immediately. In contrast, in the online forum there is a longer delay between responses and, as a result, misunderstandings take longer to be addressed. In another study, graduate students reported that it was difficult to interpret other students' comments, decipher intentions, as well as interpret the reasons for lack of responses in a text-only online environment (Murphy & Coleman, 2004).

Personality and psychological factors can also inhibit participation. Students who lack self-confidence for the task at hand are less likely to participate especially when they are not provided with models or support (Xie, 2013). Chen and Caropreso (2004) found that students low in extraversion, agreeableness, and openness tended to post one-sided messages that discouraged contributions from other students and were often unrelated to the discussion topic.

Students may also cease to contribute because of difficulty keeping track of an extensive

discussion thread. Students can experience information overload if several subdiscussions occur simultaneously (Hew et al., 2010), or if there are too many participants in the discussion (Rovai, 2002). The hierarchical structure of the discussion can make it difficult for students to see connections between posts (Gao, 2011). Finally, students might fail to participate in the discussion because of technical difficulties (Hew et al., 2010). Table 1 provides a summary of the benefits and challenges associated with online discussion boards.

Teaching Strategies for Addressing the Challenges Associated With Online Discussions

There are several ways in which instructors can increase students' participation and the quality of their writing and critical thinking skills in online discussion boards. In this section, the following four important considerations will be discussed: (a) communicating the purpose of the discussion board and expectations for responses; (b) setting

the structure for the discussion; (c) creating effective question prompts; and (d) techniques for facilitating the discussion. Table 2 summarizes these best practices.

Communicating the Purpose of the Discussion Board and Expectations for Responses

Many students may not be familiar with the online discussion board, and as a result may not understand the benefits of fully engaging in this learning activity. To begin, it is essential for instructors to help students understand the purpose and value of online discussions. When instructors clearly communicate the rationale for using online discussions as a learning tool and the goal of each discussion, students will be more motivated to engage in the dialogue (Cheung & Hew, 2005; Lee, 2013).

Instructors can communicate the importance of the discussion board by weighing it into the course grade, thereby increasing students' extrinsic motivation to participate (Yeh & Van

Table 1
Summary of the Benefits and Challenges of Utilizing Online Discussion Boards

Benefits	Challenges
<ul style="list-style-type: none"> • Students work at their own pace (Thompson, 2006) • Extends opportunity for discussion outside of the classroom (Lo, Johnson, & Tenorio, 2011; Rovai, 2002; Yang, 2008) • Facilitates peer learning by enabling students to see the responses of others (Cathey, 2007; Eryilmaz et al. 2015; Huang, 2017; Xie, 2013) • Enables students to practice writing succinctly (Warnock, 2009) in a less intimidating forum than term-papers (Foush�e, 2018) • Involves more introverted students and students' high in the personality traits of neuroticism that find it more challenging to participate in traditional in-person discussions (Amichai-Hamburger, Wainapel, & Fox, 2002; Caspi, Chajut, Saporta, & Beyth-Marom, 2006) • Provides students with more time to reflect on their answers which facilitates critical thinking skills and the ability to support arguments with evidence (Arend, 2009; Guiller, Durndell, & Ross, 2008; Szabo & Schwartz, 2011) 	<ul style="list-style-type: none"> • Lack of student participation and engagement attributable to: <ul style="list-style-type: none"> • confusion about the purpose of the discussion board and the instructor's expectations (Balaji & Chakrabarti, 2010; Dennen, 2005; Kim, 2013; Lee, 2013; Pena-Shaff & Altman, 2015; Yeh & Van Buskirk, 2005) • low self-confidence (Xie, 2013) • responses of classmates discouraging participation (Chen & Caropreso, 2004) • difficulty keeping track of an extensive discussion thread (Hew, Cheung, & Ng, 2010) • technical difficulties (Hew et al., 2010) • Creating question prompts that can foster high-level critical thinking in students (Bradley, Thom, Hayes, & Hay, 2008; Howell, LaCour, & McGlawn, 2017) • Determining the level and type of instructor involvement in the conversation (Arend, 2009; Dennen, 2005; Rovai, 2007; Thompson, 2006) • Students feeling disconnected in the online environment (Garrison, Anderson, & Archer, 2001; Hew et al., 2010; Naranjo, Onrubia, & Segu�es, 2012; Rovai, 2007) • Misunderstandings and difficulty interpreting the responses of others due to the lack of emotional cues (Gao, Zhang, & Franklin, 2013; Murphy & Coleman, 2004; Wang & Woo, 2007)

Table 2
A Summary of Best Practices for Improving the Effectiveness of Asynchronous Discussion Boards

Best practice	Teaching strategies
Communicate purpose and expectations	<ul style="list-style-type: none"> • Communicate the purpose and importance of the discussion board to increase student motivation (Cheung & Hew, 2005; Lee, 2013) • Utilize a grading structure where online discussions count for a moderate amount of the final course grade (Yeh & Van Buskirk, 2005; Rovai, 2003), especially when students are required to find additional resources to contribute to the conversation (Harrington & Thomas, 2018) • Provide students with a grading rubric which outlines expectations for initial and follow up responses (Andrade, 2000; Angeli, Valanides, & Bonk, 2003; Gilbert & Dabbagh, 2005; Eryilmaz, Thoms, Mary Kim, & van der Pol, 2015; Panadero & Jonsson, 2013; Penny & Murphy, 2009; Wyss, Freedman, & Siebert, 2014)
Set a structure for the discussion	<ul style="list-style-type: none"> • Set multiple deadlines for initial and follow up responses (Black, 2005) • Enable students to see the responses of others before posting their own response (Jacobi, 2017) • Ask students to label their messages to help others follow the flow of the conversation (Jeong, 2004) • Create separate spaces for introductions, ice-breakers, socialization and question and answer forums (Arend, 2009; Jeong, 2004; Lam, 2004; Rovai, 2007) • Consider alternative structures to threaded discussions such as a discussion map (Gao, 2011) • Divide the class into small discussion groups (Akcaoglu & Lee, 2016; Kim, 2013; Qiu et al., 2014; Rovai, 2002)
Create effective question prompts	<ul style="list-style-type: none"> • Create question prompts that target Bloom's highest levels of critical thinking; analysis, synthesis and evaluation (Bradley et al., 2008; Ertmer, Sadaf, & Ertmer, 2011) • Use divergent question prompts such as "brainstorm", "focal" and "playground" questions instead of convergent question prompts (Bradley et al., 2008; Ertmer et al., 2011; Howell, Akapnudo, Chen, Sutherlin, & James, 2014; Howell et al., 2017) • Incorporate videos and word clouds into the question prompts (Clark, Strudler, & Grove, 2015; DeNoyelles, et al., 2015; Fernandez, Simo, Castillo, & Sallan, 2014) • Utilize creative approaches such as role-playing, WebQuests and debates in the question prompt (Hou, 2012; Jin & Jeong, 2013; Kanuka, Rourke, & Laflamme, 2007) • Self-assess the effectiveness of the question (Harrington & Aloni, 2013a)
Facilitate discussion effectively	<ul style="list-style-type: none"> • Participate to increase teacher-presence, but avoid over-involvement or under-involvement (Arend, 2009; Dennen, 2005; Morris, Xu, & Finnegan, 2005; An, Shin, & Lim, 2009) • Focus on providing meaningful contributions such as pointing out themes, highlighting important posts, correcting inaccurate posts and summarizing the conversation (Wang, Chen, & Liang, 2011) • Engage students in the discussion by assigning them to various roles such as starter, skeptic, moderator, theoretician, devil's advocate, wrapper, research reporter, method evaluator and hypothesis generator (Aloni, 2016; De Wever, Van Keer, Schellens, & Valcke, 2009; Olesova, Slavin, & Lim, 2016; Wise, Saghafian, & Padmanabhan, 2012) • Utilize Socratic Questions in your responses to students and teach students to ask these questions of one another (Harrington & Aloni, 2013b; King, 1995; MacKnight, 2000; Paul, 1995; Strang, 2011; Toledo, 2006; Yang, Newby, & Bill, 2005; Yang, 2008)

Buskirk, 2005). In one study, Rovai (2003) found that the number of messages per week as well as students' sense of community increased when the discussion board accounted for 10% to 20% of the course grade. Therefore, having the discussion board account for a moderate amount of the course grade (10% to 20%) is sufficient to increase student participation and sense of community. When determining how

much the online discussions should count toward a final grade, it is important to consider many factors such as motivation, the number of conversations, and the amount of work related to each conversation. Discussions that require students to find additional research on topics should count more than discussions that require only minimal outside work. To help students focus on learning and improving their writing

and thinking skills, [Harrington and Thomas \(2018\)](#) suggest that instructors consider counting discussions early in the term less than discussions later on in the term. Toward the end of the term, students have had more opportunities to benefit from feedback about their writing.

Providing students with a grading rubric—a one- to two-page document which describes varying levels of quality for an assignment—is an effective way to communicate expectations related to participation in online discussions ([Andrade, 2000](#)). Rubrics can increase the likelihood that students will engage in meaningful conversations that align to course learning outcomes and instructor expectations. For instance, without guidance, students may focus on personal experiences without tying these experiences to the content learned ([Angeli, Valanides, & Bonk, 2003](#)). However, a rubric can inform students that these connections are needed. Another common occurrence is for students to express their agreement with one another without providing rationales for their claims. When instructors emphasize in a grading rubric the importance of backing up claims with the course readings or additional resources, students will better understand what is expected and will be more likely to make substantive responses. The rubric could emphasize the importance of adding to the conversation in meaningful ways by focusing students' attention on thinking skills such as analysis, application and evaluation ([Penny & Murphy, 2009](#)). For instance, students could be expected to demonstrate learning by paraphrasing and citing the text or outside resources, describing meaningful examples, and making inferences ([Gilbert & Dabbagh, 2005](#)). Students can also be expected to highlight important points made by their peers thereby encouraging more engagement in the discussion ([Eryilmaz et al., 2015](#)). In [Table 3](#) we provide an example of a discussion board rubric specific to a psychology course.

Research has demonstrated that rubrics can increase student learning. For example, in a review of more than 20 studies, [Panadero and Jonsson \(2013\)](#) noted that rubrics facilitated learning in a number of ways, including reducing student anxiety, increasing learning via feedback, and improving self-regulation and self-efficacy. In one study, students provided with a rubric for the discussion board reported having a clearer understanding of what was

Table 3
Sample Grading Rubric for an Asynchronous Discussion Board in a Psychology Course

Criteria	Missing	Below expectations	Average	Above average	Superior
Content quality of initial post (60 points)	0 points Did not participate in conversation	1–35 points Contributions were vague, general and brief; did not add new ideas to the conversation	36–45 points General, opinion-based responses that were not directly connected to concepts from the book or other outside resources	46–50 points Thoughtful responses with some general references to psychological theories and research from the book and other outside resources	51–60 points Thoughtful, comprehensive responses (answered all parts of the question) with numerous, specific references to psychological theories and research from the book and other outside resources (APA citations included)
Question to classmates (10 points)	0 points Did not ask a question	1–6 points Asked 1 question that was very general in nature and did not encourage further exploration	7 points Asked 2 questions that focused on opinion without encouraging students to explore the literature	8–9 points Asked at least 2 questions that required classmates to further explore the content	10 points Asked at least 2 Socratic questions that referenced readings and required classmates to more deeply explore the content
Two follow-up posts (15 points each)	0 points Did not respond to a question or make an additional contribution	1–9 points Provided a very general response that did not add value to the conversation	10–11 points Responded to question posed by adding general ideas but without making references to textbook concepts	12 points Responded to question posed, making general references to textbook concepts and outside research	13–15 points Response added value by making a new point, or adding a different perspective; made several references to the text and other outside resources using APA style

expected of them, asked fewer questions, made higher-level contributions, and were more satisfied with the course (Wyss, Freedman, & Siebert, 2014). In another study, Gilbert and Dabbagh (2005) found that students in a course where a rubric was provided, as compared with students who were not provided with a rubric, posted more frequently and were more likely to engage in cognitively complex processes such as making inferences. In this study, the rubric addressed expectations for the responses to the question prompts as well as to classmates, and how to demonstrate an understanding of the assigned readings. In addition, students were provided with tips on how to successfully participate and information about the frequency and timing of contributions to the discussion.

Setting the Structure for the Discussion

In unstructured online discussions, students may post many responses without actually learning anything substantive (Yang, 2008). Creating a virtual structure that facilitates quality discussions and a sense of community is important to help students feel comfortable enough to participate in the discussion as well as meet or exceed expectations. It is helpful for instructors to communicate the workflow and due dates for each conversation. Setting deadlines for initial and follow-up responses can help prevent students from posting their answers close to the deadline without the opportunity to benefit from the dynamic discussion (Black, 2005). Creating multiple due dates also helps students see how discussions are different from assignments. Instructors can require students to make an initial contribution early in the week and then a follow-up interaction later in the week. Follow-up interactions can include asking a question, responding to a question posed, and providing additional content or examples (Jin & Jeong, 2013; Yang, 2008).

Another consideration is whether to enable students in the course to see the responses of others prior to posting their own response. Some instructors want students to make a contribution to the conversation without being influenced by what others post. However, there is some research that suggests this may not be the best approach. Jacobi (2017) surveyed students in her course about factors they found most effective in the structure of the discussion. Stu-

dents self-reported that they found it beneficial to read the postings of others prior to posting their own responses, noting that it helped with comprehension and fostered deeper thinking. Allowing students to see the posts of others also fosters more of a conversation.

Jeong (2004) recommends that structure can also be achieved by asking students to label their messages. This can make it easier to follow the flow of the conversation. He also advises instructors to create separate discussion boards for questions related to practical matters (e.g., exam requirements), socialization, and ice-breakers. Creating a space for socialization can help ensure that the discussion board targeting course content is more focused on learning. For example, instructors can create a thread for students to introduce themselves to one another and encourage them to address one another by name (Lam, 2004). They can also create separate spaces for social conversations and a question and answer forum where students can ask questions about the material (Arend, 2009). Creating spaces for socialization in the online discussion board can help foster a sense of community (Rovai, 2007), and address the challenge of students feeling isolated in the online environment.

Gao (2011) argues that threaded discussions are too linear and can sometimes be difficult to follow. Instead, she utilized a discussion map using Mindomo: an online concept map website. In this system rather than posting discussion questions in threads, the instructor posts a discussion question at the center of a discussion bubble. Students are then invited to respond to the main question or to other posts by adding subbubbles. They can read the posts by clicking on a note icon. The main difference between this approach and a threaded discussion is that students can visually see the structure of the entire discussion which looks like a concept map. Gao (2011) found that students were more likely to make connections between posts and to sustain the conversation for longer in the discussion map condition compared with the traditional threaded discussion. This was indicated by a greater number of posts per thread in the discussion map condition compared with the threaded discussion.

Another useful approach for encouraging participation and creating structure is to divide the class into smaller discussion groups rather

than holding one large discussion. Researchers have recommended that the optimal size for small group discussions should be about five participants. For example, Akcaoglu and Lee (2016) found that students felt more connected to their peers and reported experiencing a more positive learning environment in discussions with four to five students compared with whole class discussions. Qiu, Hewitt, and Brett (2014) found that the quality of students' posts increased when they were placed in smaller groups of four to six students compared with larger groups of up to 22 students. Discussion posts in large classes tend to be more fragmented and hard to follow (Kim, 2013). In larger class discussions it is also more difficult for students to contribute new ideas to the conversation as the likelihood of others posting similar ideas increases with group size (Qiu et al., 2014). Smaller discussion groups are more likely to foster social connections between students and increase their level of comfort (Rovai, 2002).

Creating Effective Question Prompts

According to many educators, the type of question prompts instructors use directly relates to the quality of students' responses (Bradley et al., 2008; Howell et al., 2017), and this view is shared by students (Jacobi, 2017). In fact, instructors' use of lower-level questions can discourage student participation while higher-level questions can lead to high levels of cognitive presence (Howell, Akapnudo, Chen, Sutherland, & James, 2014).

Question prompts that target Bloom's (1956) highest levels of critical thinking (analysis, synthesis and evaluation) tend to generate higher level responses than questions that target lower levels of critical thinking (memorization, comprehension application; Bradley et al., 2008; Ertmer et al., 2011). In addition, divergent questions are better than convergent questions at generating higher level responses (Howell et al., 2017). Divergent questions are open ended questions for which many responses are possible (see examples in Table 4). In contrast, convergent questions are questions for which only a limited number of responses are possible (Andrews, 1980). An example of a convergent question relevant to psychology would be "What is the difference between the availability

heuristic and the representativeness heuristic?" because after the first couple of students answer the question there isn't much room for further contribution. Good question prompts tend to generate a unique response from all participants in the discussion (Dennen, 2005).

Recently, Howell et al. (2017) found that three types of divergent questions, "playground," "brainstorm," and "focal," were most effective at stimulating knowledge construction which was coded using the Interaction Analysis Model (Gunawardena, Lowe, & Anderson, 1997). According to Andrews' (1980) work, the playground prompt requires students to interpret or analyze a specific aspect of the course material. The brainstorm prompt requires students to generate a number of viewpoints or solutions to an issue, and the focal prompt required students to defend a position related to a complex situation. Howell and colleagues (2017) found that these questions were much more successful at encouraging higher level thinking compared with convergent prompts. Similar results were obtained by Ertmer et al. (2011), who found that playground, brainstorm, and focal questions generated a greater percentage of answers that aligned with higher levels of Bloom's (1956) taxonomy. Bradley et al. (2008) also found evidence that the brainstorm and playground questions were successful at stimulating critical thinking skills as measured by Bloom's (1956) taxonomy. Specifically, they found two versions of the playground question: "direct link" (a playground question referring students to a quote from an article) and "course link" (a playground question where students are asked to integrate course material with readings), to be effective.

Thus, discussions work best when divergent questions that target high-level cognitive skills are used. This is true across course levels and student populations. Bradley et al. (2008) found that question type was linked to critical thinking for undergraduate students taking a 200-level course at a public university and Howell et al. (2017) found this to be the case with graduate students at a private university. Instructors can self-assess the effectiveness of a question prompt by asking themselves a series of questions about the prompt (Harrington & Aloni, 2013a). This self-assessment tool as well as examples of effective question prompts relevant to psychology courses can be found in Table 4.

Table 4
Examples of Successful Question Prompts for Online Discussions in Psychology Courses

Question type	Explanation	Example
Effective divergent questions (recommended)	Open ended questions for which many responses are possible	
Brainstorm	Asks students to generate a number of viewpoints or solutions to an issue	<p>Part I: After reading the attached article on memory, what do you think the next study should address to further advance the field? Provide a research question and brief overview of how you would conduct the study.</p> <p>Part II: Ask at least 2 Socratic questions of your classmates about the studies they have proposed. The questions should help them think more deeply about their proposed research study and strengthen it.</p> <p>Part III: Post revisions to your study proposal based on the feedback provided.</p> <p>* Example applies to Introductory Psychology, Research Methods and Cognitive Psychology courses</p>
Focal question	Asks students to defend a position related to a complex situation	<p>Debate – Does true altruism exist?</p> <p>Part I: Altruism is helping purely out of a desire to benefit another even if it is at a cost to the self. Does true altruism exist? Or do people only help when they receive a benefit in return? Explain your position using the theories and studies described in the textbook or other outside scholarly resources to back up your claims. Use GREEN font to argue that true altruism exists. Use RED font to argue that true altruism does not exist.</p> <p>Part II: Ask at least 2 Socratic questions of your classmates. The questions should require them to more deeply explore their position and consider alternative options.</p> <p>Part III: Respond to at least 2 questions posed by your classmates. Be sure to reference the text and other outside sources.</p> <p>* Example applies to Introductory Psychology and Social Psychology courses</p>
Playground	Requires the interpretation or analysis of a specific aspect of course material	<p>Part I: Review the attached research studies on love. What finding was most interesting to you? Why? Discuss how the research finding you selected connects to concepts from the textbook.</p> <p>Part II: Ask at least 2 Socratic questions of your classmates to help them further explore the research and theory related to love.</p> <p>Part III: Respond to at least 2 questions posed by your classmates. Reference at least 2 additional resources outside of the text in your responses.</p> <p>* Example applies to Introductory Psychology and Social Psychology courses</p>

(table continues)

Table 4 (continued)

Question type	Explanation	Example
Question prompt self-assessment	Questions to ask yourself before you post the discussion prompt	<ul style="list-style-type: none"> • How likely is it for this question to promote critical thinking skills? • What level of Bloom’s taxonomy does this question address? • Is there more than one answer to the question? • Do students have the background knowledge needed to answer this question? • Can the question lead to integration of many theories/concepts? • Will students need to explore the text and/or outside resources to answer the question? • Will this question invite the sharing of different perspectives? • Is there room for further contribution if the first student to respond thoroughly answers the question? • Will students understand the expectations for this discussion?

Note. Sample question prompts are based on the work of Andrews (1980). Question prompt self-assessment (Harrington & Aloni, 2013a).

Question prompts can also incorporate a variety of tools such as videos (Clark, Strudler, & Grove, 2015) and word clouds (DeNoyelles & Reyes-Foster, 2015). These question approaches can address the challenge of students feeling isolated in online discussions as it can enhance social and teacher presence (Clark et al., 2015). In an interesting quasi-experimental study conducted by DeNoyelles and Reyes-Foster (2015), students who were provided a word cloud as part of the discussion prompt were more engaged in the conversation and utilized higher level thinking skills as opposed to students who received a traditional discussion prompt. Evidence for the use of videos comes from a research study conducted by Clark et al. (2015) where undergraduate students were randomly assigned to a text-based online discussion or a video-enhanced online discussion. In the video-enhanced condition, students created video posts based on the assigned discussion topic. Results indicated that social and teaching presence were higher in the video-enhanced version as compared with the text-based version. For example, students commented that the videos “made you feel like you’re in class instead of just being online” (p. 58). Fernandez, Simo, Castillo, and Sallan (2014) also found that students reported that video responses in online discussions were helpful, especially when practical examples were shared. However, they noted that students preferred having access to both video and text explanations.

In addition to an effective question prompt, instructors can utilize creative approaches for sustaining the conversation such as role-playing and debates. Hou (2012) used a role-playing approach where students were assigned the role of different employees and had to address the problem-based scenario from that employee’s perspective. Results indicated that the conversation quality was higher for students in this role-playing condition, as compared with students who were asked to respond to a problem-based scenario without role assignments. More specifically, different perspectives and more diverse responses were found in the role-playing condition. Kanuka, Rourke, and Laflamme (2007) found that WebQuests (i.e., activities in which students search for resources on the Internet), and debates led to the highest levels of participation and cognitive presence. Both of

these approaches were highly structured with roles and responsibilities and required students to challenge one another. Jin and Jeong (2013) conducted structured debates that required students to support or refute points by either arguing, providing evidence/examples, explaining, or critiquing arguments made by others. They found that students' levels of critical thinking as measured by Bloom's (1956) taxonomy was highest when they argued or critiqued a point made by classmates and lowest when they simply provided evidence for a position made by others. They explain that arguing or critiquing an argument required students to clarify and justify their claims which led to higher level thinking skills than providing evidence for an argument.

Overall, the aforementioned studies suggest that the type of questions the instructor asks can directly influence the levels of students' thinking and writing. Yet, in spite of this trend, Ertmer et al. (2011) found that even when instructors asked high-level questions, the answers provided by students did not always meet expectations. This finding suggests that modifying question prompts is an important first step in fostering critical thinking but students require continuous coaching through the process. In the next section we present techniques that the instructor can use throughout the discussion to elevate the level of students' responses.

Techniques for Facilitating the Discussion

Recent studies have shown that one of the most important factors for student engagement in the discussion is an engaging instructor (Goode et al., 2018). According to Mandernach et al. (2009), "An online instructor fulfills a number of roles within the threaded discussion: questioning, listening, responding, encouraging, challenging, reflecting, and summarizing" (p. 58). Thus, the instructor plays a critical role throughout the discussion.

Several studies have shown that a moderate amount of involvement by the instructor is better for fostering critical thinking skills in students than overinvolvement or underinvolvement (Arend, 2009; Dennen, 2005; Morris, Xu, & Finnegan, 2005). Overinvolvement by the instructor can decrease peer dialogue between students and can cause students to look for

confirmation from the instructor rather than develop their thinking on their own. Underinvolvement by the instructor can lead students to believe that the instructor is not reading their responses which can negatively affect their motivation (Dennen, 2005). In one study conducted by Arend (2009), higher levels of critical thinking were noted in sections of courses where the instructor made periodic comments (responding to every 2–10 students), whereas lower levels of critical thinking were found in courses where the instructor responded to almost every comment. Similarly, An, Shin, and Lim (2009) found that student contributions were significantly higher when the instructor did not respond to every post but instead provided minimal input. These findings are consistent with Morris et al.'s (2005) finding that instructors who posted a moderate number of messages throughout the semester (between 125 and 265 posts) generated more responses from students, compared with instructors who were underinvolved (posted fewer than 75 messages) or overinvolved (posting more than 450 messages).

Rather than respond to each student's post, the instructor should focus on providing meaningful contributions to the discussion that move the conversation forward. In one study, Cranney, Wallace, Alexander, and Alfano (2011) found that the amount of time the instructor spent in the course was a greater predictor of student grades than the number of contributions the instructor made. This finding suggests that quality matters more than quantity. Arend (2009) found that higher levels of critical thinking were obtained in courses where the instructor responded with very specific questions and pushed students further in their thinking while remaining impartial. In contrast, lower levels of critical thinking were found in courses where the instructor expressed their agreement or disagreements with comments without pushing students further. Even short statements made by the instructor such as "Good point, I agree" could signal to students the end of a conversation. The instructor can regulate the conversation by pointing out themes, highlighting accurate and important posts, correcting inaccuracies and providing a meaningful summary of the conversation (Wang, Chen, & Liang, 2011).

One helpful technique for engaging students in the discussion is to assign students to discussion roles. For example, Olesova, Slavin, and Lim (2016) assigned students to the following roles: *starter*, *skeptic*, or *wrapper*. The *starter*'s role was to post an initial response to stimulate discussion, the *wrapper* summarized key points made in the discussion, and the *skeptic*'s job was to challenge points brought up by students in the discussion. In this study, 139 students were randomly assigned to online discussion groups and roles. Results indicated that students with roles had higher levels of cognitive presence when compared with their classmates without roles. In another study, Wise, Saghafian, and Padmanabhan (2012) found that the roles that were viewed as particularly helpful by students were the *starter*, *wrapper*, and *devil's advocate*, who had to identify a different perspective or approach and defend that position. De Wever, Van Keer, Schellens, and Valcke (2009) found that students displayed higher levels of knowledge construction when the roles were introduced in the beginning of the term and then faded out compared with when the roles were introduced later in the term. Thus, roles are particularly helpful for engaging students in the discussion at the start of a term, but can be faded out when students get acclimated to the discussion board.

Aloni (2016) utilized some of the roles described by Wise et al. (2012) as well as designed a series of discussion roles specifically for upper level courses in psychology: *research reporter*, *method evaluator*, and *hypothesis generator*. The *research reporter* was expected to locate a relevant journal article using the PsycINFO search engine and summarize the article to the class at a point when it was relevant to the discussion. The *method evaluator* was responsible for critically analyzing the method of one of the studies described in assigned journal articles by identifying flaws in the method or alternative ways in which the constructs could have been measured. Students were also encouraged to locate the measure when possible and bring it to class so that their peers could better understand the methodology by completing the questionnaire. The role of *Hypothesis Generator* entailed developing one to two follow-up hypotheses to the studies described in the readings of the day and presenting them to the class. Students in her Advanced Personali-

ty–Social Psychology course self-reported that these roles were effective for developing their critical thinking skills. Although these roles were implemented in an in-person course, the roles can easily be implemented in online discussion boards.

Another very powerful technique for involving more students in the discussion and stimulating their critical thinking skills is the use of Socratic questioning (MacKnight, 2000; Paul, 1995; Strang, 2011). This technique dates back to the ancient philosophers and involves teaching by asking a series of structured thought-provoking questions (Plato, trans. 1997). This technique has evolved into a teaching tool for generating meaningful discussions and facilitating critical thinking (Yang, 2008). One key benefit of Socratic questions is that it promotes conceptual learning rather than memorization of material (Strang, 2011). It also stimulates students' curiosity regarding the meaning of their statements and helps clarify their thinking. In addition, this approach helps students make judgments about their reasoning and better understand the implications and consequences of their claims. Finally, using Socratic questions can help students become self-correcting of any errors in their thinking rather than relying on the instructor to correct them (Paul & Elder, 2016; Toledo, 2006; Yang, 2008).

Socratic questions can be either driven entirely by the instructor (Strang, 2011), or the instructor can teach students to ask these questions of themselves and of each other (King, 1995; Toledo, 2006; Yang, Newby, & Bill, 2005). One of the primary benefits of shifting the responsibility for the discussion to the students is that students can strengthen their ability to think autonomously and be less dependent on the instructor (King, 1995). Emphasizing the importance of student-to-student interactions is also more likely to foster a sense of community in the classroom, which is important for learning (Rovai, 2007). Furthermore, questions generated by students are more likely to be personally meaningful to them which will help students retain the information (King, 1995).

The process of asking questions is likely to lead students to discover differences in their opinions. Reconciling these differences in opinion will further foster students' critical thinking skills and increase their understanding of the material (King, 1995). In fact, Chen and Chiu

(2008) showed that disagreements in online discussion boards elicited more responses than agreements. Thus, by teaching students to challenge one another with Socratic questions, the instructor is likely to increase their engagement with the material.

Scholars using Socratic questioning have divided the questions into various categories based on their learning purpose (Harrington & Aloni, 2013b; King, 1995; Paul, 1995; Paul & Elder, 2016; Strang, 2011). For example, some questions can focus on asking students to clarify their answers (e.g., “what do you mean by ___?”), whereas other questions can ask students to compare their answer to another student’s response (e.g., “how is this response similar or different from ___?”).

The Socratic questions can easily be applied to any psychology course. For example, in a Research Methods course in psychology the professor can ask questions such as “What are the potential consequences of testing X in this manner?,” “What assumptions are you making when you measure X in this manner?,” or “In what ways are your experimental and control conditions similar and different?” as a way of encouraging students to think more critically about their study designs. The professor can

encourage students to ask Socratic questions of each other to help their peers improve the design of their studies. King (1995) recommends providing students with examples of generic questions which they can apply to the content they are learning. Examples of Socratic questions that have been commonly used by others are summarized in Table 5. The instructor can include a table such as this in the syllabus and encourage students to utilize Socratic questions in their peer responses. The instructor can also incorporate Socratic questions in the question prompts (see examples Table 4) and include them in the grading rubric as a standard for peer responses (see sample grading rubric in Table 3).

Studies that manipulated the use of Socratic questioning and then measured students’ levels of critical thinking have found strong evidence for their effectiveness (Strang, 2011; Yang et al., 2005; Yang, 2008). In one study, Strang (2011) manipulated the use of Socratic questions in four sections of an MBA online course, and then measured effects on performance. In both conditions, the instructor first raised a discussion question. Students in the Socratic questioning condition replied to a series of Socratic questions. Students in the control conditions

Table 5
Examples of Generic Socratic Questions Organized by Learning Purpose

Learning purpose	Examples of Socratic questions
Clarification	What do you mean by . . . ? Can you give an example?
Probing purpose	What is the purpose of? What was your purpose when you said?
Probing assumptions	What are the assumptions behind these statements? Is this always the case?
Compare–contrast	Can you compare X with Y? How are X and Y similar?
Exploring additional evidence	What additional evidence can you find to support or refute this idea? How does this connect to the concepts we’ve discussed previously?
Probing others’ viewpoints	What would someone who disagrees say? Does anyone see this differently?
Probing implications	What are potential consequences or implications of this? Can you provide a real world example of . . . ?
Self-reflective processes	Why should this issue matter? What is the importance of learning about this issue?
Probing concepts	What is the main idea here? What main theories do we need to consider in order to answer this question?
Probing conclusions	What conclusions can we make? On what information are we basing this conclusion?

Note. These questions are described in Harrington and Aloni (2013b), King (1995), Paul (1995), Paul and Elder (2016), and Strang (2011).

were required to reply to two of their peers with general feedback, and Socratic questions were not used. Results revealed that students in the Socratic questioning conditions generated posts which were significantly higher in quality and performed better on a final essay than those in the control conditions.

In two quasi-experiments Yang and colleagues (Yang et al., 2005; Yang, 2008) manipulated the use of Socratic questioning in asynchronous discussion boards and subsequently measured students' levels of critical thinking. Critical thinking was measured both quantitatively with the Chinese version of the California Critical Thinking Skills Test (Facione, 1990), as well as qualitatively by coding their responses in the online discussion board with the Interaction Analysis Model (Gunawardena et al., 1997) and Newman's analysis model for analyzing depth in critical thinking (Newman, Webb, & Cochrane, 1995). Results indicated that students evidenced greater critical thinking during sessions when Socratic questions were used (Yang et al., 2005; Yang, 2008).

Conclusion

Online discussion boards are an effective forum for fostering critical thinking skills and integrating writing in psychology courses. In addition, online discussions enable students to develop their writing skills by exposing students to peer models. Instructors are advised to clearly convey to students the purpose of the discussion board and their expectations for responses. This can be done by factoring the discussion board into a moderate amount of the overall course grade and providing students with a detailed grading rubric. Instructors can also set a clear structure for the discussion by including clear deadlines for discussion posts and peer responses, creating a virtual space for academics and socialization as well as dividing the class into small groups to help the discussion remain focused.

Instructors can devise question prompts that target Bloom's (1956) analysis, synthesis, and evaluation categories rather than the knowledge, comprehension, and application categories. Questions should invite multiple perspectives rather than suggesting that only one answer is possible. Divergent question prompts such as "brainstorm," "focal," and "play-

ground" are preferable to convergent questions. Instructors can also utilize creative approaches for the question prompts such as role-playing, WebQuests and debates.

Once effective question prompts have been developed, instructors are advised to carefully monitor the discussion but refrain from responding to every student as this can lead to overinvolvement and discourage student participation. Assigning students to various discussion roles as well as using Socratic questions are two very effective techniques for facilitating the discussion without dominating it. Discussion roles are more useful in the beginning of the semester and can be faded out as students become more accustomed to the discussion. Socratic questions can be used by both the instructor and students to move conversations forward and increase learning. It is recommended that the instructor provide students with a sample list of generic Socratic questions, model their use in the discussion, and encourage students to ask them of one another. Instructors can increase student motivation to use this effective approach by including the use of Socratic questions in the grading rubric. Using these strategies to facilitate online discussions is particularly important in online classes. However, instructors teaching traditional face-to-face classes may also want to consider incorporating online discussions into their courses to help students develop critical thinking and writing skills.

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