

Student Perceptions of Asynchronous Computer-Mediated Communication in Face-to-Face Courses

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While there are many distance education studies of student satisfaction or perceptions of CMC, studies on residential student perceptions of CMC are rare. A paper survey was administered to 105 residential graduate and undergraduate students at a mid-western U.S. university. Results indicated that the majority of students preferred face-to-face discussion over CMC for most tasks; however, CMC was preferred overall for simple learning tasks. Content analyses of student responses to open-ended questions revealed that some students perceived face-to-face discussion to be faster, easier, and more convenient, while others perceived that CMC saves time and is more convenient. A discriminant analysis revealed several important factors that predicted those who preferred CMC for discussion. Students further commented that they would learn better from CMC if their instructors were more involved with and enthusiastic about CMC. Speed and convenience appear to be more important to students than whether discussion is face-to-face or CMC.

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Overview

Blended instruction is becoming more commonplace in higher education. Students not only attend classes, in which they meet face-to-face with each other and their instructors, they also communicate electronically outside of class meetings using course management tools such as WebCT, BlackBoard, Angel, and the like. There has been a considerable amount of research on human interaction and communication in online distance learning. However, there is a paucity of research on computer-mediated communication (CMC) in face-to-face courses. While there are many distance education studies of student satisfaction or perceptions of CMC, studies on residential student perceptions of CMC are rare.

The purpose of this study is to explore residential student perceptions of CMC in face-to-face courses with respect to their preferences, experiences, opinions, needs,

and problems. We focus on asynchronous CMC, such as e-mail communication or threaded discussion, in contrast to synchronous CMC (e.g., real-time chat). Furthermore, we examine whether students' experiences and perceptions are consistent with existing studies, focusing mainly on the fit between media and tasks.

Past Research on CMC and the Fit Between Media and Tasks

Computer-Mediated Communication

Media Richness Theory (Daft & Lengel, 1986) presents the idea that the degree of richness of a communication medium is dependent on the capacity of the medium to process ambiguous communication, and suggests that richer media are more effective for equivocal tasks, and leaner media are better for unequivocal tasks. According to the theory, face-to-face communication is considered to be the richest, while other media are thought to be leaner since they have fewer contextual cues and slower feedback compared to face-to-face (Daft & Lengel, 1986). With the advent of the Internet, CMC has been one of the most widely used communication modes, both synchronous and asynchronous. In educational settings, asynchronous communication remains dominant.

In comparison with face-to-face communication, a major disadvantage of text-based CMC is the lack of visual and auditory cues (Vrasidas & McIsaac, 2000). Body language or gestures can often convey important meanings. During class, an observant instructor can notice whether or not students understand from their facial expressions. CMC lacks such contextual cues.

The lack of richness of communication also seems to affect the time taken to complete communications or tasks in CMC. From a meta-analysis of eighteen CMC versus face-to-face studies, Bordia (1992) found that CMC groups took longer than face-to-face groups to complete the same tasks. Walther (1996) also noted that the main difference between face-to-face communication and CMC is communication speed. Moreover, text-based asynchronous CMC can be overwhelming to students who are expected to read and/or respond to large numbers of messages (Woolley, 1998). CMC can also be burdensome to instructors for the same reasons.

On the other hand, CMC has a number of advantages over face-to-face instructional settings. First, CMC is place and time independent (Harasim, 1990). In CMC, students can work in convenient places with highly flexible schedules. Second, when compared with face-to-face instruction, CMC provides students with more time to analyze and reflect on content and to compose thoughtful responses (Althaus, 1996). Third, CMC appears to enhance interaction between instructors and students (Kearsley, 2000). Sutton (2001) further claims that CMC in online learning has caused the shift from correspondence learning to social learning, increasing interaction with other students as well as with the instructor. Berge (1995) also contends that the goal of online discussion is to maximize interactions between and among instructors, students, contents, and interface, as well as to facilitate constructive thinking. Fourth, CMC enables students to take control of their learning and build

knowledge through interaction in a more decentralized and constructivist environment where the instructor becomes a coach rather than the main source of information (Vrasidas & McIsaac, 2000). In addition, CMC allows for self-paced learning (Vrasidas & McIsaac, 2000). Finally, CMC can provide a more comfortable environment and discussion opportunities for students who do not perform well in spontaneous face-to-face discussion because they are shy or because their native language is not English (Berge & Collins, 1993; Harasim, 1990; Leasure, Davis, & Thievon, 2000).

The Fit Between Media and Tasks

Many researchers have investigated the “fit” between communication media and task characteristics. While the fit between media and tasks has been studied mostly in business settings in order to improve work performance, it lacks empirical support in educational contexts.

As mentioned previously, according to Media Richness Theory (Daft & Lengel, 1986), *richer* media are more effective for equivocal tasks, and *leaner* media are better for unequivocal tasks. Equivocal tasks refer to ambiguous situations where there are multiple possible interpretations and solutions. Similarly, Rice (1992) suggested use of rich media for nonroutine, difficult tasks and lean media for routine, simple tasks. On the other hand, Dennis and Kinney (1998) have argued that media *per se* do not affect outcomes—including decision quality and satisfaction—at least for new media such as computers. They reported that richer media enable faster decision making regardless of task equivocality, and concluded that matching media richness and task equivocality does not improve performance. Despite conflicting findings, it appears to be worthwhile to explore the fit between media richness and task characteristics in an educational context.

DeSanctis and Monge (1999) claimed that computer-mediated communication is more effective than face-to-face communication for divergent tasks such as idea generation, while face-to-face communication is more effective for convergent tasks, such as decision making, which require interdependence on others. Archee (1993) found that face-to-face groups are better at decision making than CMC groups because they can more easily reach a consensus at the same time using immediate verbal and nonverbal feedback, while CMC groups are slower due to the lack of nonverbal feedback and to more uncertainty of others' reaction to their opinions. Straus and McGrath (1994) also contended that face-to-face communication is superior to CMC, especially for highly interdependent tasks.

Research Questions

The research questions guiding this study are as follows:

1. When compared to face-to-face discussion, do residential students feel comfortable in CMC? What are the factors that might affect perceived comfort with CMC in face-to-face courses?

2. When working on different types of tasks (ambiguous, unequivocal, complex, simple, decision-making, and idea generating tasks), do students prefer face-to-face discussion or CMC? Why?

Based on previous studies discussed above and Media Richness Theory, we hypothesized that students would prefer face-to-face discussion for equivocal tasks, complex or difficult tasks, and convergent or decision-making tasks, and that students would prefer CMC for unequivocal tasks, simple tasks, and divergent or idea generating tasks.

3. What CMC factors do residential students perceive as satisfactory or as frustrating?
4. What do residential students perceive as being needed for learning best from computer-mediated discussion?

Research Method

Participants

Residential students were selected in late November 2003 from those studying at the main campus library in a large midwestern university in the United States. Only those who said they had experience with computer-mediated discussion in face-to-face courses participated. This was a convenience sample, since students participated voluntarily. Undergraduate students comprised 53.4% (56 out of 105) of the sample, and 58.1% (61 out of 105) were male. The academic majors of the participants were diverse; they included education, business, mathematics, information science, music, law, psychology, and computer science. Demographic information on the sample is presented in Tables 1.1. to 1.3.

Based on known demographics for this campus, the sample we obtained somewhat underrepresented females and younger students.

Instrument

We developed a semistructured questionnaire that included four demographic questions, 15 Likert-scale questions, five multiple-choice questions, eight dichotomous

Tables 1.1–1.3 Student demographic information (% , N = 105)

1.1 Gender		1.2 Age		1.3 Year in School	
Female	41.9	18–20	19.0	Freshman	4.8
Male	58.1	21–23	34.3	Sophomore	7.6
		24–26	17.1	Junior	14.3
		27–29	8.6	Senior	26.7
		30–32	9.5	Graduate	41.9
		=> 33	11.5	Missing data	4.8

questions (six of which include open-ended questions), and one open-ended question. Students were asked about their: 1) perceptions of themselves as learners, 2) attitudes toward technology and CMC, 3) experiences with CMC, 4) media preference for different learning tasks, and 5) opinions and beliefs about CMC in face-to-face courses. The students took approximately 15 to 20 minutes to complete the questionnaire.

Data Collection and Analysis

The researcher and an assistant distributed the questionnaires to students who were willing to participate in the study. A total of 106 completed questionnaires were collected; one was discarded because it indicated that the student had no previous experience with CMC. We used descriptive statistics to analyze quantitative data generated by the dichotomous, multiple choice, and Likert-scale questions. We conducted a content analysis of qualitative student comments in the open-ended questions. For the content analysis of the qualitative data from the six open-ended questions (included in the dichotomous questions which asked the reason for preferring face-to-face discussion or CMC), we copied student responses into a word processor, sorted and grouped them, and labeled the major themes and categories that emerged. For the open-ended question (about perceptions of what is needed for learning best from computer-mediated discussion in a face-to-face course), we wrote individual comments on index cards, sorted and grouped the cards, and identified major categories that emerged.

Results

General Perceptions

Results from the Likert-scale items are presented in Table 2. Most of the students (79%) appeared to be comfortable with computer technology (agreed or strongly agreed with question 6), and 78% had convenient access to the Internet at home and 88.5% at school. About three fourths of the students believed that they were self-directed learners (73.3%). Nevertheless, only 55.2% of the students stated that they were comfortable with participating in computer-mediated discussion, and about 20% reported that they were uncomfortable with CMC.

There were significant positive correlations between perceived comfort with computer technology and perceived comfort with CMC ($r = .500, p < .01$), as well as between experience with CMC and perceived comfort with CMC ($r = .482, p < .01$). Students who were comfortable with computer technology and had more experience with CMC tended to feel more comfortable with CMC.

While 55.2% of the students strongly agreed or agreed that they were comfortable with participating in computer-mediated discussion (Q11), when compared to face-to-face discussion only 34.3% appeared to be more comfortable in CMC than face-to-face discussion (Q20, Table 3), and only 35.2% indicate that they are more active in CMC than face-to-face discussion (Q21, Table 3).

Table 2 Percent of respondents who strongly disagreed (SD), disagreed (D), were undecided (U), agreed (A), and strongly agreed (SA) with Likert-scale items on the survey (N = 105)

	SD	D	U	A	SA
5. I am a self-directed learner.	1.9	5.7	19.0	47.6	25.7
6. I am comfortable with computer technology.	1.9	6.7	12.4	35.2	43.8
7. I am experienced with computer-mediated discussion.	7.6	22.9	11.4	35.2	22.9
8. I am shy when I speak in front of class.	11.4	30.5	26.7	21.9	9.5
9. I learn a great deal from discussion with classmates.	7.6	9.5	34.3	40.0	8.6
10. I prefer working with others to working alone.	18.1	25.7	27.6	17.1	11.4
11. I feel comfortable with participating in computer-mediated discussion.	2.9	17.1	24.8	35.2	20.0
12. I have convenient access to the Internet at home.	11.4	6.7	3.8	19.0	59.0
13. I have convenient access to the Internet at school.	1.9	1.0	8.6	15.2	73.3
14. I feel that computer-mediated discussion is very useful for learning.	1.0	11.4	41.0	35.2	11.4
15. From my experiences, students who dominate face-to-face discussion also dominate computer-mediated discussion.	2.9	19.0	50.5	20.0	5.7
16. Computer-mediated discussion is more effective when the instructor participates in the discussion.	2.9	14.3	39.0	30.5	13.3
17. Computer-mediated discussion is more effective when the instructor provides feedback on the discussion by making comments or correcting some information.	1.0	10.5	21.9	41.9	23.8
18. I participate in computer-mediated discussion more actively when the instructor sets some rules such as "Post your opinions at least five times each week."	5.7	10.5	34.3	29.5	17.1
19. I participate in computer-mediated discussion more actively when other students are active.	5.7	11.4	22.9	42.9	15.2

The Fit Between Communication Media and Tasks

For an ambiguous learning task (Q25), 74.3% of the students preferred face-to-face discussion to computer-mediated discussion. Students commented that they preferred face-to-face discussion for ambiguous tasks mainly because it is easier to clarify things through immediate questions and answers. They also pointed out that it is "faster" because they do not have to type all questions and opinions, which might be a considerable amount in the case of ambiguous tasks. Typical comments included:

- Communication would be clearer.
- I can get clear answers from other members in person.
- Discussion would take a shorter amount of time.
- I do not want to type all questions.

Table 3 Student preferences for F2F (Face-to-Face) vs. computer-mediated communication (CMC) (% , N = 105)

	F2F	CMC	Both	None
20. I am more comfortable in:	65.7	34.3		
21. I am more active in:	63.8	35.2		1.0

For a clearly defined or unequivocal learning task (Q24), 58.1% preferred face-to-face discussion to computer-mediated discussion. More than half of the students appeared to believe that face-to-face discussion (richer media) is “faster,” “easier,” and “more convenient” for clearly defined learning tasks (or problems/projects). It seems that efficiency and convenience of communication is perceived as more important for unequivocal tasks, while directness and immediacy of communication is valued for equivocal tasks. On the other hand, the 38.1% of students who preferred computer-mediated discussion for an unequivocal learning task suggested different reasons. They stated that they can “save time and energy” because they “do not need to meet” and can work with a flexible schedule. We noted that some students perceived face-to-face discussion as more efficient and convenient while others thought CMC was more efficient and convenient.

For complex or very difficult learning content (Q26), 82.9% of the students preferred face-to-face discussion to computer-mediated discussion. Some students commented that they preferred face-to-face discussion for complex content because it is “faster” and “easier” and also because they “can ask questions instantly” and “get immediate feedback” and “clear explanations and examples.” They also mentioned that they can figure out difficult points with their instructors nearby and discuss with other students efficiently face-to-face. It was further noted that nonverbal cues help them understand content better and reduce misunderstanding. Comments included:

- Communication about complex issues is easier and faster face-to-face.
- Can be explained better and faster.
- Immediate feedback for clarification.
- It’s easier when I clear things up with discussing directly with other people.
- I can ask questions instantly.
- You can see body language.
- I need body language or something to show.

For simple learning content (Q27), 59% preferred computer-mediated discussion to face-to-face discussion. The students who preferred computer-mediated discussion for simple learning content appeared to believe that it is “faster” and “saves time” when the content is so simple that they do not need to interact among themselves directly to understand it. They also commented that they preferred CMC for simple learning content because they do not need to coordinate schedules to meet face-to-face and can work wherever convenient. The 40% of the students who

Table 4 Student perception of the fit between tasks and media (% , N = 105)

	F2F	CMC	Both	None
22. If I engage in brainstorming to generate a number or ideas for a project, I would prefer:	73.3	25.7	1.0	
23. If I need to make a decision with my group members, I would prefer:	81.9	15.2	1.9	1.0
24. If I work on a clearly defined learning task, I would prefer:	58.1	38.1	2.9	1.0
25. If I work on an ambiguous learning task, which has no right answer, I would prefer:	74.3	24.8	1.0	
26. If I discuss complex or very difficult content, I would prefer:	82.9	14.3	1.9	1.0
27. If I discuss simple content, I would prefer:	40.0	59.0		1.0

preferred face-to-face discussion for simple content, on the other hand, contended that it is faster and saves time because they do not have to type.

For decision-making tasks (Q23), 82.9% preferred face-to-face discussion to computer-mediated discussion. The students who preferred face-to-face discussion for decision-making tasks commented that it is “faster” and “easier” to make a decision face-to-face, since they “can get instant feedback” and are all “on the same page.” In addition, they noted that direct interaction and verbal and nonverbal cues help reduce misunderstanding. For decision-making tasks that involve integrating different opinions, rich media with direct and immediate feedback appeared to be preferred. Comments included:

- It's faster.
- Immediate feedback can integrate ideas quickly.
- You can read people's opinions more easily.
- Decisions are better made when I can read body language.
- I can read people's faces sometimes better than their words, and can better use their face-to-face responses to help me form an opinion and reach consensus.

For idea-generating tasks such as brainstorming (Q22), 73.3% of the students preferred face-to-face discussion to computer-mediated discussion. Students appeared to prefer face-to-face discussion for idea-generating tasks mainly because they “can get immediate feedback.” Receiving instant feedback on an idea seems very important in idea-generating tasks. They also stated that face-to-face discussion is “faster” and “easier” for brainstorming. It was also noted that they can generate more ideas through collaboration and that even incomplete ideas that people present can be useful in building new ideas, whereas these are not available in CMC.

The immediate feedback and body language further stimulate new ideas. Typical comments included:

- It is faster and easier to toss ideas back and forth.
- There is no delay in feedback from group members & instructor. It facilitates collaboration in the development of an idea.

- Face-to-face brainstorming allows thinking out loud and responding to comments and half-ideas that people present, as well as their attitude.
- Spontaneous collaborative thinking happens face-to-face more quickly and more dynamically.

CMC Factors Perceived as Satisfactory or Frustrating

Student responses indicated that CMC is preferred mainly because it saves time and energy that might be spent in face-to-face meetings and because it provides more time to reflect and develop ideas. Students also commented that CMC allows a flexible work schedule, out-of-class cooperation, outside research, and seeing diverse ideas in writing. In addition, some people noted that CMC enables people who are shy in face-to-face discussion or are not fluent in English to engage in discussion more actively.

On the other hand, students appeared to be frustrated with CMC because it takes too much time to type and complete a discussion and to follow long threads, which are sometimes overwhelming. In addition, some of them reported that they are not comfortable with CMC and are hindered by technology problems. Others mentioned that CMC often becomes extra work when there is a lack of participation by other students. The impersonal nature of CMC and lack of nonverbal language were also noted.

Needs and Expectations

Based on the students' responses to the open-ended question that asked what might help them learn best from computer-mediated discussion, the role of instructors appeared to be most critical in improving and supporting CMC in face-to-face courses. Students reported that if their instructors a) have an enthusiastic attitude toward CMC, b) select appropriate topics, c) provide guidance and structure for discussion, d) regularly participate in the discussion, e) provide immediate feedback, and f) give appropriate credit towards their course grade for participating in CMC, it would help them learn better from CMC. Students' own willingness and motivation to discuss and learn, classmates' commitment and active participation, and high quality postings were also mentioned as factors facilitating CMC. Some students suggested that they should engage in CMC during class time if it is useful, rather than doing this as extra work outside of class. Others mentioned that they would be willing to have more experience with CMC even though their instructors did not encourage it. Students also indicated a need for visual aids, not just text, and better technology with increased speed.

Further Data Exploration with Factor Analyses

To see how responses to the Likert-scale and discrete-choice (face-to-face vs. CMC) items were clustered, we conducted factor analyses (image method with varimax rotation). The image method of factor extraction "distributes among factors the

variance of an observed variable that is *reflected* by the other variables . . . and provides a mathematically unique solution” (Tabachnick & Fidell, 2001, p. 612). Unique and error variance are excluded, since it is the image scores (predicted via multiple regression from other variables in the set) that are used in the covariance matrix from which factors are extracted. The net effect of this is to help prevent spurious results that can be affected by a few extreme cases (e.g., outliers) when sample sizes are not large.

First, the Likert-scale questions were factor analyzed (items 5–19). Two clear factors emerged: 1) Experience and positive attitude in working with computers and CMC technologies (items 6, 7, 11, 5, 14, and 19), and 2) CMC is more effective when instructors participate and provide feedback (Items 16 and 17). The mean for Scale 1 was 3.7 (SD = .72), with Cronbach alpha coefficient of reliability of 0.772. The Scale 2 mean was 3.6 (SD = .89), with an alpha of 0.794. Thus, students tended to agree that they were experienced and comfortable working with CMC, and that CMC is more effective when instructors participate actively and provide feedback.

Next, the items concerning preferences for face-to-face vs. CMC were factor analyzed (items 20–27). Two clear factors emerged here. Scale 3 consisted of items 25 and 22, and was interpreted as “Preference for discussion setting when tasks are divergent.” The mean for Scale 3 was 0.25 (SD = .36) with an alpha reliability coefficient of 0.955. Since face-to-face setting was coded as zero and CMC as one, this scale mean indicates that students believe that the face-to-face setting is preferred more often for divergent tasks that are ambiguous or involve brainstorming. Scale 4 consisted of items 21 and 20, and was interpreted as “Comfort and activity in class discussions.” The mean for Scale 4 was 0.35 (SD = .44), with an alpha coefficient of 0.812. Thus, students reported that they tend to be more comfortable and active overall in face-to-face discussions than in CMC discussions.

Pearson product moment correlations were run for the four scales. Scales 1 and 2 were significantly correlated ($r = 0.348$, $p < .01$). This means that students who reported that they were more experienced and comfortable with CMC also were more likely to believe that CMC is more effective when instructors participate actively in online discussions. There was also a significant positive, although relatively small, correlation between Scales 1 and 3 ($r = 0.212$, $p < .05$). This means that students who reported that they were more comfortable with CMC also reported that they were more likely to be more comfortable and active in CMC as compared to face-to-face discussion settings (CMC was coded as 1, face-to-face as 0).

Discriminant Analysis: What Predicts More Comfort With and Activity in CMC?

The subject pool was divided into two groups depending on how students responded to questions 20 and 21. If a subject reported that she or he was *both* more comfortable with CMC *and* more active in CMC, then she or he was placed into Group 1 (CMC clearly preferred, $n = 29$); if face-to-face was clearly preferred, she or he was placed into Group 0 ($n = 60$). It should be noted that responses to items 20 and 21 were highly correlated ($r = 0.634$, $p < .0005$); there were only 15 subjects out of 104

who were more comfortable with CMC but were less active with CMC, or vice versa, i.e., more comfortable with one but more active with the other. These 15 subjects were not included in the discriminant analysis, since these group memberships were small (8 and 7 subjects, respectively).

The discriminant analysis utilized a step-wise method of entry of factors identified above (excluding Scale 4 items, which were used to form the groups), and included all remaining items on the survey from the Likert scales and from the preferences of face-to-face or CMC for learning tasks (discrete choice items). The criterion for entry into the discriminant function was $p < 0.05$ for F , and for removal $p > 0.10$. The results indicated five variables that maximized prediction of group membership (standardized canonical discriminant function coefficients are in brackets):

- a) Preference for CMC with divergent tasks (Scale 3, brainstorming and ambiguous tasks) [0.635],
- b) Comfort with computer and CMC technologies and being self-directed (Scale 1) [0.609],
- c) I am shy when I speak in front of the class (Item 8) [0.416],
- d) I participate in computer-mediated discussion more actively when the instructor sets some rules such as "Post your opinions as least five times each week." (Item 18) [0.382],
- e) Preference for CMC with simple tasks (Item 27) [0.365].

This discriminant function was highly significant (Wilks' Lambda = 0.599, chi-square = 39.68, $df = 5$, $p < 0.0005$). This function indicates that students are more likely to be in the group that is more comfortable and active with CMC (Group 1) when they prefer CMC for divergent tasks (that are ambiguous or involve brainstorming—Scale 3), when they are more comfortable/experienced with computer and CMC technologies and are self-directed learners (Scale 1), when they are more likely to agree that they are shy when speaking in front of the class, when their instructor sets rules for CMC participation, and when they prefer CMC for simple tasks. The group that is more comfortable and active in face-to-face discussions (Group 0) prefers face-to-face for divergent tasks, is less comfortable/experienced with computer and CMC technologies and less self-directed, is less shy in speaking in front of class, less active in CMC when instructors have set rules for participation, and prefers face-to-face for simple tasks.

Discussion and Conclusion

Face-to-face Discussion vs. CMC

Descriptive statistics from this study indicated that residential students overall generally preferred face-to-face discussion to CMC, even though they reported that they were generally comfortable with computer technology, had experience with CMC,

and had convenient access to the Internet. Furthermore, students reported that face-to-face communication is faster, easier, and more convenient than CMC (which allows for working at convenient places with flexible schedules). These findings suggest that potential advantages of CMC are not being well utilized in the educational context at this campus.

Although about two out of three students preferred face-to-face discussion overall, the proportion of students who were more comfortable with CMC (34.3%) and who were more active in CMC (35.2%) should not be neglected. The discriminant analysis identified five factors in this study that significantly predicted membership in the group who preferred CMC over face-to-face discussion—i.e., those who were more comfortable with and active in CMC. In contrast to the face-to-face group, the CMC group preferred CMC for divergent tasks—both equivocal and brainstorming tasks. Students in the CMC group were also more likely to rate themselves more highly on Scale 1 in this study. A factor analysis resulted in Scale 1, which indicated comfort with and experience in using computer and CMC technologies, as well as being a self-directed learner. Students in the CMC group were more likely to rate themselves higher on shyness in speaking in front of the class. Those students were also more likely to agree that they participated more actively in CMC when their instructors set rules for their class, such as making five postings weekly. Finally, the CMC group preferred CMC for simple tasks.

Thus, while the majority of students indicated that they were more comfortable in face-to-face discussions and were more active in them, there is a significant minority—about one out of three—who report that they are more comfortable and active in CMC. These students appear to be more technology savvy, more self-directed, more shy in speaking in front of groups, and would rather use CMC for brainstorming, equivocal, and simple tasks. In particular, CMC can support students who prefer speaking in a more thoughtful way after exploring their own ideas, rather than devising quick responses or questions (Althaus, 1996).

Efficiency and Convenience Matter More to Students

Student responses to open-ended questions revealed that some students perceived that face-to-face discussion is faster, easier, and more convenient, while others perceived that CMC saves time and is more convenient. This implies that students value speed, ease of participation, and convenience in learning activities. Apparently these factors are more important to these students than whether discussion is face-to-face or CMC.

Media and Task Fit

According to Media Richness Theory (Daft & Lengel, 1986) and other similar studies (Archee, 1993; DeSanctis & Monge, 1999; Straus & McGrath, 1994), face-to-face discussion is more effective for equivocal, convergent, and complex tasks, and CMC for unequivocal, divergent, and simple tasks. We expected that students would prefer

face-to-face discussion for equivocal, decision making, and complex tasks, and that they would prefer CMC for unequivocal, idea generating, and simple tasks. However, the results from our study indicated that students primarily preferred face-to-face discussion to CMC for almost all kinds of tasks, except for simple tasks. Based on the analysis of student responses, we found that students prefer face-to-face communication for tasks for which students need immediate clarification, explanation, and examples. In addition, face-to-face communication appears to be preferable when students need to generate new ideas. Apparently, direct communication stimulates new ideas and helps develop partial ideas by allowing for listening to others think aloud and for spontaneous collaborative thinking.

It should be noted, however, that students may not prefer what is best for them, i.e., what is most effective for learning. Our findings do not necessarily contradict Media Richness Theory, since we did not measure actual effectiveness but rather student perceptions and preferences.

Conclusion

Our findings indicate that, in general, students hold different values for different tasks. For example, students emphasized speed, ease, and convenience for unequivocal tasks, and directness and immediacy of communication for equivocal tasks. Our findings also suggest a profile for students who prefer CMC over face-to-face discussion; these students constituted about one-third of our sample.

Classroom instructors should note that students believe that CMC will be more effective if instructors use it themselves and if there are practical consequences to students themselves. "Just because it's there" is not a good reason to use CMC. This is consistent with focus group findings by Frick (1996), who provides a critical question for instructors to ask themselves: "What can we do with information technology that *could not be done without it* to help students learn?" (n.p., emphasis added).

Limitations

This study was based on self-reported perceptions by students, rather than direct observation of their behavior in face-to-face or computer-mediated communication settings. What students say they prefer may not correlate with what preferences might be inferred by observing their actual choices. Moreover, what students prefer does not imply learning effectiveness or efficiency. For example, Raskin (2000) points out that computer interfaces that users prefer are not necessarily those that they are best at using in terms of reduction of errors and speed in task completion. While Raskin's observation is in another field of study, it nonetheless illustrates the issue.

The sample obtained in this study underrepresented females and younger students on this particular campus. Whether the same results would be replicated in a more representative sample or at other institutions is unknown. Thus, we should be cautious about making generalizations from this study alone.

Future Research

Further studies might consider the investigation of student perceptions of *synchronous* CMC, since the use of synchronous media such as MSN or AOL Messenger (instant messaging) appears to be increasing outside of formal learning settings. It would be interesting to see how students feel about synchronous CMC and using this genre of tools for more formal learning activities. Another option would be to explore student feelings about the use of cell phones and teleconferencing with cell phones. Many students these days walk around campus talking on their cell phones.

Second, future studies could examine actual student performance with concrete learning tasks, not perceptions or preferences, in order to see whether these are consistent with learning effectiveness. For example, researchers might explore whether students actually perform routine, simple tasks better through CMC than in face-to-face settings.

Finally, it is worthwhile to explore nonresidential students' perceptions of CMC in terms of what is convenient and easy. Since the predominant reason for the face-to-face communication preference was ease and convenience, it would be interesting to see if online learners have a different sense of what is convenient and easy.

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