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Does increasing communication through visual learning environments enhance student perceptions of lecturers?

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The current study was conducted in an effort to examine whether increased levels of communication using visual learning environments (VLEs) alters student perceptions of lecturers. Eighty-six MSc students in Computing Science participated by using She and Fisher's (2002) Teacher Communication Behavior Questionnaire (TCBQ). In addition to using the questionnaire, data from the electronic class site were used to make assessments about the quality and quantity of communication. Two types of classrooms were evaluated: a) a control condition in which the lecturer did not alter any communication aspect of the module, and b) the experimental condition in which the lecturer posted weekly discussion topics. Significant differences were found by cultural background and gender of the students. The bulletin board postings in the experimental condition were more heavily content-based than the control condition ones. The consistency in discussion topic of the experimental condition postings, both bulletin board and email, were more fluid than in the control condition.

E-learning, visual learning environment, communication, culture, student perceptions, gender

INTRODUCTION

Online education is becoming increasingly popular in academia (Collis, 1996; Dutton, Dutton, and Perry, 2002; Hiltz and Wellman, 1997; Schweizer, Paechter, and Weidenmann, 2001; Spitzer, 1998; Stadtlander, 1998; Webster and Hackley, 1997). In academia in the United States alone, of the 5655 accredited postsecondary education institutions, 1979 offer a form of distance delivery (Council of Higher Education Accreditation, 2002). The vast literature in the field indicates that the distance education programs are being studied extensively (for example, Buerck, Malmstrom, and Peppers, 2002; Dutton, Dutton, and Perry, 1999; Frumkin, Mimirinis, Dimitrova, and Murphy, 2004; Russell, 1999).

It is important to asses how teachers' behaviours are perceived by students since 63 per cent of what happens in a classroom may be explained by the student's perception of the teacher's influence, a factor possibly based on teacher behaviour (van Tartwijk, 1993). Past work has found that perceptions of behaviours can influence affective learning (Anderson, 1979), cognitive learning (Gorham, 1988; McCroskey, Sallinen, Fayer, Richmond, and Barraclough, 1996; Richmond, Gorham, and McCroskey, 1987; Richmond, McCroskey, Kearney, and Plax, 1987), the effectiveness of the teacher (Anderson, 1979; Cheng and Tsui, 1996), interactions between the student and teacher (Andersen, Norton, and Nussbaum, 1981; Choi, 2002; Moller, 1998), and general student performance (Matsumoto, Garside, and Roberts, 1991; Picciano, 2002).

Student motivation is an important aspect of the learning process (Hall, 1966). Christophel (1990) defines student motivation as the process of 'how' students are taught, rather than 'what' it is that they are actually taught. Vansteenkiste, Simons, Lens, Soenens, Matos, and Lacante (2004)

argued that in the classroom, increasing the quantity of motivation might positively alter the quality of the learning experience regardless of whether the motivation was intrinsic or extrinsic. Ryan and Deci (2000) argued that intrinsic tasks could be viewed positively even if a student was not interested in the task for its own sake. Rather, it could be the intrinsic desire for some future that the task led to one that facilitated the accomplishment of the task. In fact, it has been claimed that the value one placed on a task predicted academic achievement (Eccles and Wigfield, 2002). The more readily a task (for example, learning a computer programming language) led to a future goal (for example being offered a high paying computer program job), the more motivated a student will likely be to complete the task (Eccles and Wigfield, 2002; Lens, Simons, and Dewitte, 2002; Miller, DeBacker, and Greene, 1999). However, lecturers might be able to extrinsically motivate a student to do well (for example, success on coursework results in high grades, possibility of internships).

The study described in this paper uses a framework of extrinsic motivation. It evaluates how distance students perceive teacher communication behaviours. The current study assesses the relationship between perceptions of communication behaviour and module outcome (that is, how well the student does in the module) among other variables. It is hypothesised that positive perceptions of teacher communication can provide extrinsic motivation for the students such that students who perceive their teachers as more communicative are more likely to do better in the module.

Distance Education

Student academic success is equivalent when measured by final grades in distance-based and lecture-based courses (for example, Dutton, et al, 1999; Russell, 1999). Buerck, et al (2002) report that, specifically for computer science students, those enrolled in online courses performed as well as their traditional program counterparts.

The use of computer-mediated technology might expect to enhance communication (Schweizer, et al, 2001). Schweizer, et al (2001) reported that students acknowledge disadvantages of online education such as missed opportunities in communication, anonymity, and high demand on resources. Interaction was a critical element in the learning process (Moore, 1993; Offir, 2000). Interaction between students and teachers might be even more important in the online learning environment (Gresh and Mrozowski, 2000). While time consuming, research has shown that students wanted to be able to access lecturers in a virtual learning environment (VLE) (Sanders and Morrison-Shetlar, 2001).

Online lecturers must move from the instructor role to the facilitator role (Lin and Hseih, 2001). According to Gates (2000), lecturers need to be able to increase their levels of interaction with online students by using effective pedagogical tools and incorporating innovative design features. The use of forced interaction and discussion on module relevant topics might assist students to embrace the material and making them feel as if they 'belong to the classroom' even if they were in distant locations.

Communication Behaviours

Communication in the classroom is comprised of communication with the instructor and communication, as a separate category, with other students (Anderson and Garrison, 1998). Communication with the instructor allows the student to ask questions but perhaps more importantly, to develop a working relationship on which to base assignments and grading. It also kept the student feeling connected to the academic institution and provided a feeling of proximity to an expert in the field (Miller, Preston, Elbert, and Lindner, 2003). Richmond (1990) believed that there was a link between the way a teacher communicated and the way the student learnt. She further argued that the connection between motivation and learning are critical; that is, those who

were motivated learn more and those who learn become increasingly motivated. Motivation might be triggered by the communication style of a teacher (for example, extrinsically created motivation).

Communication in face to face modules was comprised of spoken verbal information and nonverbal personal or social cues (Schweizer, et al, 2001). Verbal messages provided cognitive aspects of communication, while nonverbal messages appeared to be the ones responsible for affective types of communication (McCroskey, et al, 1996). It has been claimed that nonverbal behaviours were relevant in educational environments because they are relied upon for true sentiment or emotions that are hidden when a verbal-only message is provided (Schweizer, et al, 2001). Eye contact and smiling are positively related to cognitive learning (McCroskey, et al, 1996); Teachers' active participation in school activities assisted students in exercising skills and talents (Vansteenkiste, et al, 2004). However, in an online environment nonverbal communication mght not be particularly useful.

Verbal behaviours were useful in such a setting. Samples in the Netherlands, the United States, and Australia revealed that friendly, helpful, and understanding teacher behaviour was connected to higher cognitive outcomes and positive student attitudes (Fisher, Henderson, and Fraser, 1995; Fisher and Rickards, 1997; Wubbels and Levy, 1993).

Challenging communication behaviours such as teacher questioning and reaction to student answers promoted relevance of a given topic, encouraged ownership of module material, assisted students in their interpretations of new module content, and connected recently learned information to information students already have (Deal and Sterling, 1997; Good and Brophy, 1974; Walberg, 1984). She (1998a, 2000, 2001) found that teacher questioning and verbal reinforcement following high performance by students were positive facets of teacher behavior (that is, requiring students to collate new information with already-existing information, encourage ownership of educational material, and assist students in analysing the new content). Furthermore, Comadena, Semlak and Escott (1990) found that among adult learners, a dominant teacher style was a predictor of the teacher's effectiveness.

Research has shown that controlling behaviour on the part of teachers increased cognitive gains among students (Wubbels and Levy, 1993; Fisher, et al., 1995; Fisher and Rickards, 1997). A study looking at Dutch students found that girls perceived their teachers as being more dominant (that is, controlling) than did boys (Levy, Wubbels, and Brekelmans, 1992).

A Taiwanese study revealed that student achievement was increased when students felt that their teacher exhibited behaviours such as encouragement and praise (She and Fisher, 2002). Motivation which might be provided by teacher encouragement, or praise of the student, enhanceed interest and involvement in class as well as students reportedly looking forward to attending lectures (Frymier, 1994).

Gender

Past work has found some differences in online student behaviour based on gender. Males preferred to work independently to develop more class postings and were more likely to ask lecturers for assistance. The females preferred more classroom interaction, use language that was more complimentary when responding to other learners, and were more likely to ask peers for help (Trego, 2004). Australian male students preferred an individualised classroom when compared with their female counterparts (Hansford and Hattie, 1989). Taiwanese girls more frequently than boys reported their teachers as being understanding and friendly (She and Fisher, 2002). Several studies indicated that girls perceived their learning environments more positively than did boys, regardless of cultural background (Fraser, et al, 1995; Fisher, et al, 1997; Rawnsley and Fisher, 1997). Since females perceived their learning environments more positively and

enjoyed greater levels of interaction, it was logical to assume that females who felt good about an instructor would give him or her higher ratings on his or her communication skills.

Culture

The cultural background of the student might affect how the particular student perceived his or her teacher's behaviour (Mehrabian, 1969; Powell and Harville, 1990). Perceptions might be influenced by a number of behaviours that differed across cultures (McCroskey, et al., 1996). Cultures needed not to be defined by function of being in different parts of the world; rather, cultures should be considered as sociopsychological entities in and of themselves (Lee, Matsumoto, Kobayashi, Krupp, Maniatis, and Robert, 1992). For example, an individual who considers herself Egyptian, even if she was living in London, might have more of an Egyptian cultural personality than an English one.

Teacher behaviours were not related to cognitive learning among United States African-American, Asian-American, Hispanic, and non-Hispanic Caucasian groups of students (Sanders and Wiseman, 1990). In Chinese society the teacher-student relationship mgiht be compared to the father-son one (Pratt, Kelly, and Wong, 1998). The teacher role commanded a certain level of respect from the student. In return, the teacher should exercise authority over the material which he or she was teaching. Pratt, et al (1998) further argued that in Western society teachers might compromise their position as an authority figure in an effort to be better liked. This did not provide a clear picture of what to expect with regard to perceptions of communication patterns based on culture. Nonetheless, it might be assumed, based on Pratt's (1998) work, that Chinese students would be less likely to provide ratings of their lecturers because of the authority position which they held. That is, it might be irrelevant to a Chinese student what he or she thought about a teacher. The teacher was the expert and therefore respected, regardless of communication behaviour.

Current Study

It is expected that online educational communication depended on a number of social and personal variables. The current study was designed to manipulate experimentally an already developed module to investigate whether increased levels of communication using VLEs altered student perceptions of the lecturers. Measurement of whether perceptions of the lecturers' communication behaviours tangibly influenced module outcome scores. The effects of gender and cultural background were also assessed. The framework for this study was that extrinsic motivation was provided by the teacher, both online and in the classroom. As the motivation to succeed externally was provided by the teacher, through enhanced communication behaviour online, the students learnt to incorporate it internally such that they became intrinsically motivated. This led to students having higher levels of academic achievement (that is, module outcome scores would be higher), learning would be enhanced and students would report more positive perceptions of their teachers.

METHOD

Participants

Eighty-six MSc students in Computing Science, 53 Asian and 33 Caucasian, from two modules participated in the study. Only eight of the participants had lived in the United Kingdom for five or more years, while 66 had moved to the United Kingdom in the past year. The remaining 12 students have lived in the United Kingdom between one and five years.

Materials

She and Fisher's (2002) *Teacher Communication Behavior Questionnaire* (TCBQ) was used to assess student perception of variations in communication style with lecturers. The questionnaire had 40 questions, comprised of five scales, each representing a type of communication. They were (a) challenging, (b) encouragement and praise, (c) nonverbal support, (d) understanding and friendly, and (e) controlling communication. It was a Likert style questionnaire and questions were answered by circling 'almost never' (1), 'seldom' (2), 'sometimes' (3), 'often' (4) or 'almost always' (5). Cronbach alpha coefficient was calculated to measure reliability on the five scales. A range of 0.86 to 0.93 on samples in Taiwan and Australia was found (She and Fisher, 2000). Validity, measured by principal components analysis, showed that the 40-item questionnaire was structured based mainly on the factor analysis and in small part on the interviews conducted with the students. Discriminant validity measures ranged from 0.06 to 0.45. These were small enough correlations between the scales to be satisfactory (She and Fisher, 2000).

In addition to using the questionnaire, data from the electronic class site was collected. Following the end of the semester, and after final grades had been posted, communication from the class bulletin board site and email correspondence was downloaded.

Two types of classrooms were evaluated. In the first, a control condition, the lecturer (Lecturer A) did not alter any communication aspect of the module. In the second, the experimental condition, the lecturer (Lecturer B) posted weekly discussion topics. Students were instructed to engage with each other and the lecturer on the discussion topics. The correspondence was looked at both for quantity of contact as well as quality of discussion (for example, questions about coursework or due dates to more substantive questions regarding module content). To ensure that differences were not lecturer-specific only, communication only data (no questionnaires) were obtained from Lecturer B during the enhanced communication semester as well as the semester prior to the modification (the second control condition).

Procedure

Questionnaires were distributed to two groups of students. The first completed the questionnaire in Spring 2004 and the second group in Fall 2004. The principal researcher attended the lecture sessions, in both cases with an associate, to disseminate and collect the questionnaires, and to respond to questions about the research.

Hypotheses

The study models earlier work comparing communication patterns at the secondary school level in Australia and Taiwan (She and Fisher, 2002; She and Fisher, 2000). A framework to investigate student perceptions of communication at the university level was used. It modelled an earlier study with similar students although this time using an experimental design (Frumkin and Murphy, manuscript submitted for publication). Several hypotheses were developed.

Hypothesis 1:   There is a positive relationship between student perceptions of the teacher communication patterns and module outcome; the larger the degree to which a student believes the teacher interacts with the student, the higher the module outcome is for that particular student.

Hypothesis 2:   There are cultural differences with the Asian students reporting less overt patterns of all communication behaviours than the Caucasians due to their respectful nature towards lecturers.

Hypothesis 3:   Female students report greater levels of all communication patterns from their lecturers than male students.

Hypothesis 4: The module with enhanced communication results in greater content, more substantive correspondence and postings and better linked discussion threads than will the module without the enhanced communication.

RESULTS

There were no significant effects found for Hypothesis 1. There was a significant effect for Hypothesis 2. Roy's Largest Root (F = 3.79, p < 0.00) demonstrates significant differences in perceptions of tutors by cultural background of the students. Additional univariate analyses were run with the cultural background variables. There were significant differences by culture and challenging behaviour (F= 2.18, p < 0.04), and culture and controlling behaviour (F= 4.94, p < 0.03) and a significant difference on a non-predicted interaction of culture by gender (F= 2.46, p < 0.05). Follow-up t-tests revealed findings in the predicted direction for challenging behaviour (t = -5.91, p < 0.01) such that Caucasian students reporting more challenging behaviour from their lecturers than did the Asian students. The same held true for controlling behaviour (t = -3.58, p < 0.001). A t-test for culture and gender (t = -15.86, p < 0.00) showed that the Caucasian females were more willing to report on perceptions of their teachers than were Asian females, Caucasian males or Asian males.

A multiple regression analysis was run to examine the significance of Hypothesis 3. A significant difference was found on gender for encouragement and praise behaviour (F= 3.51, p < 0.04). A follow-up t-test indicated that, as predicted, females reported higher levels of encouragement and praise than did male students (t= 2.44, p < 0.02). There was an unexpected interaction effect of gender by tutor on controlling behaviour. Females rated lecturer A as more controlling than lecturer B. While it was predicted that females would in general rate the lecturers as more controlling, there was a distinct difference in females' ratings of the two lecturers (F= 3.54, p< 0.04).

Hypothesis 4 was partially supported. The bulletin board postings on Lecturer B's enhanced communication module (experimental condition) were more heavily content-based than the postings in the other two modules (Lecturer A and Lecturer B's non-enhanced communication module). This supported the hypothesis. However, the number of postings, irrespective of content, was higher in Lecturer B's non-enhanced communication module (35 postings) than in the enhanced communication condition (34 postings). While this was an insignificant difference, it was noteworthy that the enhanced communication module did not yield a higher number of postings than the non-enhanced condition. Lecturer A's module had far fewer postings, only 15. A comparison of the content quality of the postings revealed that the only increase in communication for the experimental condition was by the students in their emails (see Table 1). The lecturer posted more content-based emails in the control condition. The students posted more content-based bulletin board messages in the control condition. The consistency in discussion topic of the experimental condition postings, both bulletin board and email, were more fluid than in the control condition. That is to say, the control conditions had more disjointed content-based postings while the experimental postings followed a discussion type of flow, confirming an aspect of Hypothesis 5.

DISCUSSION

Hypothesis 1 posited that students would both perceive the lecturer in a communicative way (high on all communication variables) and receive higher outcome scores. This finding was not recorded. It is unclear why this is the case. It is possible that nonverbal communication is heavily relied upon for perceptions of lecturer behaviour (McCroskey, et al., 1996; Philippot, Feldman, and McGee, 1992; Schweizer, et al., 2001). Nonverbal communication is perhaps near impossible to tease out, if it even exists, in the online environment. It might not be feasible, therefore, to

examine whether lecturer behaviour is manifested as nonverbal communication and influences student's perceptions and their module outcome.

Table 1. Qualitative patterns of communication

	Lecturer A (Control)		Lecturer B (Second Control)		Lecturer B (Experimental)	
	Lecturer	Student	Lecturer	Student	Lecturer	Student
Email (Administrative)	2	2	0	1	0	1 (1)**
Bulletin Board (Administrative)	1	12	0	6 (2)*	0	9
Email (Content)	0	0	8	2	0	8 (1)**
Bulletin Board (Content)	1	1	2	16 (2)*	2	12

* (2) Indicates that two students posted messages containing content and administrative material.
** (1) Indicates that one student posted a message containing content and administrative material.

An alternate explanation for the lack of findings is that perception of communication behaviour is not a primary contributor to module outcome scores. It is possible that motivation, or lack thereof, on the part of the student is a far more significant contributor to module outcome score.

There is partial support for Hypothesis 2. The significant multivariate analysis indicated that a relationship between culture and perceptions of communication behaviour exists. What is interesting to note is that the relationship is not significant for all five communication behaviours. Namely, friendly-understanding, encouragement-praise and nonverbal are not related to culture. Feng (1994) has argued that Asian students were not expected to rate the lecturers dramatically in any category, based on their respectful style. However, the Caucasian students were expected to rate the lecturers more dramatically and this did not surface for the three communication behaviours mentioned above. Nonverbal behaviour might not have been significant for the reasons mentioned above. Consequently, there is a need to explore further cultural differences between the Asian and Caucasian students, especially with respect to the two non significant variables. It is possible that the Caucasian students expected their lecturers at the postgraduate level to be more of a friend or peer than a lecturer. Thus, the Caucasian students rate their lecturers as challenging and controlling. The non-predicted finding fits with other hypothesis-based work. Both females and Caucasians can be expected to rate lecturers higher on communication behaviours, which surfaces in this interaction.

The fact that there is one significant finding for Hypothesis 3 warrants further investigation. It is possible that females are less expectant of their lecturers, since as Trego (2004) notes they rely more on peers for help. Thus it is possible that in this study the students were unaware that the lecturers would be as encouraging as they in fact were. At the same time though, if this were the case, one would expect understanding and friendly behaviour also to have surfaced as being significant for the females. An explanation of this finding requires further research.

The fact that the females rated Lecturer A as more controlling than Lecturer B, but not both lecturers as more controlling than did males, is interesting. Lecturer B is female while Lecturer A is male. Perhaps the females felt that Lecturer B was easier to approach or acted in a less hierarchical manner so that they rated her as less controlling. Alternately Lecturer B, who used the VLE with greater frequency, had changed better from the instructor to facilitator role, resulted in lower controlling ratings (that is, traditional lecturers would have been more in charge of the classroom while VLE instructors were moderators) (Lin and Hseih, 2001). This finding required further investigation on patterns of communication based on gender.

Hypothesis 5 provided information of a different sort. The students were expected to respond eagerly to the experimental condition by posting more content-based (lecture appropriate) messages. It was also anticipated that students would continue on a consistent discussion path initiated by the lecturer. There was not a greater number of postings for the experimental versus the second control condition but the content of the postings in the experimental condition was better linked from posting to posting. The students did not initiate discussions of their own, but

they did respond to the lecturer's content-based postings. While this is a positive outcome, it is unclear whether the preparation and follow-up work required by the lecturer to post weekly discussions is worthwhile. If simply comparing Lecturer A to Lecturer B's experimental condition, leads to the conclusion that the experiment was a success as there were many more postings. Yet, with the inclusion of the control condition from Lecturer B, it appears that the difference is a lecturer difference more so than an experimental one. Recommendations to Lecturer A, and other lecturers who have low participation in online discussions, may be to impose a structure similar to the experimental condition.

CONCLUSIONS

Taken together, this research provides insight into VLE courses. While they do not appear to be detrimental to the student's performance, altering the communication design of the module does not seem to enhance final module grade or student perceptions of the lecturer. All three conditions yield students with similar academic success rates.

Perceptions of lecturer communication behaviour is related to various factors, such as gender and culture. The findings on culture and gender yield interesting results. What surfaces as the most interesting result is the lack of consistent findings across communication behaviours. Research needs to be conducted to determine whether students do not pay much attention to the lecturer's behaviours and whether this varies based on the type of course (undergraduate, postgraduate). Research also needs to be carried out to assess how or if other aspects of enhanced communication, besides posting weekly discussion topics, appeals more to students and increases academic outcome. Finally, ways to increase motivation through enhanced communications need to be investigated.

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