Seeking feedback in blended learning: competitive versus cooperative student attitudes and their links to learning outcome

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Abstract

Emerging research has revealed the impact of electronic media usage on student outcomes, such as satisfaction and reported learning efficacy. However, little is known of its impact on measurable knowledge acquisition. Results from this study showed that participation on discussion topics through Blackboard, an electronic discussion forum, predicted multiple-choice test performance. In contrast, none of the traditional face-to-face feedback-seeking behaviours, neither with professors in class or out of class, nor among fellow students, had significant influence on test results. An examination of underlying attitudes driving both electronic and face-to-face feedback-seeking behaviours showed that competitiveness rather than cooperation drove average intensity of electronic board participation, which in turn, was related to participation across the number of electronic topical forums. The influencing role of competitiveness in this undergraduate student sample may indicate undergraduate students’ lack of workplace experience, where cooperation rather than competition is often needed for workplace effectiveness. This and implications of other findings are discussed in the paper.

Keywords

blended learning, competition, cooperation, hybrid learning.

Introduction

Research on the use of virtual learning media in college classrooms continues to draw the attention of researchers. Many emerging studies have argued for the new role of these media in the increasingly connected world that we live in (Leidner & Jarvenpaa 1995; Rungtusanatham et al. 2004; Bonk & Graham 2006). There are also a growing number of studies on students’ reported satisfaction, interaction and perceived usefulness of these media (Alavi et al. 1997; Swan et al. 2000; Yoo et al. 2002; Martins & Kellermanns 2004; Arbaugh 2000a, 2005; Ellis et al. 2006). Researcher interest in this field is understandable given the breathtaking uptake of student enrolment in both totally online courses, where classes are conducted only through the virtual medium, and ‘blended’ courses, where both traditional classroom face-to-face interactions and virtual online interactions are used together (Garrison & Kanuka 2004; Bonk & Graham 2006). In a study supported by the Sloan Consortium and the Babson Research Group, Allen & Seaman (2006) reported 3.2 million students across 2200 colleges took at least one online course in 2005. This was a significant increase from the 2.3 million students in 2004.

As the number of online courses and institutions offering them continue to grow, some researchers suggest that the most significant impact of online learning will come from a combination of traditional
classroom instruction and online learning to create what is known as a ‘hybrid’ or ‘blended’ learning environment (Garrison & Kanuka 2004; Bonk & Graham 2006; Ellis et al. 2006). Although initial studies suggest that the use of blended learning approaches is valuable, and may even enhance learning outcomes relative to purely classroom-based learning environments (Alavi et al. 1997; Hartman et al. 2000; Benbunan-Fich & Hiltz 2002; Yoo et al. 2002), how characteristics of these new hybrid learning formats may interact with participants to produce learning outcomes remains somewhat of a mystery. As part of an effort to understand the process of learning that takes place in a ‘blended’ environment, this paper examines learner orientations towards competitive and cooperative attitudes, and their consequent feedback-seeking behaviours and learning performance in such an environment. The approach taken in this study is a variation of Gibbs’ (1982) approach, where respondents’ internal perceptions of their attitudes and behaviours are examined for their impact on an external measurable learning outcome. Our approach of relating feedback-seeking activities to a measurable learning outcome is also consistent with Edwards’ (2005) call in his British Teaching and Learning Research Programme paper to not confuse participation in learning as learning itself but rather to be conscious of the cognitive changes underlying learning, and in our case, it was demonstrated through performance on multiple-choice tests.

**Face-to-face and virtual feedback-seeking processes**

The benefits of student interactions with professors and other students, and consequent learning that takes place from such face-to-face interactions, have been well recognized by educational researchers (Chickering et al. 1987; Fassinger 1995; Johnson & Johnson 1998). The role of learning interactions is also drawing interest from online learning researchers (Coppola et al. 2002; Swan 2002; Arbaugh 2005; Packham et al. 2006). De Laat and Lally’s (2004) content analyses of learning roles from a sample of British students reviewed activities that revolved around tutoring and learning processes. Examples provided from critical event recalls from their sample showed some similarity to feedback-seeking activities that have been examined in the USA (Hwang et al. 2002). For example, Andrea (De Laat & Lally 2004, p. 169) said ‘I was constantly checking’ or Brian (p. 169) said he ‘was really into asking questions’. Thus, there is support both in the USA and UK for the important role that feedback-seeking activities play in the learning environment. According to Hwang et al. (2002), such learning interactions as asking questions of professors in class and outside of class, and checking with fellow students can be viewed as feedback-seeking behaviours to address knowledge needs (Rubin 2006). These behaviours are consistent with feedback-seeking theory, where feedback-seeking efforts have long been recognized to be essential components in learning and correction of system’s deviations (Ashford & Cummings 1983; Northcroft & Ashford 1990). Thus, it is reasonable to examine such learning interactions under the umbrella of feedback-seeking theory.

According to Schweir (1995), feedback information ‘facilitates metacognition in interactive instructional systems’ and is an important part of the self-regulated learning process. In other words, feedback information from others helps an individual to develop a better overview of how one is performing with respect to different aspects of a task, and enables that individual to see areas of inadequate performance for the next round of improvement. Within the learning context, this feedback process would involve students iteratively gathering information from others and checking for understanding of knowledge through questions, so as to eventually reach in-depth comprehension of a topical area of interest. Because research has shown self-regulation, arising from usage of feedback information to be positively related to learning achievement (Zimmerman & Martinez-Pons 1986; Sundre & Kitsantas 2004), and self-regulation and self-monitoring to be positively related to performance achievement (Ley & Young 1998), the importance of such feedback-seeking behaviours and application of feedback-seeking theory to the learning environment does have empirical support.

There are at least three common feedback-seeking options for students in the face-to-face learning environment (Hwang et al. 2002): seeking feedback from professors in class (InAsk), seeking feedback from professors outside of class (OutAsk) and seeking feedback from fellow students outside of class (OutCheck). Asking questions of professors (InAsk) is the most recognized form of feedback-seeking behaviour in the classroom. This feedback-seeking behaviour has been given credit for being the most obvious way to acquire
knowledge, and correct errors and gaps in the students’ learning environment (Dillion 1986; Chickering et al. 1987). However, despite its importance, research has shown that students are reluctant to ask questions because of fear of possible embarrassment in front of other students (Fassinger 1995; Hwang et al. 2002). This dilemma of asking questions to acquire knowledge versus keeping silent to avoid possible embarrassment also has been pointed out in management research, where such personal considerations have been shown to hinder feedback-seeking behaviours in organizations (Ashford & Cummings 1983). The second feedback-seeking behaviour, asking professors questions outside the classroom (OutAsk), is also a familiar phenomenon in educational institutions. Most, if not all, institutions require professors to maintain office hours to meet with students outside of normal class time. When compared with asking questions of professors in class (InAsk), this channel reduces student risk of embarrassment in front of fellow students and is possibly the reason that such out-of-class interactions are an important part of the educational environment (Hwang et al. 2002). Although this second feedback-seeking process is also an important avenue to meet students’ learning needs, it has been examined less often in the learning literature.

Informal discussions among students without the presence of a professor (OutCheck) functions as a third feedback-seeking option. Research on such informal out-of-class learning processes has affirmed their importance because of the expanded scope and flexibility that such discussions could play in meeting a variety of students’ needs (Topping 1996) – not least of which is the need to avoid embarrassment of asking questions in class that may reveal personal inadequacy. Such discussions are likely to take place among students who are not deemed to be threats to a participant when he/she has to reveal his/her lack of knowledge. This third avenue is an important self-help process for students who do not want to seek feedback in class or approach their professors after class for a range of reasons.

In the virtual learning environment, electronic-based channels such as chat rooms, discussion boards, e-mail lists and other options are common feedback channels. From these electronic options, the discussion board stands out because of its versatility in both synchronous and asynchronous virtual interactions – unique medium capabilities that remove traditional constraints of time and location to enable learning to take place. When used in asynchronous mode, participation on a discussion board does not require the physical presence of anyone in a central location (Harasim 1990; Hiltz & Wellman 1997), nor does it require the simultaneous presence of anyone at a single time (Harasim et al. 1995; Palloff & Pratt 1999). Such an asynchronous approach is especially attractive to students who want to learn yet cannot meet at the same time or place because of work or personal reasons. Arising from the ability of the electronic discussion board to allow students to interact without being physically present at a location, some researchers such as McIntyre and Wolff (1998, p. 257) have called attention to improved interactivity in the learning process, as seen in frequent online interactions throughout a week: ‘One of the powers of interactivity in a Web environment is the capability to engage by providing rapid, compelling interaction and feedback to students’. This increased interactivity is not possible with typical face-to-face classroom-based sessions that usually take place once a week. In support of the importance of interactivity, Monguet et al. (2006) showed that an instructor’s time and effort spent in a blended learning environment could increase students’ motivation to learn, while Salovaara (2005) showed that students do engage in deeper learning strategies when they use an inquiry approach that requires them to frequently gather and share information on electronic forums. Although studies to date have shown increased satisfaction from participation and even student-reported learning through virtual channels (Hiltz & Wellman 1997; Rovai 2001; Arbaugh & Duray 2002; Yoo et al. 2002; Arbaugh & Benbunan-Fich 2006), little is known about student performance that demonstrates changes in learning outcomes, such as test results.

Thus, our first major research question to address in this study is the relative impact of both face-to-face and online feedback-seeking behaviours on measurable learning outcomes, such as multiple-choice tests, where minimal professorial judgement that could vary across professors is required in the grading process.

**Cooperation and competition**

While feedback-seeking behaviours are important in the learning environment, they should be seen as expressions of underlying attitudes towards learning. Two attitudes that have been highlighted as possible premises for students’ learning performance are cooperation...
In a study of cooperative and competitive attitudes among students, King et al. (1995) pointed to the preference for cooperation by both Japanese and American students. Even while competitiveness was a salient attitude, especially among Japanese students, there was an inclination towards sharing and working with others. A review of attitudinal items in the cooperative component (Cooperate) of King et al.'s (1995) study showed items reflecting a willingness to work with others, and a belief that working with others is the best way to succeed. These items are congruent with Deutsch’s (1985) argument on the importance of commonality of purpose and Mead’s (1976) focus on the act of working with others. Therefore, a cooperative attitude should lead to greater willingness to participate in feedback processes with professors and fellow students, whether these be in class, out of class or even in the virtual environment.

Therefore, our second research question is to determine the extent a cooperative attitude could affect virtual feedback-seeking behaviours on the electronic discussion forum and face-to-face interactions in and outside of the typical classroom environment.

Although we have argued that students’ engagement in feedback processes with professors and fellow students in a face-to-face classroom environment, and sharing of materials on the electronic discussion forum supports the position for cooperative attitudes (Hodgson & Watland 2004; Francescato et al. 2006), there still is a need to consider possible underlying competitive attitudes that may influence such feedback-seeking behaviours, especially when many studies have shown students to be competitive in the learning environment (Simmons et al. 1988; King et al. 1995; Ryckman et al. 1997; Tang 1999; Hwang et al. 2002). While on the one hand, students may cooperate with each other by sharing some materials on electronic discussion forums and in face-to-face classroom environments, on the other hand, they may also decide to withhold some information in their competitiveness to stay one step ahead of other students. Such behaviours have been observed in both the US and Asian learning environments, with extreme forms of such US seen behaviours labelled as ‘hypercompetitiveness’ (Ryckman et al. 1997), and an Asian variation labelled as ‘Kiasu’ (Hwang et al. 2002). Even Johnson & Johnson (1998) recognized the possible presence of competitive attitudes despite their positions on the central role of cooperative learning structures in the learning environment.

When examining competitiveness, researchers have frequently contrasted competitiveness against cooperation (Simmons et al. 1988; King et al. 1995; Ryckman et al. 1997; Tang 1999). Despite the commonly accepted thinking that competitiveness and cooperation are opposites and tend to be incompatible, empirical findings often have shown them not necessarily to be so. For example, King et al.s’ (1995) study found that American students preferred cooperative (Cooperate) over competitive (Compete) strategies in the learning environment despite the commonly assumed competitive nature of American students. Although their Japanese counterparts also preferred cooperative strategies, they scored higher than American students on competitive attitudes. These results do indicate that competitive and cooperative attitudes are not necessarily mutually
exclusive in the learning environment, within a cultural
group and even across different cultural groups. The
possible simultaneous presence of both types of atti-
tudes in individuals and within any single cultural group
raises the possibility that both attitudes may play a role
in achieving learning success among students. Simmons et al. (1988) recognized this by concluding:
‘. . . the motivation to achieve success consists of at least
two independent strategies: achieving success through
competition and achieving success through coopera-
tion’ (p. 204).

Another study by Tang (1999), who contrasted com-
petitiveness and cooperation in students’ learning strat-
gegies in the US and China, revealed that Chinese
students leaned towards a competitive style, whereas
their American counterparts leaned towards cooperation, although the results were not clearly conclusive.
The seeming paradox in the Tang (1999) study – com-
petitive attitude existing within the deeper group and
 collaboration inclined Chinese societal environment – is
just as intriguing as the results from the King et al.
(1995) study. Two other studies on competitiveness in
the Far East also called attention to competitive attitudes
in the learning environment. These were rooted in the
fear of losing out to others and were labelled as Kiasu
attitudes (Ho et al. 1998; Hwang et al. 2002). These
latter studies have found such competitive attitudes to
reduce feedback-seeking behaviours with fellow stu-
dents because of the fear of accidentally sharing informa-
tion that was meant to be kept for oneself.

One could argue that the underlying motivation of
many competitive attitudes is a desire to get ahead of
others (Ryckman et al. 1997; Hwang et al. 2002). Thus,
personal success, instead of the needs of others,
becomes the focus. This focus on personal success
should place a higher priority on personal needs and a
lower priority on others’ needs. An individual who has
taken such a stand should concentrate on seeking feed-
back from the professor – the one who is often the most
knowledgeable in the learning environment (Hwang et al. 2004). In contrast, because engaging in feedback-
seeking with peers may not produce as much knowledge
gain as from a professor, the competitive individual
should prefer not to expand effort in seeking feedback
from peers. However, with the electronic discussion
board, the competitive individual may expend more
effort there as it is the primary interaction mechanism
for seeking information and obtaining responses from
everyone, including the professor. Thus, although the
competitive individual may avoid peer feedback-
seeking behaviours in a typical face-to-face learning
environment, he or she is likely to prefer greater partici-
pation on the electronic discussion board as it is the
primary channel for information. Also, with the pos-
sible asynchronous nature of the electronic discussion
forum, it becomes easier on the one hand for the com-
petitive individual to ponder before deciding to respond,
or not respond, to queries from others (thus withholding
information) while on the other hand simultaneously
requesting and observing responses from others and
learning from them. Therefore, the electronic discus-
sion forum provides the opportunity to actively engage
others for information while simultaneously affording
the time to carefully consider before providing responses to them.

Consequently, our third research question is to deter-
mine the extent competitive attitudes could affect
virtual feedback-seeking behaviours on the electronic
discussion forum and face-to-face interactions in and
outside of the typical classroom environment.

In summary, there is ground to believe that both coop-
erative and competitive attitudes are present in the
learning environment, with potential influence on face-
to-face as well as virtual feedback interactions, which,
in turn, should affect learning outcomes.

The study

This study was carried out to test the effects of coopera-
tive and competitive attitudes on face-to-face and
virtual feedback interactions, and their consequent
impact on multiple-choice test performance in a sample
of students from a north-eastern university. Seven
undergraduate classes spanning courses such as busi-
ness strategy, principles of management, human
resource management, and training and development,
participated in this study. The classes were hybrid
classes, with about half the time spent in traditional
classrooms and the other half in Web-based interac-
tions. In the face-to-face class, the professor would first
introduce the topic for the week with a short lecture and
then pose questions or a short case for students to apply
the taught concepts. The week’s topic and concepts
were then carried onto the electronic discussion board
where the professor poses questions for students to
respond to, and for them to work with each other in
clarifying each others’ responses. Class sizes ranged from 22 to 39. The Web-based interactions in each class were carried out through Blackboard, an electronic discussion forum medium for asynchronous interactions. After eliminating incomplete responses and ensuring all students participated only once in the study, the final useable sample had 217 unique student participants. The sample’s median age was 21 years, and the mean age was 22 years [standard deviation (SD) \(=\) 4.3], with the lowest age at 19 years and the highest age at 51 years. The mean age and SD of respondents were similar to those of students in the business school. However, the proportion of female students in this sample (69%) was somewhat higher than the proportion of female students in the business school (62%).

**Measures**

The scales for the Competiveness and Cooperation constructs were taken from the King et al. (1995) exploratory factor analytic study of cooperation and competition. Exploratory factor analytic results showed clear and discriminate loadings for competitive versus cooperative factors. Competitive factor items were: it is important to me to do better than others; people who succeed are more likely to have satisfying lives; the rewards of success outweigh the costs; success is my major goal in life; I feel better about myself when I am working towards success; success is not very important to me (reverse-scored). Meanwhile, the cooperative factor items were: individual success can be achieved while working with others; to succeed, one must cooperate with others; shared efforts can lead to both individual and group success; I enjoy working with others to achieve joint success; in the end, cooperation with others is not compatible with success (reverse-scored). Cronbach’s \(\alpha\) for the competitive item scale was 0.74, while that for cooperative item scale was 0.73. The three face-to-face feedback-seeking constructs were taken from the Hwang et al. (2002) study. All three feedback-seeking constructs (each consisting of four items) exhibited a clear and discriminate factor structure with high scale reliability coefficients (OutCheck \(\alpha\) = 0.94; InAsk \(\alpha\) = 0.92; OutAsk \(\alpha\) = 0.90). All attitudinal scales were anchored on a seven-point scale ranging from ‘Strongly Agree’ to ‘Strongly Disagree’. Survey responses to the scales were collected in the second to fourth weeks of the semester.

Student participation on the electronic discussion board was measured by participation in the number of electronic discussion forums (Forumno) and the average number of postings (Intensity) across forums over the semester (Baugher et al. 2003). Participation was measured by these two different modes to ensure that the impact of participating intensely in any single forum could be compared with participation across as many topical forums as possible, a separation that has not been raised previously or examined in other studies. For the learning performance measure, student performance on both midterm (week 7) and final-term (week 13) multiple-choice exams that covered different topics were averaged to ensure greater reliability (\(\alpha\) coefficient = 0.79). The collection of feedback-seeking responses early in the semester and test results later in the semester provided a longitudinal design for this study. All tests were taken in their respective face-to-face class environment. Multiple-choice test performance was chosen as the measure to minimize potential judgemental variations in the grading process that were common in essays or other term assignments. While some have argued that multiple-choice tests were too simplistic to assess complex levels of knowledge or an individual’s ability to perform a task (Rotfeld 1998), empirical studies of multiple-choice versus free-response tests have found multiple-choice tests to be effective measures of learning outcomes. For example, Lukhele et al. (1994) found that the reliability of multiple-choice questions exceeded that of the constructed-response section on every one of the seven advanced placement (AP) tests. In addition, there was convergent validity between the multiple-choice and constructed-response sections of AP examinations such that the multiple-choice section predicted the essay portion better than the essay portion could theoretically predict itself. Similarly, Bridgeman and Rock (1993) found that the reliability-per-hour-of-testing on multiple-choice tests on the analytic reasoning sub-scale of the graduate record examination was equivalent to an experimentally constructed response format. Perhaps an even more important consideration is the ‘objective nature’ of multiple-choice tests that have built-in assessment consistency. This cannot be said of free-response questions where judgement and grader biases could easily affect the assessment. Researchers do agree on the greater reliability of multiple-choice tests, and some also have found multiple-choice ques-
tions to have greater validity in predicting learning outcomes (Lukhele et al. 1994; Bacon 2003). Even James and Brown (2005), in their study of how best to design learning outcome measures in the UK Teaching and Learning Research Programme, acknowledged the role of standardized tests, such as the Scholastic Assessment Test (SAT), General Certificate of Secondary Education (GCSE), etc., in the learning environment.

Analyses

The first analysis was an exploratory factor analysis of the King et al. (1995) cooperative and competitive attitudinal items to remove items that did not clearly load either on the cooperative or the competitive attitudinal constructs. Of the 18 items, 7 were removed, and the resultant two-factor model accounted for 36.4% of item variance. The \( \alpha \) reliability coefficients for the factor items were 0.74 and 0.73 for the respective competitive (Compete) and cooperative (Cooperate) factors. A linear structural relations model (LISREL) of the two modified cooperative and competitive constructs also showed good fit indices \( \chi^2(\text{d.f.} = 43) = 81; \) Goodness of Fit Index (GFI) = 0.94; Adjusted Goodness of Fit Index (AGFI) = 0.91; Residual Mean-Square Error (RMR) = 0.065.

Exploratory factor analysis of items from the Hwang et al. (2002) feedback-seeking factors loaded according to the three intended factors, and the model accounted for 76.5% of item variance. The \( \alpha \) coefficients were 0.94 for OutCheck, 0.92 for InAsk and 0.90 for OutAsk. The confirmatory factor measurement model also had good fit indices \( \chi^2(\text{d.f.} = 51) = 87; \) GFI = 0.94; AGFI = 0.91; RMR = 0.045.

The next step was to test the impact of cooperative and competitive attitudes on student face-to-face and virtual feedback-seeking participation, and consequent multiple-choice test performance. Initial attempts to take a full structural equation modeling approach proved infeasible because of the large sample size needed to accommodate the number of factors, control items and error variances in the model (MacCallum et al. 1992). As the construct items already had proven to be appropriate and reliable from initial exploratory factor analysis, reliability tests and confirmatory factor measurement models, it was decided to create variables from the individual factor items and then use these variables to test the hypothesized relationships through LISREL path models (Joreskorg & Sorbom 1989). In the test model, the five feedback-seeking variables (InAsk, OutAsk, OutCheck, Forumno and Intensity) were regressed against the two attitudinal variables (Cooperate, Compete). The multiple-choice test performance variable was regressed against the five feedback-seeking variables. All phi relationships among the three competitive variables were freed in the model. Similarly, psi relationships were freed among the four feedback-seeking variables. Performance on multiple-choice tests was controlled for gender, age, class level and the top three grades from the previous semester. Previous semester grades were used as a proxy control for participant intelligence in the model. These controls ensure that any significant relationships from the tests of interests were above and beyond possible influences from variables, such as different types of classes, student intelligence, gender and age.

Results

The tested LISREL path model is shown in Fig 1. Fit indices indicated good model fit, although not all tested relationships were significant \( \chi^2(\text{d.f.} = 59) = 143; \) GFI = 0.92; AGFI = 0.86; RMR = 0.07. At the independent variables’ end, Cooperate was positively correlated with Compete \( (\psi = 0.19) \). The Cooperate variable positively predicted OutCheck \( (\gamma = 0.17) \), OutAsk \( (\gamma = 0.14) \) and InAsk \( (\gamma = 0.22) \), and the Compete variable positively predicted Intensity \( (\gamma = 0.17) \), OutAsk \( (\gamma = 0.16) \) and InAsk \( (\gamma = 0.24) \). The only feedback-seeking variable that predicted the multiple-choice dependent variable was participation across the number of discussion forums \( (\text{Forumno}; \beta = 0.27) \). None of the traditional face-to-face feedback-seeking variables had any significant relationships with the multiple-choice performance measure. There were significant relationships among the three traditional feedback-seeking variables: OutCheck and InAsk \( (\psi = 0.15) \); InAsk and OutAsk \( (\psi = 0.41) \); and OutAsk and OutCheck \( (\psi = 0.36) \). Forumno and Intensity also were related to each other \( (\psi = 0.23) \). There was a positive correlation between InAsk and Intensity \( (\psi = -0.15) \). Other than significant relationships among the independent and dependent variables of interest, some control variables (previous grades and one of the
class-dummy variables) were significantly related to performance on the multiple-choice test results.

### Online participation and learning

First and foremost, results from this study showed that participation on the electronic discussion board, as measured by the number of topical forums in which a student participated in the semester (Forumno), has a significant influence on multiple-choice test performance, even after taking into account age, gender, type of class and previous grades of students. Although intensity of participation on the electronic discussion board (average number of postings per forum) was not significantly related to learning performance, it was related to participation across the number of forums. This implies that a student who chose to participate intensely on any single topical forum has an increased likelihood of participating across many topical forums, which in turn, led to improved performance on multiple-choice tests. However, the lack of a direct relationship from intensity of participation to multiple-choice test results indicates that those who choose to participate intensely (Intensity) in a few, but not many, topical forums (Forumno) are unlikely to see significant improvement in test results. The contrasting test performance outcome between Intensity and Forumno makes sense because individuals who choose to participate in as many topical forums as possible are likely to cover more topical areas, and coverage across topical areas rather than in a narrow area is the approach taken in typical multiple-choice tests in these hybrid classes.

The usefulness of student participation in forums is consistent with the argument of Baugher et al. (2003) on how faculty could take advantage of such participation in the learning process.

The significant relationship between participating across electronic forums and learning performance lends support to advocates on the usefulness of electronic media on learning outcomes (Harasim et al. 1995; Hutchins 2001; Arbaugh 2005; Monguet et al. 2006). This finding is also consistent with feedback-seeking researchers and educational learning researchers who have found feedback-seeking to lead to improved performance (Ashford & Cummings 1983; Dillion 1986; Fassinger 1995; Ellis et al. 2006). As the sample was taken from a hybrid learning environment, where both electronic and face-to-face feedback-seeking interactions were available to students, the results shown here revealed the comparative strength of electronic participation over traditional face-to-face feedback-seeking interactions on multiple-choice test performance results. The demonstrated usefulness of the electronic feedback channel in this hybrid learning environment lends support to it as a self-monitoring mechanism for students to determine their learning progress and act upon emerging feedback information to improve their learning outcomes (Chiviacowskii et al. 2005; Ellis et al. 2006). Interestingly, McConnell’s (2005) examination of functional versus nonfunctional groups in the learning environment showed nonfunctional group (group II) had members who often did not respond to members’ questions and need for information. This was argued to be a cause of failure of the

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**Fig 1** Normal and virtual feedback-seeking behaviours: competitiveness versus cooperation on learning performance. Bolded continuous lines: $t > 1.96; N = 217$. $\chi^2(59f) = 143$ ($P = 0.00$); GFI = 0.94; AGFI = 0.86; RMR = 0.078.
group to perform well in the learning environment. Thus, in addition to nonparticipation leading to lack of learning at the individual level as was shown in this study, there is also the risk of impeding others’ learning that could result in group performance failure. Therefore feedback-seeking and related activities were indeed important at the individual- and group-learning performance levels.

**Some indications of participation quality**

In addition to capturing the frequency and intensity of discussion board participation, we examined some available student feedback-seeking activities to ensure that participation was meaningful and that students were, indeed, relating theories and knowledge to questions. For example, A.A. (female, age 19 years) sought responses on a question relating to risk of globalization, and Z.J. (female, age 20 years) responded with a short response: ‘The risks are not knowing the country’s religions and morals and then stepping all over them and not even knowing it.’ Another student (A.A., female, age 21 years) responded with a more detailed view: ‘A MAJOR risk of globalization is failure. Other risks include high transportation costs, potential tariffs, competition from local markets, loss of competitive advantage, large capital outlay, and a limited ability to use profits in one country to increase competition in another country.’ There were many such responses across the classes, but we have shown one case here to assure readers that student participation was not perfunctory and lacking in demonstration of learning in the classes.

**Virtual and face-to-face influences**

The findings from this study provide initial insights on how blended learning approaches may improve the classroom learning experience. The strong relationship between asking questions of the professor in class (InAsk) and electronic forum participation intensity (Intensity) could reflect a number of things taking place in the learning environment. Questions that were raised by students in class could continue in online discussions for further clarification. In this way, the electronic discussion forums provided the opportunity for students to further engage the professor on class discussion points that were ‘off the hip/lip’ in the face-to-face class environment (Meyer 2003; Monguet et al. 2006). The reverse also could happen, where online discussions are carried over into the face-to-face classroom with the professor. These behaviours reflect the construct of learner–instructor interaction (Moore 1989), which has been found to be a strong predictor of learning outcomes in online learning (Fredericksen et al. 2000; Swan 2002; Ellis et al. 2006), especially students’ perceived learning in the course (Rovai 2001; Arbaugh 2005; Arbaugh & Benbunan-Fich 2006). Another insight comes from the relationship between forum participation and test performance. This finding is consistent with recent research on participation behaviours and student performance in online courses (Baugher et al. 2003). In a blended learning environment, regular participation in online discussions between weekly class meetings suggests that students were engaging the material more regularly and reflectively, which in turn, helped them to retain knowledge more completely (Garrison & Kanuka 2004; Salovaara 2005). These insights should provide a useful starting point for researchers seeking to examine the dynamics of blended learning environments.

Despite the lack of relationship from any of the three traditional face-to-face feedback-seeking behaviours on learning performance, the results should not imply that face-to-face feedback interactions (Fassinger 1995; Mory 1996; Ellis et al. 2006; Francescato et al. 2006) are no longer relevant. One must remember that the vast majority of classes rely primarily on traditional face-to-face classroom interactions where such feedback-seeking behaviours are still important, as pointed out by earlier studies (Fassinger 1995; Hwang et al. 2002). A possible explanation for the inability of the three face-to-face feedback-seeking behaviours to predict test performance may lie in the majority of female students (69%) in the sample. Studies have shown that females feel more comfortable interacting through electronic-based virtual media than their male counterparts (Arbaugh 2000b; Wolfe 2000; Rovai 2001). Because of this, the predominant female sample in this study may have heightened discussion board participation and consequently led to the significant relationship between discussion board participation and learning performance seen here.

An examination of relationships among the face-to-face and virtual feedback-seeking behaviours shows that each face-to-face feedback-seeking behaviour (InAsk, OutAsk and OutCheck) was significantly related
to each other. This was not surprising because previous studies have already demonstrated these relationships (Hwang et al. 2002). In addition, there was a significant relationship between the two different sets of feedback-seeking behaviours – a correlation between InAsk and Intensity. This means that a student who sought feedback from the professor in class was likely to participate more intensely in a discussion forum. This relationship may reflect curiosity and desire for more information after interactions with the professor in class, and may even lead to a more student-oriented learning environment as all participants seek to help meet each others’ needs (Moore 1989; Meyer 2003; Motschnig-Pitrik 2005). The relationship between InAsk and Intensity shows the continued relevance of normal face-to-face feedback-seeking interactions in enhancing electronic board participation. These relationships could be used by educational researchers to encourage face-to-face feedback-seeking interactions in enhancing electronic board participation. These relationships could be used by educational researchers to encourage face-to-face feedback-seeking behaviours in class (Chickering et al. 1987; Fassinger 1995), because such in-class behaviours could lead to participation in the online environment (Ellis et al. 2006; Francescato et al. 2006).

Roles of cooperation and competition

At the independent variable end of the model, neither cooperative (Cooperate) nor competitive (Compete) attitudes predicted participation across topical forums. However, Compete predicted intensity of participation, which in turn, was related to participation across topical forums. This means that a competitive individual is likely to make a higher number of postings in a topical forum, and related to this, to also engage in participation across more topical forums. The Compete to Intensity relationship is a reflection of the competitive student’s drive to get ahead of others by seeking more feedback on the discussion board. The indirect relationship from Compete to participation across forums, via Intensity, and its consequent multiple-choice test success, would support Simmons et al.’s (1988) argument that competitiveness is one of the avenues to achieve success.

Both the Compete and Cooperate variables predicted InAsk and OutAsk. The convergence of two different attitudes on feedback-seeking activities with the professor in class and out of class affirms the central role of the professor in the learning environment and agrees with researchers who advocate the importance of such feedback-seeking behaviours (Chickering et al. 1987; Fassinger 1995; Hwang et al. 2002) regardless of underlying driving attitudes. To some extent, these results also support the views of researchers who have argued that competitiveness and cooperation are not necessarily mutually exclusive or opposite of each other (Simmons et al. 1988; King et al. 1995), because both types of attitudes led to similar behavioural expressions in asking questions of professors in and out of class. This argument – cooperation and competition are not necessarily opposites – is strengthened further by the positive correlations between Cooperate and Compete – correlations that indeed showed that cooperation and competition are not contradictory attitudes but in fact even could be positively related. Therefore, the findings indicate that it is possible to be competitive and cooperative at the same time.

Further examination of the Cooperate variable showed that it predicted the feedback-seeking behaviour of checking with peers outside of class. This relationship is consistent with its nature to involve others, especially peers who could be helpful in the learning process. The cooperative attitude that is driving feedback-seeking activities with peers in this sample agrees with Deutsch’s (1985) argument on the similarity of goals among actors in making cooperation possible. In this study, the primary common goal was learning from each other in a given social situation. It is important to understand these and other underlying motivations of students when they collaborate in the learning process (Sundre & Kitsantas 2004; Monguet et al. 2006) so that we can develop strategies to best meet students’ learning needs.

Implications and limitations

The fact that competitive rather than collaborative attitude was directly associated with electronic board discussion and consequent test performance raises questions on the primary focus on the use of collaborative pedagogical approaches in online learning environments. These results contrast with arguments by some researchers for the important role of collaborative rather than competitive approaches in online learning (Alavi et al. 1997; Yoo et al. 2002; Hodgson & Watland 2004; Arbaugh & Benbunan-Fich 2006). One possible explanation for the contradictory finding may be the sample used in the study. Most studies of online management education have focused on graduate-level courses.
Because participants in graduate-level courses are much more likely to have professional work experience, and are therefore more likely to have experience working in virtual teams and possess greater professional maturity, collaborative techniques may be more appropriate for that population of learners (Benbunan-Fich & Hiltz 2002; Rungtusanatham et al. 2004; Salovaara 2005). In fact, this study’s findings on the important role of competitiveness are consistent with other studies of online learning that used undergraduate samples (Oliver & Omari 2001; Swan 2002) and examined competitiveness among undergraduates (Simmons et al. 1988; Tang 1999). More needs to be done in examining differences between graduate and undergraduate student populations, and how their respective different attitudes may have different impact on learning strategies in a hybrid learning environment.

Although results from this study have clearly demonstrated the positive role of the electronic discussion board vis-à-vis face-to-face interactions in influencing knowledge acquisition, there is a need to further replicate these results across a wider sample of students in other institutions and possibly in other countries. The findings in this study must be interpreted in light of its other limitations. First, researchers only have begun to examine attitudinal impact of cooperation, and in this study also competitiveness, on measurable learning outcomes. Further studies of these attitudes are needed to develop a richer understanding of how cooperative versus competitive attitudes may affect virtual and face-to-face learning behaviours. Second, the current study uses some self-reported scales that suffer from the normal biases of such measures. However, effort was taken to reduce such biases by testing for each measure’s internal reliability, stability and discriminating ability from each other. In addition, actual frequency of participation on discussion boards to determine virtual feedback-seeking behaviours was used to help reduce bias problems with self-reported measures in this study. A third concern is the relatively small sample of students (N = 217) in this study. A larger sample may reveal relationships that may not be possible from such a small sample. A fourth concern is whether the new electronic media will prove just as effective in a classroom where students meet with the professor in the traditional ‘face-to-face’ interactions all the time, with the electronic media being used as an add-on feature. A fifth concern is the multiple-choice format of the test.

Although it eliminated any subjective interpretations by the professor in the test grading process, with research showing its appropriateness and test equivalence of essay questions that are supposedly a richer test format, future studies may want to consider such other formats as well.

References
Seeking feedback in blended learning


