The Effect of Instructor Information Provision on Critical Thinking in Students Using Asynchronous Online Discussion

Chris Klisc, Tanya McGill, and Valerie Hobbs

Murdoch University, Australia klisc@westnet.com.au t.mcgill@murdoch.edu.au
v.hobbs@murdoch.edu.au

The facilitation of critical thinking is one of the most frequently discussed potential benefits of the asynchronous on-line discussion environment, but many studies have reported that it does not occur to any great extent. This study investigated the effect of information provided to students on the facilitation of their critical thinking outcomes as perceived by their instructors. The study examined the effect of three main types of information that can be given to students at the commencement of the discussion: information about the purpose of the discussion activity, information on how discussion postings will be graded, and examples of graded postings. It also explored the impact of preparatory sessions aimed at helping students understand the concepts of critical thinking. The study found that information on the purpose of the discussion activity and how postings would be graded were important in the facilitation of critical thinking, while the results for examples of graded postings and preparatory sessions were inconclusive.

The development of critical thinking skills in students is an aim of most tertiary institutions with the ability to reason, think analytically and justify conclusions regarded as essential skills for today’s graduates (Garrison, Anderson, & Archer, 2001; Gunawardena, Lowe, & Anderson, 1997). Critical thinking skills are needed by students across all disciplines and many Australian universities are recognising this by incorporating critical thinking skills into the desired outcomes for their graduates thus acknowledging the importance of these skills in preparing students for the workplace.

Much has been written about the potential of asynchronous online discussion to facilitate critical thinking skills in students (Birch & Volkov, 2007; Foley & Schuck, 1998; Greenlaw & DeLoach, 2003; Hara, Bonk, & Angeli, 2000; McKenzie & Murphy, 2000; Rodrigues, 1999; Schellens & Valeke, 2006; Wu & Hiltz, 2004). However, many studies report that critical thinking does not occur to any great extent in asynchronous online discussion (Aviv, 2000; Bullen, 1998; Christopher, Thomas, & Tallent-Runnels, 2004; Corich, Kinshuk, & Hunt, 2004; Garrison et al., 2001; Gunawardena et al., 1997; Maurino, 2007; Meyer, 2003; Newman, Webb, & Cochrane, 1995; Ng & Murphy, 2005; Srinigham & Geer, 2000). One often cited reason for the lack of critical thinking is the absence of instructor support in preparing students for the rigours of critical discussion (Bullen, 1998; Cheong & Ch-ung, 2008; Cook, 2002; Hara et al., 2000; MacKnight, 2000; Mazzolini & Maddison, 2007; Srinigham & Geer, 2000).

While much research has examined critical thinking during a discussion, and many studies have surveyed students, there is relatively little research that investigates the instructor perspective (Maurino, 2007). An often missed perspective is that of the instructors themselves who are the instigators of any such initiatives. Therefore the aim of the study was to examine the facilitation of critical thinking as perceived by instructors, in students using the asynchronous online discussion environment by investigating the information given to students at the commencement of the discussion.

Background

Critical thinking has been defined in various ways. Twentieth century educationist John Dewey defined reflective thinking as “active, persistent, and careful consideration of a belief or supposed form of knowledge in the light of grounds which support it and the further conclusions to which it tends” (1993 p.9). More recently, critical thinking has been defined as “a process, the goal of which is to make reasonable decisions about what to believe and what to do” (Ennis, 1995 p.xvii). In short, students need to be taught not what to think, but how to think; how to work their way through the enormous maze of information available today, and draw on information which helps them to make a decision or define a stance and be able to defend their position.
In teaching critical thinking, the literature suggests a strong relationship between the acts of critical thinking and writing (Althaus, 1997; Applebee, 1984; Biesenbach-Lucas, 2004; Cohen & Spencer, 1993; Cook, 2002; Feenberg, 1989; Garrison et al., 2001; Greenlaw & DeLoach, 2003; Lea, 2001; White, 1993). Applebee states that “it is widely accepted that good writing and careful thinking go hand in hand” (1984 p. 577) and that one is not possible without the other. Similarly Cohen and Spencer (1993) reported that after the introduction of writing and reading exercises specifically designed to teach argument, student levels of critical thinking improved dramatically. The text-based nature of online discussion along with its asynchronous response time enables the combination of thinking and writing so necessary for the facilitation of critical thinking, and makes the facilitation of critical thinking one of the most discussed potential benefits of asynchronous online discussion (Foley & Schuck, 1998; Greenlaw & DeLoach, 2003; Hara et al., 2000). The fact that students need to create their discussion contributions in a written form and read their peers’ postings, it is suggested, exposes students to divergent viewpoints, requiring them to evaluate material from multiple perspectives, make judgements about the material presented and finally synthesise and draw inferences before coming to their own conclusions (Birch & Volkov, 2007; Greenlaw & DeLoach, 2003; Hara et al., 2000; McKenzie & Murphy, 2000; Rodrigues, 1999; Schellens & Valcke, 2006; Wu & Hiltz, 2004).

In order to examine the thinking that occurs in asynchronous online discussions various frameworks have been adopted, adapted and developed. Several studies have adopted Bloom’s Taxonomy of Educational Objectives for the Cognitive Domain (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956) to assess student thinking in their online discussions (Christopher et al., 2004; Gilbert & Dabbagh, 2005; Gunawardena et al., 1997; Schrire, 2006). Bloom identified six different types of thinking in his taxonomy: knowledge sharing, clarification, exploration, analysis, synthesis and evaluation. Alternative frameworks have been developed based on Bloom’s taxonomy (Garrison et al., 2001; Henri, 1992; Newman et al., 1995). Henri’s (1992) analytical model consists of five dimensions, with the cognitive dimension identifying the reasoning skills of elementary clarification, indepth clarification, inference, judgement and strategies. Henri’s model has been duplicated or adapted to develop further models (Aviv, 2000; Cheong & Cheung, 2008; Hara et al., 2000; Newman et al., 1995; Sringham & Geer, 2000). Newman, Webb and Cochrane (1995) using Henri’s (1992) deep and surface thinking concepts, created a set of paired indicators to reveal critical and uncritical thinking at the different levels of thinking which they classified as relevance, importance, novelty, experience, clarification and interpretation.

Many of the above frameworks and models share elements in common with Bloom’s Taxonomy. Researchers using previously developed frameworks and models have often adapted the frameworks or models to better align with the objectives of their particular study, but there seems to be a basic agreement about the levels of thinking making up critical thinking. There appears to be a general consensus that knowledge sharing and exploration represent lower level or superficial thinking, involving little critical thinking, while the objectives of analysis, synthesis and evaluation represent higher level, or deeper thinking engaging the elements of critical thinking. For the current study, therefore, Bloom’s Taxonomy was used as a basis for creating the discussion outcomes used in the survey.

The literature examining critical thinking in asynchronous online discussion has not overall been positive. While some studies report a considerable amount of higher level thinking representing critical thinking in the discussion (Hara et al., 2000; Meyer, 2004; Schellens & Valcke, 2005; Schrire, 2002; Thomas, 2002), the majority indicate that most of the discussion is at the low levels of thinking representing superficial thinking (Aviv, 2000; Christopher et al., 2004; Corich et al., 2004; Garrison et al., 2001; Gunawardena et al., 1997; Meyer, 2003; Newman et al., 1995). Other studies state that critical thinking did not occur at all in their discussions (Bullen, 1998; Cheong & Cheung, 2008; Maurino, 2007; Ng & Murphy, 2005; Sringham & Geer, 2000). Maurino (2007) examined the state of critical thinking in online discussions by reviewing 37 studies and concluded that critical thinking was not happening to any great extent in asynchronous online discussions.

Many reasons have been put forward for the lack of critical thinking shown by students in asynchronous online discussion, and many suggestions to improve it have been proposed. These include the incorporation of collaborative projects and group work within the discussion space (Kanuka, 2002), the development of a sense of an online community
(Bullen, 1998; Cheong & Cheung, 2008; Gunawardena et al., 1997), the importance of initial postings and their effect on subsequent discussion as well as a summary post at the discussion’s conclusion (Hara et al., 2000; Thomas, 2002), and the need for probing and pertinent questions, especially the use of Socratic questions (Cheong & Cheung, 2008; Cook, 2002; MacKnight, 2000; Mazzolini & Maddison, 2007).

Research suggests that students do not intuitively understand the concepts involved in critical thinking (Aviv, 2000; Chen & Wu, 2004; Christopher et al., 2004; Corich et al., 2004; Gunawardena et al., 1997; Newman et al., 1995; Ng & Murphy, 2005). Bullen (1998) questioned students about their understanding of critical thinking and found that of the 13 students who had completed a course, only four students could give definitions of critical thinking that conformed to the definition provided in their course of study. Greenlaw and DeLoach (2003) point out those students need prior instruction on argumentation:

Our experience is that most undergraduates have little practice with a forum in which they have the freedom and the responsibility to create knowledge. In addition, they typically do not fully understand that to be persuasive an assertion must be developed with logic and evidence. This development requires time and discipline… (p. 43)

One of the most frequently cited issues concerning critical thinking in online discussions relates to what the instructor can do, particularly in helping students understand the concepts of critical thought, and in clarifying the purpose of the discussion (Bullen, 1998; Cheong & Cheung, 2008; Cook, 2002; Gunawardena et al., 1997; Hara et al., 2000; MacKnight, 2000; Mazzolini & Maddison, 2007; Sringham & Geer, 2000; Thomas, 2002; Tolmie & Boyle, 2000).

The literature also advocates that more instructor effort is needed to ensure the purpose of the discussion activity is clear and meaningful to students at the commencement of the discussion if critical thinking is to be achieved in the online discussion (Bullen, 1998; Cheong & Cheung, 2008; MacKnight, 2000; Maurino, 2007; Song, Singleton, Hill, & Koh, 2004). Tolmie and Boyle (2000) stress the importance of clarity about the discussion task and that students need to understand how to go about the task. Ellis and Calvo (2004) report that when 153 third year engineering students were questioned about their online discussion experience that those students who had an understanding of the relationship of the discussion to their learning outcomes tended to approach the discussion in meaningful ways, compared to those students who lacked understanding. This suggests that students need to be aware of why they are completing a particular learning activity, and this purpose should be communicated to students clearly and unambiguously. Linking the aim of a teaching activity to its course outcomes is one way of clarifying the purpose for a particular activity (Sherry, 2000; Song et al., 2004), however research suggests that this alone may not enough (Ellis & Calvo, 2004; Tolmie & Boyle, 2000). It has also been suggested that providing information on how discussion contributions will be graded and the possible inclusion of graded posting examples may help in clarifying the goals of an online discussion (Ellis & Calvo, 2004; Gilbert & Dabbagh, 2005).

**Research Aims**

The literature suggests that students do not automatically think critically and therefore the online discussion needs to be supported by additional information and/or instruction before the benefits of developing critical thinking can be realised. The study described in this paper explores the extent to which critical thinking appears to be occurring across a range of courses, and examines the influence of information provided to students prior to the commencement of the discussion. The first research question addresses the extent of critical thinking in online asynchronous discussion:

**1. To what extent does critical thinking occur in online asynchronous discussion?**

The remaining two research questions explore how information provided to students prior to the discussion influences critical thinking. Firstly the type of information provided is considered:

**2. How does information about the discussion given to students at the commencement of the discussion facilitate critical thinking in the discussion?**
On the basis of the literature arguing the importance of prior information about the purpose of the discussion (Bullen, 1998; Cheong & Cheung, 2008; MacKnight, 2000; Maurino, 2007; Song et al., 2004), and the importance of prior information about how discussion contributions will be graded (Ellis & Calvo, 2004; Gilbert & Dabbagh, 2005), it was hypothesized that:

H1: Students will experience an increase in the amount of thought about the discussion topic when they are given information about the discussion at the commencement of the discussion.
H2: Students will experience an increase in awareness of differing perspectives about the discussion topic when they are given information about the discussion at the commencement of the discussion.
H3: Students will experience an increase in their depth of thinking about the discussion topic when they are given information about the discussion at the commencement of the discussion.
H4: Students will experience an increase in their critical analysis and reflection about the discussion topic when they are given information about the discussion at the commencement of the discussion.

The method by which information about the discussion is provided may also be of importance in achieving critical thinking. This study therefore also considers whether using formal preparatory sessions, defined as specific teaching sessions preparing students for the online discussion, has any additional benefit. The following research question was addressed:

3. How do preparatory sessions given to students at the commencement of the discussion facilitate critical thinking in the discussion?

MacKnight (2000) recommended that instructors conduct ‘off-line activities’ to provide students with a better understanding of the collaborative learning and communication process before commencing the discussion and Greenlaw and DeLoach (2003) argue that students need prior instruction on argumentation. It was therefore hypothesized that:

H5: Students will experience an increase in the amount of thought about the discussion topic when they are given preparatory sessions at the commencement of the discussion.
H6: Students will experience an increase in awareness of differing perspectives about the discussion topic when they are given preparatory sessions at the commencement of the discussion.
H7: Students will experience an increase in their depth of thinking about the discussion topic when they are given preparatory sessions at the commencement of the discussion.
H8: Students will experience an increase in their critical analysis and reflection about the discussion topic when they are given preparatory sessions at the commencement of the discussion.

The Project

The study reported in this paper was part of a broader project investigating the use of asynchronous online discussion in tertiary teaching. Only those aspects of the project relating to information provided to students and the impact of this on critical thinking are included in this paper.

The data was collected via an online web-based survey of academics who had used asynchronous online discussion in their teaching. Both postgraduate and undergraduate courses were surveyed, and there was no attempt to target particular discipline areas. Only those respondents who had used asynchronous online discussion for assigned topic discussion where the achievement of student learning outcomes related to critical thinking were selected. Respondents who had used the tool for information sharing or announcement-type functions only were excluded from the analysis.

Participants were recruited via their membership of educational and information systems listservs including ASCILITE (Australasian Society for Computers in Learning in Tertiary Education), ODLAA (Open and Distance Learning Association of Australia), IRMA (Information Resources Management Association), AIS (Association for Information Systems) and a university learning management system list. This open form of recruitment allowed the inclusion of instructors teaching both fully online and blended courses. An email request was sent to all members of the targeted
listservs, inviting them to participate in the online questionnaire by following the contained link. Completion of the questionnaire was entirely voluntary and participants were assured of their anonymity.

**The Questionnaire**

The unit of analysis was the most recent course that the respondent had taught that used online discussion. Questions were developed to determine the types and methods of information provision used. Respondents were also questioned on their perceptions of the success of the discussion by rating discussion outcomes associated with critical thinking.

Respondents were questioned about three main types of information. They were asked whether they provided information relating to the *purpose of the discussion*, whether they provided information about *how postings were graded*, and whether *examples of graded contributions* were provided to students prior to the commencement of the discussion. Respondents were also given the opportunity to enter details of any other information that they had provided to their students relating to the purpose of the discussion.

Respondents were also asked whether they had used *preparatory sessions* and what was included in the preparatory session. The term ‘discussion preparatory sessions’ was defined in the questionnaire as specific teaching sessions preparing students for the online discussion, which may include any of the following: techniques on how to deconstruct the discussion topic; recognising key words in the topic, which may need defining; developing a persuasive argument using logic and evidence; explaining what is meant by ‘critical thinking’ and how it is applied; or showing how evaluation and synthesis are used to formulate conclusions.

In order to measure the instructors’ perceptions of the achievement of critical thinking, discussion outcomes were defined and instructors were asked to rate the achievement of these outcomes. The outcomes sought to cover a range of thinking levels, from lower levels of superficial thinking through to higher levels representing critical thinking. The following outcomes were considered:

1. Amount of thought about the topic under discussion
2. Awareness of differing perspectives
3. Depth of thinking
4. Critical analysis and reflection

These outcomes were loosely based on Bloom’s taxonomy of six objectives representing different types of thinking: knowledge sharing, clarification, exploration, analysis, synthesis and evaluation.

Achievement of the first outcome, which relates to the amount of thought about the discussion topic, means that students are discussing the topic, as opposed to contributing comments such as ‘I agree’ or ‘I disagree’ without any further elaboration. The presentation of new knowledge also implies that students are researching the topic and hopefully in turn, giving more thought about the issue under discussion. This outcome corresponds to Bloom’s first two objectives of *knowledge sharing* and *clarification*.

Bloom’s objective of *exploration*, is addressed in the achievement of the second outcome ‘awareness of differing perspectives’. The ability to see a situation from another’s perspective is to show empathy towards that perspective, and understand the other person’s point of view. Developing empathy involves exploring and examining the new knowledge presented in the discussion and applying some analysis to the information in order to draw out different viewpoints. This can be seen to represent the beginnings of critical thinking.

Achieving the outcome of ‘depth of thinking’ requires further analysis than needed for assessing different perspectives of the presented material, and should include synthesis and perhaps the beginnings of evaluation. Students should show the ability to breakdown and dissect the arguments presented in their reading as well as the discussion contributions of
their peers. Deeper levels of thinking also involve bringing together material from a variety of sources and composing the beginnings of a coherent and clear argument. This outcome corresponds to Bloom’s objective of analysis.

Achievement of the final outcome of ‘critical analysis and reflection’ indicates that students are engaging in the discussion at a very high level, critically assessing what other students have said, and have evaluated what they have written themselves. Students can support their conclusions with evidence from their readings or personal experience, as well as being able to identify the flaws in the conclusions of their peers. This outcome corresponds to Bloom’s highest two objectives, synthesis and evaluation.

Respondents were asked to indicate the achievement of each discussion outcome for the course/unit on a scale of 1 to 7. A score of 1 indicated ‘not successful’ and 7 corresponded to ‘highly successful’. Respondents could also choose a “this was not a discussion aim” alternative if they felt the outcome was not relevant to their situation.

The final section of the questionnaire collected background information about the participants, including age, gender, computer competency, possession of a teaching qualification, number of years of teaching, and levels of professional development both for the use of online discussion and for the use of software for online discussion.

**Results and Discussion**

The study described in this paper analyses information collected from 79 respondents who used the online discussion tool for discussion of assigned topics. Fifty two percent of the participants were male, while 48% were female. Ages ranged from a minimum of 23 to a maximum of 66 years, with an average of 46 years. Participants had a very wide range of backgrounds in terms of teaching experience, and levels of professional development and reported relatively high levels of computer skill.

**To what extent does critical thinking occur in online asynchronous discussion?**

As can be seen from Table 1 below, on average the instructors perceived relatively high levels of achievement of the discussion outcomes. The most frequent response for the outcomes Amount of thought about the topic and Awareness of differing perspectives was that the discussion was highly successful in achieving the outcome (i.e. rating of ‘7’). The most common response for the outcomes Depth of thinking and Critical analysis and reflection in students was 6. There was however a wide range of perceptions of success for all outcomes, with at least one respondent rating each outcome as not successful (i.e. a rating of ‘1’). Given this range of perceptions further investigation is required to identify what factors may have influenced success.
How does information about the discussion given to students at the commencement of the discussion facilitate critical thinking in the discussion?

Table 2 summarises the different types of information given to students. Forty four participants (55.7%) gave their students information about the purpose of the discussion. Forty one respondents (51.9%) let students know how their postings would be graded. Providing examples of graded postings for students was relatively uncommon with only six respondents (7.6%) doing so.

Nineteen respondents also commented on ‘other’ information that they provided to their students. This ‘other’ information included discussion rules and conduct (6 respondents), giving students feedback and encouraging social discussion (4 respondents), information on facilitating group dynamics and developing a reflective approach to the discussion (2 respondents) and assisting students in ways that are unique to the particular course, for example, case study discussion (1 respondent). Eight (10.1%) respondents did not provide any information about the purpose of the discussion or any information about grading to their students.
The nonparametric Mann-Whitney U test was used to examine the impact of the types of information provided and the way in which it was provided on the achievement of each of the discussion outcomes. This test was used as an alternative to ANOVA to ensure that violations of the assumptions of ANOVA identified in preliminary assumption testing did not impact on the interpretation of the results. A significance level of p < 0.05 was established. Because very few instructors had provided examples of graded contributions this factor was not included in the analysis. Table 3 provides the overall results of this analysis and Tables 4 to 7 provide descriptive information about the nature of the influences.

### Table 3

Influence of the Impact of the Types of Information Provided and Way in Which It Was Provided on the Achievement of Each of the Discussion Outcomes

<table>
<thead>
<tr>
<th>Information on the purpose of using an online discussion tool</th>
<th>Amount of thought about the topic</th>
<th>Awareness of differing perspectives</th>
<th>Depth of thinking</th>
<th>Critical analysis and reflection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mann-Whitney U</td>
<td>Sig.</td>
<td>Mann-Whitney U</td>
<td>Sig.</td>
<td>Mann-Whitney U</td>
</tr>
<tr>
<td>521.5</td>
<td>0.014</td>
<td>335.0</td>
<td>&lt;0.001</td>
<td>435.0</td>
</tr>
<tr>
<td>Information on how postings would be graded</td>
<td>562.5</td>
<td>0.038</td>
<td>431.5</td>
<td>0.003</td>
</tr>
<tr>
<td>Preparatory sessions</td>
<td>372.0</td>
<td>0.073</td>
<td>345.0</td>
<td>0.103</td>
</tr>
</tbody>
</table>

Providing information about the purpose of the discussion was shown to have a significant impact on the achievement of the discussion outcomes. Achievement of all outcomes was significantly better compared to those courses that had not received any information about the purpose of the discussion: Amount of thought about the topic (6.16 versus 5.54, U = 521.5, Z = -2.46, p = 0.014), Awareness of differing perspectives (6.26 versus 5.06, U = 335.0, Z = -3.99, p < 0.001), Depth of thinking (5.88 versus 5.00, U = 418.0, Z = -3.33, p = 0.001), and Critical analysis and reflection (5.56 versus 4.65, U = 435.0, Z = -2.87, p = 0.004).
These results are consistent with research findings that students perform better if they understand the purpose of a teaching activity (Bullen, 1998; Cheong & Cheung, 2008; Ellis & Calvo, 2004; Maurino, 2007; Tolmie & Boyle, 2000). For example, Ellis and Calvo (2004), found that when students were unaware of the purpose of the discussion they were unlikely to benefit or perform well in the discussion. Instructors should make every effort to ensure that students fully understand the objectives of the discussion, know what is expected of them and what they must do to attain the objectives of the discussion.

Given that just over half (55.7%) of the respondents had provided information about the purpose of the discussion the results raise the question of how widely adopted the practice actually is of discussing the purpose of an online discussion with students. Further research is needed to determine how widespread this practice is, and to promote its adoption as much as possible, especially given the strong support in the literature to clarify the purpose of a learning activity to students (Ellis & Calvo, 2004).

As with information about the purpose of the discussion, providing information about the how postings would be graded had a significant impact of the achievement of all of the discussion outcomes. Courses that had received information about how postings would be graded had significantly higher results for the outcomes of: Amount of thought about the topic (6.17 versus 5.57, U = 562.5, Z = -2.08, p = 0.038), Awareness of differing perspectives (6.15 versus 5.24, U = 431.5, Z = -2.95, p = 0.003), Depth of thinking (6.00 versus 4.92, U = 392.0, Z = -3.66, p < 0.001), and Critical analysis and reflection (5.68 versus 4.50, U = 390.0, Z = -3.36, p = 0.001)
These results are consistent with literature suggestions that information about grading gives students a clear idea of what is expected of them and so better achievement of learning outcomes should result compared to courses where information about grading is not provided (Ellis & Calvo, 2004; Gilbert & Dabbagh, 2005). Future research should investigate exactly what information about grading is actually given to students and how this impacts on critical thinking.

Based on the above results, Hypotheses 1 to 4 are all supported with respect to the provision about the purpose of the discussion and the provision of information about grading. Providing this information facilitates critical thinking. The results for providing examples of graded postings are shown in Table 6. As only a small number of instructors (6) had provided examples of graded examples no conclusions could be drawn about this effect on discussion outcomes. Why so few instructors had provided graded examples in their courses remains unclear. Perhaps instructors believe that students have a clear idea of what is expected of them, yet the literature suggests otherwise (Maurino, 2007; Song et al., 2004).

### Table 5

Comparison of Discussion Outcomes of Those who Received Information about how Postings Will Be Graded Versus Those that Had Not Received Any Information

<table>
<thead>
<tr>
<th>Discussion Outcomes</th>
<th>Received information</th>
<th>No information received</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N  Mean  Std Dev</td>
<td>N  Mean  Std Dev</td>
</tr>
<tr>
<td>Amount of thought about the topic</td>
<td>41  6.17  1.14</td>
<td>37  5.57  1.57</td>
</tr>
<tr>
<td>Awareness of differing perspectives</td>
<td>41  6.15  1.17</td>
<td>34  5.24  1.56</td>
</tr>
<tr>
<td>Depth of thinking</td>
<td>41  6.00  1.12</td>
<td>36  4.92  1.54</td>
</tr>
<tr>
<td>Critical analysis and reflection</td>
<td>41  5.68  1.17</td>
<td>34  4.50  1.70</td>
</tr>
</tbody>
</table>

### Table 6

Comparison of Discussion Outcomes of Those Who Received Examples of Graded Discussions Versus Those that Had Not Received Any Information

<table>
<thead>
<tr>
<th>Discussion Outcomes</th>
<th>Received information</th>
<th>No information received</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N  Mean  Std Dev</td>
<td>N  Mean  Std Dev</td>
</tr>
<tr>
<td>Amount of thought about the topic</td>
<td>6  6.17  1.60</td>
<td>72  5.86  1.38</td>
</tr>
<tr>
<td>Awareness of differing perspectives</td>
<td>6  6.17  1.60</td>
<td>69  5.70  1.42</td>
</tr>
<tr>
<td>Depth of thinking</td>
<td>6  6.00  1.10</td>
<td>71  5.45  1.45</td>
</tr>
<tr>
<td>Critical analysis and reflection</td>
<td>6  5.83  1.47</td>
<td>69  5.09  1.54</td>
</tr>
</tbody>
</table>
How do preparatory sessions given to students at the commencement of the discussion facilitate critical thinking in the discussion?

The final research question considered whether preparatory sessions given to students at the commencement of the discussion facilitate critical thinking in the online discussion. Only 16 of the 74 participants had provided their students with preparatory sessions. Table 7 presents the average perceived level of success for each discussion outcome for both the classes in which students had received preparatory sessions and those where they had not. The analysis showed that there were only significant differences in achievement of the discussion outcomes between those courses that had provided preparatory sessions and those that had not for Critical analysis and reflection (5.88 versus 4.93, \( U = 283.0, Z = -2.44, p = 0.015 \)). Running preparatory sessions did not influence: Amount of thought about the topic (6.35 versus 5.75, \( U = 372.0, Z = -1.80, p = 0.073 \)), Awareness of differing perspectives (6.19 versus 5.60, \( U = 345.0, Z = -1.63, p = 0.103 \)), or Depth of thinking (6.00 versus 5.35, \( U = 351.0, Z = -1.70, p = 0.089 \)). Thus, Hypothesis 8 was supported, but Hypotheses 5 and 7 were not.

Table 7

Comparison of discussion outcomes of those who used preparatory sessions versus those that had not used preparatory sessions

<table>
<thead>
<tr>
<th>Discussion Outcomes</th>
<th>Received preparatory sessions</th>
<th>No preparatory sessions received</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean</td>
</tr>
<tr>
<td>Amount of thought about the topic</td>
<td>17</td>
<td>6.35</td>
</tr>
<tr>
<td>Awareness of differing perspectives</td>
<td>16</td>
<td>6.19</td>
</tr>
<tr>
<td>Depth of thinking</td>
<td>16</td>
<td>6.00</td>
</tr>
<tr>
<td>Critical analysis and reflection</td>
<td>16</td>
<td>5.88</td>
</tr>
</tbody>
</table>

Part from the achievement of critical analysis and reflection these results are inconsistent with literature suggestions that provision of preparatory sessions gives students a clearer idea of what is expected of them and so better achievement of learning outcomes should result compared to courses where sessions are not provided (Bullen, 1998; Ellis, Calvo, Levy, & Tan, 2004; Greenlaw & DeLoach, 2003). This unexpected result of the current study, may be in part because the numbers of instructors providing preparatory sessions was relatively low, and further research to investigate the effect of carefully constructed preparatory sessions incorporating critical thinking concepts on the facilitation of critical thinking in online discussions would be valuable. It may be however, that the critical factor is the provision of information itself, not the method by which it is provided.
Conclusion

Asynchronous online discussion is widely used in both totally online learning environments and blended environments, but its benefits especially to those regarding the facilitation of critical thinking are still being debated. This study investigated the facilitation of critical thinking in students, as perceived by instructors, by examining the instructor support given to students at the commencement of the discussion, and the impact of preparatory sessions on discussion outcomes. The results suggest that instructor support can make a significant difference in facilitating critical thinking in students especially in providing information about the purpose of the teaching activity and information relating to how grading is done.

Some limitations of the study need to be acknowledged in interpreting these results, however. Firstly, the survey used a convenience sample and participants were recruited on a self-selecting basis. The participants may therefore have been enthusiasts for online discussion, rather than representing instructors in general. The background information collected on the participants, however, suggested that instructors had a wide range of experience and professional development, and many had considerable experience in teaching at a tertiary level.

While investigating instructor perceptions itself is a worthwhile exercise, the use of perception measures rather than any objective measure of achievement of critical thinking outcomes must also be acknowledged as a possible limitation. However, the participants’ experience in tertiary teaching suggests that their perceptions are likely to be a reliable indicator of actual critical thinking levels.

Overall the instructors in the study perceived relatively high levels of critical thinking as was shown in the ratings of the discussion outcomes. This was encouraging in view of the literature suggesting critical thinking does not occur to any great extent. However, this result may not be unexpected given that the survey included only those instructors who were using asynchronous online discussion for the purpose of developing critical thinking outcomes. This study confirms that further investigation is warranted here to identify what factors would increase critical thinking in the higher levels.

The results of the influence of different types of information provision suggested several useful avenues for further research. Information relating to the purpose of the discussion activity was shown to have a significant impact on the achievement of all discussion outcomes as perceived by the instructors. The questionnaire did not distinguish exactly what information about the purpose was given to students, which could have ranged from simply stating that the purpose was to improve critical thinking, to a comprehensive set of objectives corresponding to course goals along with descriptions of the required student skills. Further research into this area could investigate and compare the different types of purpose-related information given to students. However the study result that just over half of the instructors had provided this information raises the question of how widely adopted the practice is of discussing the purpose of an online discussion with students. Further research is needed to determine how widespread this practice is, and to promote its adoption.

Information about how the postings would be graded also had a significant impact of the achievement of all of the discussion outcomes, and further research should investigate exactly what information about grading is given along with different ways of providing this information. The effect of providing examples of graded postings was inconclusive, and could be investigated further.

Finally the study considered whether preparatory sessions given to students at the commencement of the discussion would facilitate critical thinking in the online discussion. Limited influence was found here as only the outcome of Critical analysis and reflection, yielded a significant difference between those students who had received preparatory instruction and those who had not. Perhaps the result from this study may be partly due to the low numbers of instructors providing any preparatory sessions. Further research to investigate the effect of carefully constructed preparatory sessions incorporating critical thinking concepts on the facilitation of critical thinking in online discussions is likely to prove valuable.
This study has provided support for the importance of instructor provision of information in facilitating critical thinking in asynchronous online discussion. Although several questions remain to be explored more fully to determine the optimum type and method of information provision, the results have useful practical implications for instructors using asynchronous online discussion in their courses.

References


