

Divided by a common degree program? Profiling online and face-to-face information science students

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This study examines profiles of online and face-to-face students in a single information science school: the University of Wisconsin-Milwaukee School of Information Studies. A questionnaire was administered to 76 students enrolled in online course sections and 72 students enrolled in face-to-face course sections. The questionnaire examined student capabilities in four areas associated with success in distance education. These are: basic communication skills and access to the Internet, motivational styles, preferences for individual vs. group work, time management issues, and attitudes toward online education. Online students were more comfortable than face-to-face students communicating electronically, had better access to the Internet, and reported better typing skills. Face-to-face students reported themselves to be more reliant on class participation to stimulate their interest in a class, and were more favorably disposed to group exercises. Online students were very much more likely than face-to-face students within the same institution and degree program to believe that online education was of comparable quality to face-to-face education.

Keywords: Library and Information Science online education, Library and Information Science distance education, pre-entry variables, learner characteristics, self efficacy

1. Introduction and Background of the Study

Online education is the subject of a well established and rapidly growing body of scholarly research. While in the US interest in the general field of distance education goes back to the 1950s and 1960s [5], the recent proliferation of online degree programs offered entirely over the Internet has been accompanied by a corresponding surge in academic investigation of online teaching [33]. For the purposes of this study, a course is considered “online” if students ordinarily interact with its instructor entirely through the Internet and other computer networks, rather than the traditional face-to-face contact in lecture halls, seminar rooms or faculty offices.

The online education pioneers of the 1990s quickly discovered that creating a successful online degree program posed many challenges. Online students experienced far higher attrition rates than their face-to-face counterparts [21,36,48], finding it hard to develop the study habits and rhythms necessary to succeed [20]. Instructors struggled to develop a rapport with online students, discovering that it took far more

time and effort to provide personalized support and guidance in the online environment [17]. Prospective students and employers expressed skepticism as to the worth of an online degree [7]. Critics even suggested that online degree programs were little more than glorified diploma mills, or at best correspondence courses with a snazzy new image [30,47]. Some of the most expensive and well publicized efforts to provide online professional degrees, launched by prestigious institutions such as Columbia University, New York University, and a collation of Oxford, Yale and Stanford, endured rapid and humiliating failures [28].

Despite these problems, online education has established a secure and rapidly expanding niche. According to a Distance Education issued in 2003 by the US Department of Education, fifty six percent of all 2- and 4-year degree-granting institutions offered online education courses. The Library and Information Science field has been an enthusiastic adopter of online education over the past decade. A 2000 report already identified nine fully online LIS degree programs worldwide [44]. By 2006 the American Library Association (ALA) reported that twenty ALA accredited schools in the United States and Canada allowed students to earn MLIS degrees entirely online, with twenty-five of the remaining thirty-six schools offering some online courses for credit toward the degree [1]. Online LIS education is well established in Canada [8] and Australia [18], is offered by several British institutions [37, 40], and has been established in South East Asia [4] and is growing rapidly in South Africa [29].

Many academic studies of online education support what is often called the “no significant difference” hypothesis, that the measured outcomes of online courses, in terms of knowledge and skills acquired, cannot be distinguished from those of comparable face-to-face courses [15,38] (though others argue that real differences have been shown in education outcomes [49]). Universities now provide more attention to the social environments of online education, establishing mechanisms to socialize students into the school’s culture [19], requiring attendance at face-to-face “boot camps” [32], creating online communities to encourage fraternization between students [24], and enhancing mentoring and support services [23]. Meanwhile broadband Internet connections have become the norm for online students and instructional platforms such as WebCT, Blackboard and DesireToLearn have matured.

Online education is now a very important part of most LIS schools, but research suggests that online education is not suited to all students. Attrition rates in online education remain high – for example just four percent of online students at the for-profit University of Phoenix obtain degrees within six years [10]. While this is an extreme example, it confirms that online education is no panacea and that many students who are attracted to the idea of earning a degree online lack the skills and abilities necessary to successfully attain this goal. This directed our attention to the factors that distinguish those students likely to succeed in the online environment from their less successful classmates. Zhao et al. in their thorough review of the online education literature concluded that these issues concerning the demographics, preparation and skills of online students were of vital importance in

establishing success factors for online students, noting that although “some learners may be more able to take advantage of distance education than others . . .” the current literature gave few clues here because studies omitted crucial information on “learner characteristics, such as gender, study habits, learning styles, learning environment, access to resources, experiences with distance learning, and technology proficiency.” ([49, p. 1864]). This study aims to begin to fill that gap.

2. Purpose

A well established body of research within the education literature has explored the idea of “learning styles,” essentially the concept that individual students have predispositions (whether innate or culturally constructed) toward specific instructional methods [22,26,41]. Problems faced by early online education efforts caused investigators to hypothesize that the online environment favored certain learning styles over others, and hence that online education was most suited to students who would naturally prefer those styles of learning for example (individual vs. group work). This led to a number of studies exploring the learning styles of online students. Learning styles could be more crucial in online education than in traditional class settings, because online learners have much more autonomy and, therefore, responsibility for structuring their own learning. Previous research found that online education students often live too far from campus to attend on campus courses [46]. Postsecondary online education students are more likely to be female, married or divorced, older, with intensive work and family responsibilities [16,43].

This study surveys online and face-to-face students to determine their self-reported skills and attitudes in four distinct areas associated with success in online education. This study examines whether online and face-to-face student cohorts enrolled in the same degree program at the same institution differ significantly in their self-reported skills and attitudes with respect to these four success factors. This information is particularly useful in determining whether schools are successful in recruiting an online student body well-suited for success, and in steering students toward the instructional format best suited for their particular background, work habits, and attitudes.

The first of these is conceptualized here as “Basic communication skills and access to the Internet.” The importance of this topic is well established in the existing literature. Factors identified as contributing to student retention in the online environment include their existing computer skills (particularly Internet searching and online applications) [11,12,14], age, prior familiarity with higher education [35, 50], and years of computer use [25].

The second success factor is conceptualized as a preference for individual rather than group work. This factor is also well established in the literature. Successful online learners tend to be independent and rely less on external stimuli or group interactions [9].

The third success factor is conceptualized here as “Time management skills.” Students with inadequate time management and study skills tend to procrastinate and perform poorly in online classes [26,45].

The final success factor is conceptualized here as “Attitude Toward Online Education.” The importance of the placebo effect is well established in medical research: patients who believe themselves to be receiving a powerful medicine often report improvements in their condition even if the drug is merely a sugar pill decoy. Likewise, students with faith in the potential of online education may not only be more likely to take courses online but also more likely to invest the time and energy necessary to succeed in the online environment. While this factor is not well established in the existing literature, I include it here in case it emerges as important in later studies.

3. Method

A survey was conducted of face-to-face and online students in the MLIS and undergraduate programs at the School of Information Studies (SOIS) of the University of Wisconsin-Milwaukee (UWM). Students were asked a set of questions focused on attitudes and habits directly related to the differences between online and face-to-face education. These questions concerned self assessment of basic communication skills, access to the Internet, preferences for individual work versus group work, ability to work independently, time management abilities, and attitudes toward online education.

Respondents came from two distinct populations, analyzed separately. The first population consisted of online and face-to-face students in the school’s Master of Library and Information Science program. The second population consisted of online and face-to-face students in the school’s Bachelor of Science in Information Resources program, an undergraduate information systems degree.

UWM’s School of Information Studies provides an excellent site in which to compare online and face-to-face student populations, because it offers mature and successful degree programs in each format. The UWM School of Information Studies was a pioneer in online information science education. It offered its first online course in 1994 (in a hybrid format), and launched a full online education in 1999, allowing students to complete all required courses without a residency requirement [3,13]. Hybrid courses consist of limited number of face-to-face meetings, supplemented by online materials and online interactions. Currently the UWM SOIS MLIS program enrolls over 300 students, more than half of whom are enrolled in the online MLIS program. Many of the online students are attracted by the convenience of the format, which allows them the temporal flexibility to combine study with professional or domestic duties and the geographic flexibility to live outside easy commuting range of an accredited library school. The SOIS undergraduate major, leading to a Bachelor’s of Science in Information Resources, has included online teaching since 1999. More than 150 students are pursuing this major. Most of the required undergraduate

courses are frequently offered in both online and face-to-face formats, but this is not promoted as an entirely online degree program (in part because of the difficulty in satisfying the wide range of courses outside the major demanded of undergraduates by university requirements). Undergraduate online students usually take some face-to-face courses. Because of the difference in age, preparation, interests and subject matter between the graduate and undergraduate students these have been treated as two distinct populations here.

Online and face-to-face course sections generally both last for an entire semester and courses are designed to impart the same skills and knowledge in each format. While standard syllabi exist for all courses, in practice individual instructors often develop their own course material. The expectation is that assignments, lectures and techniques used to accomplish this will differ substantially between online and face-to-face sections. For face-to-face sections the total in-class time was 3 hours a week. Graduate classes met once a week, undergraduate classes usually meet twice. Online courses in the school are delivered using Desire2Learn, a leading commercial course management system. All the class sections surveyed made use of Desire2Learn's ability to post course materials online, host threaded asynchronous discussion forums, create electronic drop boxes for student work, and distribute grades and feedback to students. Many instructors also used live (synchronous) text or video chats and posted video lectures or PowerPoint presentations with audio commentaries.

For the pilot study, to pretest the survey instrument, 80 responses were gathered in Spring 2005 and Fall 2005. A pilot study suggested that users found systems which reject incomplete responses to be frustrating, and were likely to avoid using them voluntarily. Consequently, no attempt was made to enforce mandatory fields in the main study. Respondents provided feedback though comments with their responses and a focus group session held with face-to-face students. As a result of the pilot study additional demographic information was included and several redundant questions removed.

The main study was conducted at the end of the Spring 2006 semester. The survey was distributed to 175 students, with 152 received responses, a response rate of 86%. The classes surveyed were face-to-face and online sections of the Online Information Retrieval, Multimedia Application Development, and Database Information Retrieval Systems at the undergraduate level; and Knowledge Management, and Introduction to Reference Services and Resources at the graduate level.

The survey was completely web based. The URL address of the survey page was distributed via email to the students enrolled in specific classes. The respondent was free to fill in as few or as many fields as he or she wished. Responses with more than 6 unfilled items were treated as missing data, and were not included in the analysis. A total of 3 responses were excluded from the sample for this reason. Students enrolled in several of the included classes were asked to complete the survey only once. Students were coded as online or face-to-face according to the method of delivery of

the specific course section.¹ To complete the entire survey took approximately 15 minutes. Once the respondent clicked the “submit” button, the information he or she filled out was inserted into a results table stored in a Microsoft SQL Server database. Once all responses were collected, the data was transferred to statistical software for analysis.

The survey instrument was generated dynamically for each respondent via a custom PHP script, including the same questions each time but with the order of questions inside each main section randomized to eliminate bias caused by question ordering. While this did not eliminate the possibility of respondent fatigue, it substantially improved the validity of the survey by turning this fatigue from a source of bias into a source of noise spread evenly over all questions.

Although the order of questions was randomized, they can be separated into several logical groups. As discussed earlier, this research was guided by examination of existing research to identify pre-entry student characteristics associated with success in online learning. Some of the specific questions used within these areas were suggested by a review of the many on-line “self assessment quizzes” used by educational institutions to help students determine for themselves whether they might have the ability to succeed in an online environment [6,31,34,39,42], many of which appear to be based on [27]. Most of the questions require students to make a measure of self efficacy in a particular area [25]. Each student provided information about level of study (graduate or undergraduate) and which delivery method the respondent had used to take the course in question: on-site or online. Students also provided demographic information, which is not reported here for reasons of space but may be used in subsequent analysis. Personally identifying information was not collected.

Because responses to a Likert scale should be treated as ordinal rather than continuous data this analysis relies on median values and non-parametric significance tests rather than mean values and parametric significance tests.²

¹Some students mixed online and face-to-face classes during the course of their studies, a practice common among the undergraduates and rare among the graduate students. It is likely that some of the students surveyed were taking courses in both formats. In this case whether the student was counted as face-to-face or online would depend on factors such as which courses the student took during Spring 2006, or whether the student first encountered the questionnaire in an online or face-to-face course. But a student’s likelihood of first encountering the questionnaire in an online course, and hence of being classified as an online student in this study, would increase in direct proportion to the number of courses he or she took online. Hence this method poses no systematic threat to the validity of the results.

²The consensus among statistical experts is that Likert scale data cannot responsibly be converted to a continuous numerical scale for analysis. Doing so would rest on the assumption that the Likert scale produces an “interval variable” in which the intervals between possible responses are of constant size (for example that the difference between “Agree strongly” and “Agree” is exactly the same as the difference between “Disagree Somewhat” and “Disagree”). In addition, the most commonly used statistical tests (including the t-test) assume a normal distribution, which is rarely achieved in survey data based in a Likert scale. Instead, we treat the data produced by the survey instrument as ordinal: meaning that the responses on the scale have an unambiguous order but cannot otherwise be placed on a continuous scale.

Table 1
Questions included in the survey, grouped by success factor

Success Factor	Question
Area 1: Basic communication skills and access to the Internet.	I have good typing skills
	I am comfortable with written communication
	I need assistance to understand the text I read
	I am comfortable communicating electronically
Area 2: Ability to work independently.	I am able to easily access the Internet as needed for my studies
	I am able to work independently
	I am self-motivated and self-disciplined
	I work better in groups
	I need the stimulation of class participation
	I can get motivated if I push myself
Area 3: Time Management Skills	I can usually figure out what to do in an assignment by reading and following instructions
	I rarely ask for help even when I need it
	I am comfortable approaching the instructor for assistance
	I put things off until the last minute
Area 4: Attitude Toward Online Education	I need reminding to get things done on time
	I am able to get things done on time
	I am willing to dedicate 8 to 10 hours per week per course for my studies
	I feel that online learning is of at least equal quality to traditional classroom learning

Table 2
Summary of respondents

	Online		Face-to-face	
Graduate	43	56.6%	26	36.1%
Undergraduate	33	43.4%	46	63.9%
Total	76	100%	72	100%

4. Results

The distribution of graduate vs. undergraduate and face to face vs. online students is shown in Table 2.

This section presents summary results for both populations (graduate and undergraduate information science students). It lists the median answer for each of the 18 questions, any observed differences between the median results for online and face-to-face students, and a measure of the statistical significance of this difference. For each of the six questions for which significant differences between online and face-to-face students were found, it includes bar charts showing the distribution of responses for members of each population and a short discussion of the results.

Tables 3 and 4 include an estimate of the statistical significance of the differences between the answers given by online and face to face students. Differences are tested

Table 3
Graduate student responses with online/face-to-face differences

Question	Median Answer	Face-to-face vs. Online	Signif. Estimate $p =$
I am able to easily access the Internet as needed for my studies	Agree Strongly	Online higher*	0.03
I am comfortable communicating electronically	Agree	Online higher**	0.002
I am willing to dedicate 8 to 10 hours per week per course for my studies	Agree	No difference	0.61
I feel that online learning is of at least equal quality to traditional classroom learning	Agree Somewhat	Online higher**	< 0.0001
I am comfortable with written communication	Agree	Online higher	0.29
I am able to work independently	Agree Strongly	Online higher	0.56
I am able to get things done on time	Agree	No difference	0.85
I put things off until the last minute	Agree Somewhat	Face-to-face higher	0.25
I can usually figure out what to do in an assignment by reading and following instructions	Agree	Online higher	0.12
I need the stimulation of class participation	Agree Somewhat	Face-to-face higher**	0.0008
I work better in groups	Disagree Somewhat	Face-to-face higher	0.06
I need reminding to get things done on time	Disagree Somewhat	No difference	0.55
I need assistance to understand the text I read	Disagree Somewhat	No difference	0.76
I am comfortable approaching the instructor for assistance	Agree	No difference	0.99
I rarely ask for help even when I need it	Disagree Somewhat	No difference	0.36
I have good typing skills	Agree	Online higher*	0.01
I am self-motivated and self-disciplined	Agree	Online higher	0.25
I can get motivated if I push myself	Agree	Online higher	0.25

*Indicates significance at the 0.05 level. **Indicates significance at the 0.01 level.

using the log likelihood ratio Chi square significance test. Like the better known Pearson's Chi square test, the log likelihood ratio Chi square works by testing the hypothesis that there is no association of columns and rows in tabular data. However, Pearson's test is not reliable when some cells in the table hold fewer than five responses, which is frequently the case with this data. As a result, the log likelihood version of Chi square should give more accurate estimates.

Significant results are discussed below in detail. In general, Table 3 shows that the online graduate students appear more self motivated, are less attached to group work and class participation, are more confident in their typing, writing and online communication skills, have better internet access, and hold a much higher opinion of online education.

Significant results are discussed below in detail. Table 4 shows that online under-

Table 4
Undergraduate student responses with online/face-to-face differences

	Median Answer	Face-to-face vs. Online	Signif. Estimate $p =$
I am able to easily access the Internet as needed for my studies	Agree	No difference	0.45
I am comfortable communicating electronically	Agree	Online higher	0.34
I am willing to dedicate 8 to 10 hours per week per course for my studies	Agree Somewhat	Online higher	0.14
I feel that online learning is of at least equal quality to traditional classroom learning	Agree Somewhat	Online higher**	< 0.0001
I am comfortable with written communication	Agree	Online higher	0.07
I am able to work independently	Agree	Online higher	0.32
I am able to get things done on time	Agree	Online higher	0.38
I put things off until the last minute	Agree Somewhat	Face-to-face higher	0.12
I can usually figure out what to do in an assignment by reading and following instructions	Agree Somewhat	No difference	0.67
I need the stimulation of class participation	Agree Somewhat	Face-to-face higher*	0.02
I work better in groups	Disagree Somewhat	Face-to-face higher	0.08
I need reminding to get things done on time	Disagree	No difference	0.92
I need assistance to understand the text I read	Disagree Somewhat	No difference	0.29
I am comfortable approaching instructor for assistance	Agree	No difference	0.31
I rarely ask for help even when I need it	Disagree Somewhat	No difference	0.52
I have good typing skills	Agree	No difference	0.41
I am self-motivated and self-disciplined	Agree	Online higher	0.13
I can get motivated if I push myself	Agree	Online higher	0.21

*Indicates significance at the 0.05 level. **Indicates significance at the 0.01 level.

graduate students follow the same pattern as graduate students: they appear more self motivated, are less attached to group work and class participation, are more confident in their typing, written and online communication skills, and hold a much higher opinion of online education. However, fewer of these results reach the threshold of statistical significance than for the graduate student population.

Given that the number of undergraduate respondents (79) was higher than the number of graduate respondents (69), this seems to suggest that differences between online and face-to-face students are more pronounced among the graduate student population. This may be due to reasons specific to this institution, since in UWM undergraduate students taking online courses are much more likely, than graduate students, to live in the Milwaukee area and take a mixture of online and face-to-face courses. Graduate students enrolled in the online MLIS program tend to be out of state. In graduate program there is rarely overlap between online and face-to-

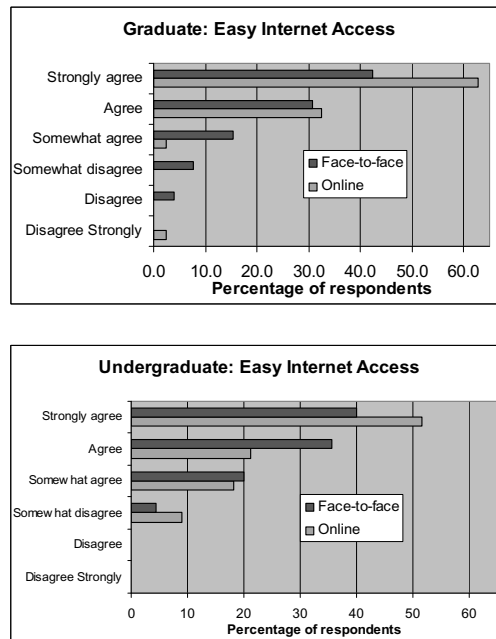


Fig. 1. Online vs. face to face in ease of internet access.

face students, though, of course, graduate students are likely to have experienced face-to-face college education earlier in their careers.

Bar charts of the distribution of responses are presented below for all questions for which the difference between online and face-to-face students was significant in either respondent population. The same trends were observed in both populations, although they were more marked in the graduate sample and so passed the threshold of statistical significance in five instances as opposed to two in the undergraduate population.

Figure 1 shows responses given by each of the populations to the question “I am able to easily access the Internet as needed for my studies.” In both cases the clear majority of students agrees with the statement, though online students are more likely to strongly agree with it. For graduate students this result gave a log likelihood ratio Chi square result with a $p = 0.03$, exceeding the standard 0.05 threshold for statistical significance.

Figure 2 shows responses given by each of the populations to the question “I am comfortable communicating electronically.” Though both populations agreed with the statement, face-to-face students were very much more likely to strongly agree. This result was highly significant for graduate students, with $p = 0.002$. For undergraduate students, a similar pattern was observed but the result failed to come

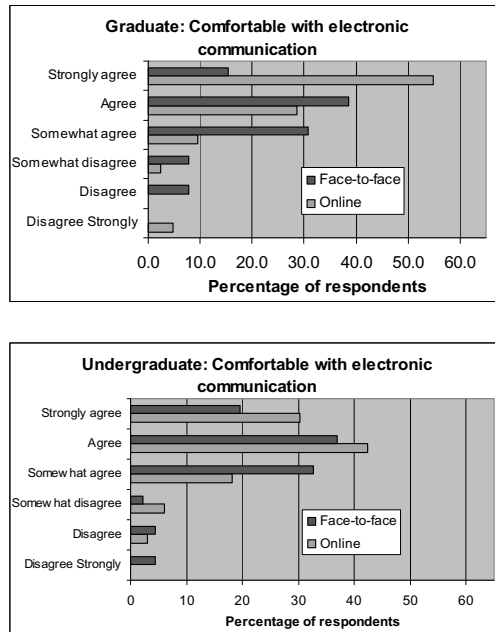


Fig. 2. Online vs. face to face in ease of internet access.

close to the threshold of statistical significance.

Figure 3 shows responses given by each of the populations to the question “I feel that online learning is of at least equal quality to traditional classroom.” The results here are quite striking. Only eight percent of graduate students taking face-to-face classes agreed or strongly agreed with the statement, versus sixty three percent of online graduate students. For undergraduate students, the figures were seven percent of face-to-face students versus fifty five percent of online students. Even within degree programs and institutions fully supportive of online education, most face-to-face students retained a negative impression of the quality of online education. This result far exceeded standard thresholds for statistical significance, with the Chi square test generating estimates of $p < 0.0001$ for graduates and $p = 0.0002$ for undergraduates.

Figure 4 shows responses given by each of the populations to the question “I need the stimulation of class participation.” Forty-eight percent of online graduate students disagreed with this statement, versus only fifteen percent of face-to-face students. The undergraduate students were less attached to class participation (a result unlikely to surprise many instructors), but even here twenty four percent of face-to-face students agreed or strongly agreed with its importance, versus just three percent of online students. For graduate students, this difference was highly

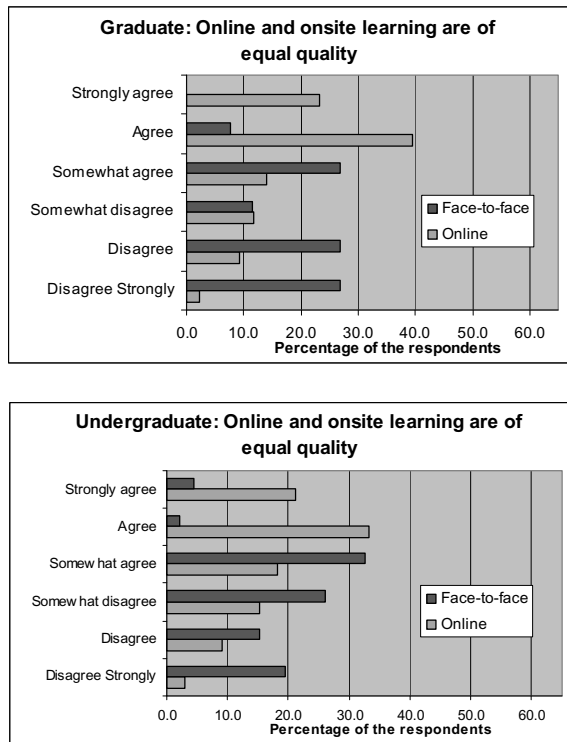


Fig. 3. Online vs. face to face in perceptions of online education quality.

significant statistically, with a p value of 0.0008 according to the log likelihood Chi square test. For undergraduate students it met the standard threshold of statistical significance, but at the lower level of $p = 0.02$.

Figure 5 shows responses given by each of the populations to the question “I work better in groups.” In both populations, face to face students gave much greater levels of support to the statement. Thirty one percent of face-to-face graduate students were at least somewhat in agreement, versus twenty one percent of online students. No online students in either population strongly agreed with the statement, whereas no face-to-face graduate students strongly disagreed with it. The log likelihood Chi square tests yield significance estimates for online/face-to-face difference of $p = 0.08$ for undergraduates and $p = 0.06$ for graduate students, neither of which quite reaches the conventional 0.05 threshold. However, these tests do not take into account the ordinal (rather than nominal) nature of Likert scales. A glance at the distribution of responses shows that the order of the responses matters a great deal in accessing the degree of systematic variation between the two groups (the responses with the biggest differences between online and face-to-face being strongly agree and strongly

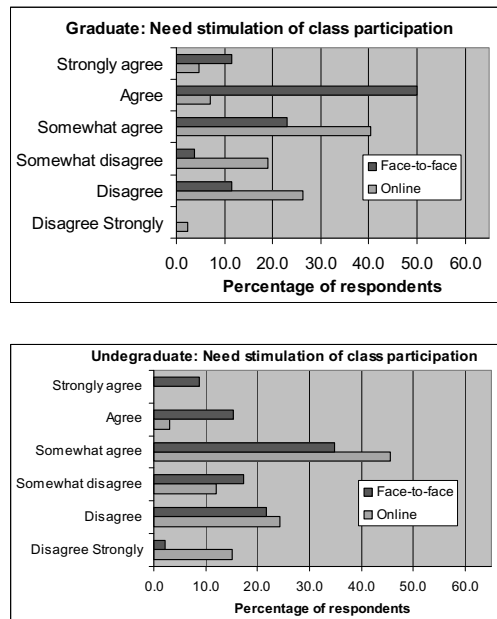


Fig. 4. Online vs. face-to-face in attitudes toward class participation.

disagree, positioned at opposite end of the ordinal scale), and so these results may be regarded as strongly suggestive.

Figure 6 shows responses given by each of the populations to the question “I have good typing skills.” Among graduate students, most online respondents strongly agreed with the statement, making them more than twice as likely as face-to-face students to agree strongly. This difference was significant at the $p = 0.01$ level, reaching a generally accepted threshold for being highly statistically significant. In contrast, the undergraduate population showed no clear pattern: online and face-to-face students had the same median and mode response (“agree”) but face-to-face students were more likely to disagree at least somewhat, (22 percent versus 12 percent).

5. Conclusions

The study demonstrated several significant differences between the online and offline information science student populations taking the same courses and pursuing the same degree program within the same institution. These differences all reflected higher scores in areas shown by previous research to correlate with student success in the online environment. Online students reported that they were more comfortable

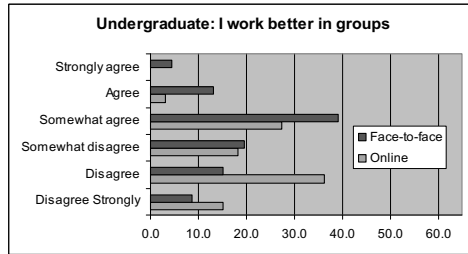
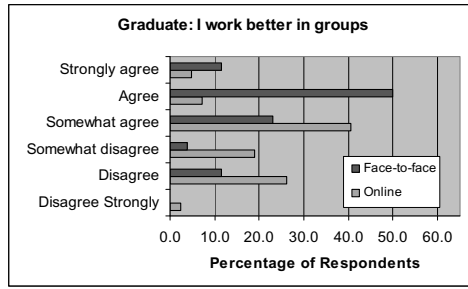


Fig. 5. Online vs. face-to-face in attitudes toward group work.

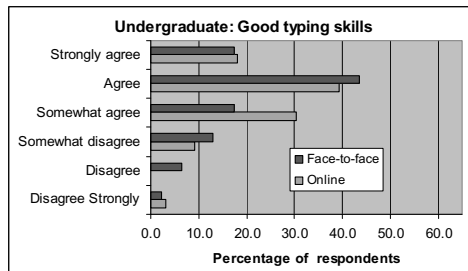
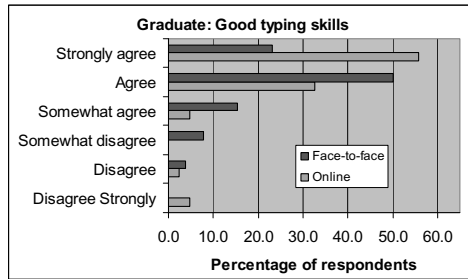


Fig. 6. Online vs. face-to-face in typing skills.

communicating electronically, had easier access to the Internet, and had better typing skills than face-to-face students. Interestingly, face-to-face and online information science students did not differ significantly in their self-reported ability to manage deadlines, understand course materials and assignments without assistance from others and seek help where needed. Perhaps unsurprisingly, online students had a substantially higher impression of the quality of online education than that held by their face-to-face counterparts. This indicates success in aligning the characteristics of the online and face-to-face student populations with the attributes required for success in each venue.

The favored learning styles of online and face-to-face students differed significantly in two respects. Online students felt that they worked less well in groups than face-to-face students, and were significantly less reliant on the stimulation of class participation as a motivational tool. This suggests that online information science courses are more likely to appeal to students who are self-reliant in their study habits. Although proponents of online educational technologies frequently praise them as a superior venue for group collaboration and host participatory class discussion, these results suggest that online information science students are less attracted to these activities and might prefer to be left to work alone. Whether instructors view this as a preference that should be accommodated through avoidance of group assignments and participatory discussion, or a weakness that should be corrected through increased use of these elements, this observation is of considerable relevance to institutions shifting their information science course offerings into an online format.

The experience of online education has probably reinforced these skills and attitudes. While students without good typing skills or confidence in electronic communication might be less likely to seek out online classes in the first place, their confidence in their abilities here might well rise with their exposure to the online educational environment. Likewise, although students who believe online instruction to be inferior to face-to-face instruction would be unlikely to take courses online, one might expect that their faith in this instructional medium would rise after taking successful online courses.

The most striking discovery was that only 8 percent of face-to-face MLIS students agreed or strongly agreed that online education was of at least the same quality as face-to-face education, versus 63 percent of online graduate students. (For the undergraduate population, the figures were 7 percent and 55 percent respectively). Within the school, face-to-face students are well aware of the existence of online courses. They know that online students take the same classes and learn the same material from the same instructors. UWM's reputation as a provider of quality graduate information science education is as well established for its online programs (where enrollment is rising rapidly) as it is for its face-to-face programs. Yet the stigma against online education remains strong among face-to-face students, despite an overwhelming feeling among online students that their education is at least as good. This suggests that schools planning online information science programs will also need to convince their existing face-to-face students of the validity of this means of instruction.

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