What Characteristics of College Students Influence Their Decisions to Select Online Courses?

John T. Mann
Michigan State University
mannjoh3@anr.msu.edu

Shida R. Henneberry
Oklahoma State University
srh@okstate.edu

Abstract

The primary goal of this study was to identify a wide range of characteristics of college students that may influence their decisions to select online courses. The motivation underlying this study is the realization that online courses are no longer exclusively being taken by non-traditional students (for undergraduates, that would be students age 25 years and older with career, family, and/or social obligations). In fact, there are recent reports indicating that traditional undergraduate students (on-site students that are age 18-24) are now including online courses in their course curriculum. To accomplish the goal of this study, an ordered logit model was developed in which a Likert scale question asking students how likely/unlikely they were to take an online course was used at the dependent variable. The independent variables were based on a wide range of responses to questions regarding student demographic, experience, and preference information (these are the students' characteristics). The data for this study is from a 2010 Oklahoma State University campus-wide student survey. The results of the study have identified a number of considerations that may be helpful to administrators wishing to improve and/or expand online course offering, as well as areas that can be further investigated in future studies. For example, undergraduate and graduate students enrolled in business majors were more likely than those in other majors to select online courses. On the other hand, undergraduate students (traditional and non-traditional) enrolled in engineering majors and graduate students enrolled in anatomy, biochemistry, biology, and botany major were the least likely groups of students to select online courses. Freshman and sophomores were found to be more likely than juniors and seniors to select online courses, and were much more likely than graduate students to select online courses. With respect to residency, out-of-state/non-residents (not including international students) were the most likely to select online courses, while international students were the least likely to select online courses. Finally, a significant and positive relationship was identified between some web 2.0 technologies, such as online social networking (e.g. Facebook) and live video chatting (e.g. Skype), and students' likelihood of selecting online courses.

Introduction

Higher education is currently undergoing a potential paradigm shift in the way in which college-level courses are delivered to students, for example courses in a face-to-face (F2F), online, or hybrid delivery format (Allen and Seaman 2010; Bejerano 2008; Haythornthwaite and Andrews 2011; Jenkins et al. 2011; Oblinger, Barone, and Hawkins 2001). Over the past several years, greater proportions of students are selecting online courses instead of F2F courses. Between 2002 and 2008, public and private universities in the U.S. experienced a 260% increase in the proportion of students enrolling in online courses relative to F2F courses (Allen and Seaman 2010). One reason for this increase is that many institutions of higher education have adopted strategies that incorporate online courses and programs to meet the overall demand for college-level courses (Allen and Seaman 2010). These strategies have directly increased the relative proportion of online-to-F2F courses available to non-traditional undergraduate students (typically students 25 years and older with work, family, and/or social obligations), as well as to traditional undergraduate students (students normally taking courses on-site, living on or near campus, and who are 18-24 years old).

At their onset, online learning environments were believed to be appropriate for non-traditional students for two reasons (Howell, Williams, and Lindsay 2003). First, the maturity and experience of non-traditional students allowed them to achieve learning objectives with a minimal amount of technology and direction. Second, the flexibility of online courses and programs made it possible for non-traditional students to complete degree requirements while maintaining work, family, and social obligations. Most of the generalizations in the distance education (DE) literature regarding the characteristics of non-traditional students taking online courses have reflected these ideas (Allen and Seaman 2010; Bejerano 2008; Haythornthwaite and Andrews 2011; Howell, Williams, and Lindsay 2003; Jenkins et al. 2011; Oblinger, Barone, and Hawkins 2001).

Additionally, non-traditional student enrollment has accounted for a large proportion of total college-course enrollment and online college-course enrollment is growing much faster than total college-course enrollment (Allen and Seaman 2010; Howell, Williams, and Lindsay 2003; Oblinger, Barone, and Hawkins 2001). However, many traditional undergraduate students are also taking online courses (Bejerano 2008; Haythornthwaite and Andrews 2011; Jenkins et al. 2011). In some circumstances the online version of the course may be the only option for these students due to scheduling conflicts or full course enrollment (Bejerano 2008).

The increased enrollment in online courses by traditional undergraduate students may also be related to their level of acceptance of online courses and their familiarity and comfort with the technology used to deliver them (Allen and Seaman 2010; Bejerano 2008; Haythornthwaite and Andrews 2011; Jenkins et al. 2011; Oblinger, Barone, and Hawkins 2001; Russell 1999). For example, web 2.0 technologies, such as web-based social networks, blogs, and streaming video, have greatly impacted the manner in which traditional undergraduate students interact with one another. These technologies are also similar to those used to construct online learning environments (Haythornthwaite and Andrews 2011; Jenkins et al. 2011). Further, online social networking, texting, instant messaging, and emailing have become the primary means of communication for many traditional undergraduate students.

The effects from a change in institutional strategy regarding online course offerings and student familiarity and comfort with web 2.0 technology provide some of the evidence supporting a potential paradigm shift in college course delivery). However, some colleges and universities may not be specifically reporting the proportions of traditional versus non-traditional undergraduate students that are taking online courses (Hawkins 2011). Therefore, this potential shift may only be apparent by those currently teaching online courses, or seen in the results of student surveys about online course participation.

As the popularity and acceptance of online courses have risen across most institutions of higher education, it may be that students' choices to enroll in online courses include more than career, family or social obligations (Allen and Seaman 2010; Haythornthwaite and Andrews 2011; Howell, Williams, and Lindsay 2003; Jenkins et al. 2011; Oblinger, Barone, and Hawkins 2001). Identifying a wider range of student characteristics is one step toward understanding how future college course delivery will evolve (Allen and Seaman 2010; Bejerano 2008; Haythornthwaite and Andrews 2011; Jenkins et al. 2011; Oblinger, Barone, and Hawkins 2001). The objective of this study is to identify a wide range of student characteristics that influence the likelihood of them selecting online courses. The results include traditional and non-traditional undergraduate students as well as graduate students. Additionally, the characteristics identified in this study were compared to the results of previous studies in the DE literature.

Background

Potential factors contributing to the rise in demand for online courses

There are three factors that are highlighted here that have potentially interacted and contributed to the significant rise in the demand for online courses: 1) the shift in strategy by higher education institutions to meet total student demand by increasing online course and program offerings (Allen and Seaman 2010); 2) the

demand by non-traditional students for higher education which has been driven by the labor market and changes in technology (Howell, Williams, and Lindsay 2003; Oblinger, Barone, and Hawkins 2001); and 3) the potential impact of web 2.0 technologies on the communication and learning preferences of traditional undergraduate students (Haythornthwaite and Andrews 2011; Jenkins et al. 2011).

Oblinger, Barone, and Hawkins (2001) recognized that the growth trend of total student enrollment (traditional and non-traditional) would eventually overwhelm the infrastructure at many higher education institutions. Therefore, they believed that developing and expanding online courses and programs by these institutions was inevitable to meet the demand of both groups of students. According to Allen and Seaman (2010), this prediction appears to be occurring. For example, many colleges and universities reported that online courses and programs are an essential part of their long-term institutional strategy to compete with others in meeting future student demand. In fact, by 2008 one-in-four undergraduate students had taken at least one online course. The effect of increased online course offerings may be especially relevant for traditional undergraduate students where scheduling conflicts or competition to enroll in the most demanded F2F courses occur (Bejerano 2008).

According to Howell, Williams, and Lindsay (2003), the demand for higher education by non-traditional students has continued to increase over several decades and has been primarily related to increased demand by employers for college graduates and updated skills. Further, the increased availability and affordability of personal computers and the internet has allowed more non-traditional students to gain access to online courses and programs. It is also important to note that the level of acceptance and awareness of online degree programs, specifically those at traditional public and private universities, has also risen (Allen and Seaman 2010; Bejerano 2008).

The demand for online courses by traditional undergraduate students potentially has one additional potential driver: these students have demonstrated preferences for technology similar to that used to deliver online courses (Haythornthwaite and Andrews 2011; Jenkins et al. 2011). Over the past decade, the effect of web 2.0 technologies has affected the way many traditional undergraduate students communicate and learn. Not only have these students become familiar and comfortable with web 2.0 technologies, they have also made significant contributions to the application and development of the technologies. Additionally, these technologies can allow participants to maintain moderate to high levels of anonymity when making contributions to a variety of online forums. Similarly, traditional undergraduate students may perceive online courses as also providing a lower risk environment with respect to course participation compared to their F2F counterparts. For this reason, Haythornthwaite and Andrews (2011) and Jenkins et al. (2011) argue that some online course formats may actually result in increased student participation relative to the F2F version of the course.

Identifying the characteristics undergraduate students selecting online courses

The DE literature has identified a number non-traditional undergraduate student characteristics associated with the selection of online courses (Allen and Seaman 2010; Bejerano 2008; Haythornthwaite and Andrews 2011; Howell, Williams, and Lindsay 2003; Jenkins et al. 2011; Oblinger, Barone, and Hawkins 2001). For example, it has been generally understood that online courses were well suited for non-traditional undergraduate students who were not be able to take F2F versions of courses due to career, family, or social obligations (Howell, Williams, and Lindsay 2003; Oblinger, Barone, and Hawkins 2001). On the other, the characteristics of traditional undergraduate students selecting online courses have not been well established. Further, at least some of the characteristics of many traditional students taking online courses will differ from those of non-traditional students. The most obvious distinction is age, possibly employment, and course load per semester*(1)*.

To identify some characteristics of traditional undergraduate students who select online courses, Haythornthwaite and Andrews (2011), Jenkins et al. (2011), and Oblinger, Barone, and Hawkins (2001) point to the use of web 2.0 technologies. In short, these authors suggest that the communication and information

consumption via web 2.0 technologies has resulted in an increased interest in online formatted courses, especially by younger students. Based on this logic, as the frequency of using web 2.0 technologies increases, such as high levels of online social networking and streaming video consumption, the likelihood for students to take online courses should also increase. Additionally, Haythornthwaite and Andrews (2011) have implied that students who prefer communicating via text, instant messaging, and email, which potentially allows for the perception of some level of anonymity, may also have higher preferences for online courses as compared to those students using more direct forms of communications (such as F2F conversation or phone calls).

Finally, there might be other student characteristics or aspects of online courses affecting students' preferences for online courses that have not previously been discussed in the DE literature. For example, language barriers and limited selection of relevant courses may deter students from selecting online courses. Additionally, students enrolled in majors that require considerable laboratory work or other hands-on-training may believe online courses are not practical. One the other hand, students' learning styles and previous experiences with online courses may positively or negatively influence their preferences for online courses.

Methods and Procedures

Based on the discussion in the previous section, the current DE Literature(*2*), and the authors' own experience with undergraduate online and F2F students, a wide range of student characteristics were selected for analysis including: students' college major, course load, employment, basic demographic information, preferences for learning and communicating, use of different computer technology, and experience and knowledge about online courses. To accomplish the objectives of this study, a student survey was developed that included questions about these particular student characteristics (see Table 1). Responses to the student characteristic questions make up the independent variables (IV) of the empirical model. In the survey, students were also asked to identify, on a five-level Likert item format, their likelihood of taking another an online course*(3).* The responses to this question we used as the dependent variable (DV).

In order to determine the relative impact that each of the student characteristics had on the DV, an ordered logit model*(4)* was constructed as follows:

(1) $$L_i^* = \boldsymbol{X}_i^T \boldsymbol{Y} + c_i$$

(2) $$L_{i,j} = \begin{cases} 0 \text{ if } L_i^* \le 0, \text{very likely} \\ 1 \text{ if } 0 < L_i^* \le \mu_1, \text{likely} \\ 2 \text{ if } \mu_1 < L_i^* \le \mu_2, \text{neither likely nor unlikley} \\ 3 \text{ if } \mu_2 < L_i^* \le \mu_3, \text{unlikely} \\ 4 \text{ if } \mu_3 \le L_i^*, \text{very unlikley} \end{cases}$$

(3)
$$\begin{aligned} \text{Prob}\{L_{i,j} = 0|\boldsymbol{X}_i\} &= \Phi(-\boldsymbol{X}_i^T \boldsymbol{Y}) \\ \text{Prob}\{L_{i,j} = 1|\boldsymbol{X}_i\} &= \Phi(\mu_1 - \boldsymbol{X}_i^T \boldsymbol{Y}) - \Phi(-\boldsymbol{X}_i^T \boldsymbol{Y}) \\ \text{Prob}\{L_{i,j} = 2|\boldsymbol{X}_i\} &= \Phi(\mu_2 - \boldsymbol{X}_i^T \boldsymbol{Y}) - \Phi(\mu_1 - \boldsymbol{X}_i^T \boldsymbol{Y}) \\ \text{Prob}\{L_{i,j} = 3|\boldsymbol{X}_i\} &= \Phi(\mu_3 - \boldsymbol{X}_i^T \boldsymbol{Y}) - \Phi(\mu_2 - \boldsymbol{X}_i^T \boldsymbol{Y}) \\ \text{Prob}\{L_{i,j} = 4|\boldsymbol{X}_i\} &= 1 - \Phi(\mu_3 - \boldsymbol{X}_i^T \boldsymbol{Y}) \end{aligned}$$

$$s.t.\ \ 0 < \mu_1 < \mu_2 < \mu_3,$$

where L_i^* is the latent attitude of the student and not directly observable, $\boldsymbol{X}_i$ is a vector of the student characteristics, $\boldsymbol{Y}$ is a vector of the parameters to be estimated, c_i is the error term, $L_{i,j}$ is the Likert item selected by student i that belongs to category j and maps L_i^*, $\Phi(\cdot)$ is the logistic distribution, $i = 1, \ldots, N,\ j = 0, \ldots A$, and μ_1, μ_2, and μ_3 are additional parameters that are estimated (see Greene 2005). For the objective function, the log likelihood function is maximized by changing the parameters as follows:

(4) $$\max_{\lambda} \Lambda = \sum_{i=1}^{N} \sum_{j=0}^{A} L_{i,j} \log\left[\Phi(\mu_i - \boldsymbol{X}_i^T \boldsymbol{Y}) - \Phi(\mu_{i-1} - \boldsymbol{X}_i^T \boldsymbol{Y})\right]$$

where λ is a vector of the parameters (μ_i and $\boldsymbol{Y}$), $L_{i,j} = 1$ if student i belongs to category j and 0 otherwise (see Fok and Frances 2002). The estimated parameters from the ordered logit model are interpreted as the

marginal effect on the log of the odds ratio given each characteristic, and not the marginal effects of the of the student characteristics themselves (X_i). The log odds ratio is given by:

$$\log\left(\frac{\text{Prob}(L_i = l|X_i)}{\text{Prob}(L_i = l+1|X_i)}\right) \quad (5)$$

for $l \in \{1,2,3,4\}$.

For the sake of analysis in this study, only the parameters sign*(5)*, relative magnitude (compared to other characteristics considered in the model), and the significance level ($\alpha \leq 10\%$) were considered.

Data

Data for this study are from an email survey (via SurveyMonkey) of Oklahoma State University (OSU-Stillwater) students that was conducted in the fall 2010 semester. At the beginning of the fall 2010 semester (and prior to the launch of this survey), the OSU system Communications Department implemented a new policy that restricts researchers access and frequency of contact to students via email. However, the authors of this study were given special permission to sample the full OSU-Stillwater student population (graduate and undergraduate students), but with limited contact. More specifically, only a single email invitation to participate in the survey was allowed (there was no opportunity for follow-up emails). For this study, nearly 22,000 emails were sent over a six hour window to OSU-Stillwater email addresses. In order to maximize the response rate, an incentive was provided (a free Apple iPad) which was given away in a random drawing of participants that completed the survey. In all, 2,691 students completed the questionnaires during the two weeks the survey was open which resulted in a response rate of about 12.6%. The basic student demographic information based on the participants who completed the survey as well as that of the total OSU-Stillwater population is presented in Table 2.

Twenty-seven questions were asked about students' college major, course load, employment, basic demographic information, preferences for learning and communicating, use of different computer technologies, and experience and knowledge about online courses. The specific student characteristics used in this study are grouped under the different italicized headings in Table 1. The first italicized group, Likelihood of taking an online course, was the dependent variable used in the model while the other italicized groups made up the independent variables. Students' majors were categorized into one of eight Biglan categories: hard pure life, hard pure non-life, hard applied life, hard applied non-life, soft pure life, soft pure non-life, soft applied life, and soft applied non-life (see Schommer-Aikins, Duell, and Barker 2003; Sinclair and Muffo 2002; Stoecker 1994). The Biglan categories are based on students' learning preferences and are a convenient way to categorize a wide range of college majors. In this study, Biglan categories were used to reduce the large number of college majors into more manageable categories.

Questions regarding characteristics under a particular italicized heading and with percentages to the right were asked as single questions, and students were asked to select the response that best reflected their experience (these independent variable headings include: Student status, Major by Biglan category, Number of hours take - fall 2010, Number of hours working - fall 2010, and Other student demographics). The percentages indicate the proportion of student responses under each italicized group. For example, under Student status, 17.76% of respondents answered that they were freshman. For the student characteristics under Preference to learn difficult topics and Communication preference, students were asked to rate their response to each characteristic on a 1 to10 scale, where 10 was the highest and 1 was the lowest. The value to the right indicates the overall average. For example, the average response for face-to-face communication under Communication preference was 9.00 (relatively high). For the student characteristics under Computer/internet use, students were asked to rate their responses on a 1 to 6 Likert scale where 1 was "4 or more hours per day" and 6 was "I don't spend any time on this particular activity." For example, the average response for "Time on social networking sites" was 1.79, which falls between "3-4 hours" and "4 or more hours" (note that the average for all responses under this particular italicized heading can be interpreted as the same, i.e. 3 or more hours per day). For the student characteristics under Online course perception, students were asked to rate their responses on a 1 to 5 Likert scale where 1 was "very good" and 5 was "very poor." For example, the average response for "Good online

course experience" was 3.63 which fall between "Neither good nor poor" and "Poor."

Since the goal of this study is to utilize a wide range of student characteristics which were generated from the survey, the data consisting of ratings and Likert items responses were reduced to binary responses. The motivation for this step is to save degrees of freedom during model estimation. Additional, the authors of this study intend to publish additional research based on further investigations of the survey results.

The data reduction occurred as follows. Ratings responses were categorized as "lower preference" if the question was rated from 1 to 5 and "higher preference" if rated from 6 to10. Likert items with a 1-5 scale (where responses ranged from "very good" to "very poor") were categorized as "good" if the Likert item response was 1 or 2, and "poor" if the Likert item response was 3 to 5. The reason the Likert item response 3 was categorized as "poor" is because there were not enough observations to allow the SAS procedure to generate a "neither good nor poor" parameter estimate. Finally, Likert items with a 1-6 scale, where responses ranged from "4 hours or more" to "I don't spend any time on this particular activity," were classified as the "highest frequency of use" if the Likert item response was 1 and as "lower frequencies of use" if the Likert item response was 2 to 6. The choice to make this particular grouping occurred since the majority of responses were "4 hours or more," and there were not enough responses for some of the lower use options for SAS to estimate the parameters. The dependent variable, students' responses to the question asking about their likelihood of taking an online course, was not reduced to a binary response. This choice was made because there were a sufficient number of responses under each choice and because the impact on the degrees of freedom during model estimation was not substantial.

Results and Discussion

The numbers and proportions of students who have and who have not taken online courses based on survey responses are shown in Table 3. This table is divided into two groups: 1) traditional students who are undergraduates and are not enrolled in an online degree programs, and 2) graduate and non-traditional students who are or are not enrolled in online programs. Over half (55.9%) of the traditional undergraduate students and two-thirds of the graduate and non-traditional students (70.8%) reported to have taken at least one online course. With respect to traditional undergraduate students, this number, based on 2010 data, is twice the size of the 2008 value reported by Allen and Seaman (2010). On the other hand, this result may reflect some level of bias, based on the preferences of students who chose to participate in the survey, as the overall survey response rate was low.

The results of the ordered logistic model parameter estimates for the student characteristics based on students selecting online courses are presented in Table 4*(6)*. There are three sets of results which are based on: 1) a pooled model (combined undergraduate and graduate students' responses); 2) a model for undergraduate students' responses only (traditional and non-traditional); and 3) a model for graduate students' responses only. The results of the log-likelihood test used to determine if the pooled model was the appropriate model indicate that the parameter estimates for undergraduate and graduate models differ. However, there are a number of consistencies across the three models, even though the significance level of parameters varies. The results for all three models are discussed below.

It is also important to point out that the results presented here are not intended to suggest a causal relationship between student characteristics and students' likelihood of taking online courses. While there are a number of significant parameter estimates that support much of the DE literature, there are also findings in this study that have not previously been discussed in the literature and based on the nature of this study would be inappropriate to assign cause. The first is how students' college major preferences may affect online course selection. As discussed in the data section, college majors were simplified into eight Biglan categories which are based on student learning preferences (see Schommer-Aikins, Duell, and Barker 2003; Sinclair and Muffo 2002; Stoecker 1994). The results presented are relative to soft-applied non-life majors and includes all business majors (e.g. accounting, economics, finance, management, and marketing majors). In general, this study found that students in soft-applied non-life majors are the most likely group of students to select online

courses. At the undergraduate level, students in majors that are hard-applied non-life (e.g. different engineering majors) and soft-applied life (e.g. communications, English, history, philosophy, and art majors) are the most unlikely groups to select an online course, while graduate students in hard-pure life (e.g. anatomy, biochemistry, biology, and botany majors) and hard-pure non-life e.g. (mathematics, physics and chemistry majors) are the most unlikely groups to select an online course.

The second set of findings not previously discussed in the literature relates to undergraduate preferences for learning difficult topics. The two results that were significant were also positive, and include "meeting with the course instructor" and "searching the web." The third set of findings, also at the undergraduate level, was that international students are the least likely student group to select an online course, while students classified as out-of-state/non-residents were the most likely group of students to select an online course. Finally, there is a positive relationship between student experience with and knowledge about online courses and their likelihood to select an online course.

The results also highlight, to an extent, the potential impact of information and communication technology on students' likelihood to select online courses. The parameters for "high frequency of social networking," "high preference for communicating via social networks," "high preference for communicating via instant messaging," and "high preference for communicating via live streaming video" are positive across all models and are significant. However, the significance level of the parameters differs across the three models. Additionally, the parameter for "high preference for communicating F2F" is negative and significant in two of the three models. These findings support the ideas of Haythornthwaite and Andrews (2011), Jenkins et al. (2011), and Oblinger, Barone, and Hawkins (2001) who believe that students' familiarity and comfort with web 2.0 technologies positively influences students' preferences for online courses.

Finally, there are three trends related to the historical view of non-traditional students as the primary group of students taking online college-level courses. First, the age parameter is positive in all three models and significant in two of the three. This implies that older students are more likely to take online courses. However, freshman and sophomore students were more likely than junior and senior students to select "very likely" with respect to taking an online course, and undergraduate students were more likely than graduate students to select "very likely" with respect to taking an online course. One explanation may be that freshman and sophomores might potentially have a wider selection of online course options (whether traditional or non-traditional) as compared to juniors and seniors (and graduating seniors would not need to take any more courses). Freshman and sophomores may also believe that these courses are easier than the F2F versions, compared to the experience and belief of juniors and seniors. Second, as the number of reported hours employed per week that students increased from "none" to "more than 30 hours per week" (the later value was used as the base of comparison for the other indicator variables), the likelihood of selecting "very likely" to take an online course increased. This implies that students working in full-time jobs (or with careers) are more likely to take online courses than students not working. Third, as the number of college-credit hours taken per semester increases, the likelihood of selecting "very likely" to take an online course decreases. This result may be related to the amount of employment per week as students with careers may not have as much time to devote to taking classes.

Summary and Conclusions

The primary goal of this study was to identify a wide range of student characteristics that may influence students' decisions to select an online course. This study considered traditional and non-traditional undergraduate students as well as graduate students. The motivation for this study was to expand the existing DE literature regarding the characteristics of students selecting online courses to include those of traditional undergraduate students. This is especially relevant with respect to a potential paradigm shift occurring across many colleges and universities in the manner in which college courses are being delivered (F2F, online, or hybrid). Online courses have historically been taken primarily by non-traditional students; however, due to increasing total student demand for higher education, many institutions of higher education have developed policies that have opened the door for traditional students to take online courses to fulfill degree requirements.

At the same time, developments in technology resulting in increased access to personal computers and the internet combined with effect of web 2.0 technologies on the exchange of information and communication are reshaping the way in which learning is occurring.

Based on the survey responses in this study, graduate and non-traditional students make up a large proportion of students taking online courses. However, this study found that the number of traditional undergraduate students who have taken at least one online course is much greater than the number of graduate and non-traditional students who have done so. These findings indicate there are at least two distinct populations of undergraduate students enrolling in online courses:traditional and non-traditional undergraduate students. This presents a potential opportunity for institutions wishing to differentiate themselves from other colleges and universities by the types of online courses that are offered, i.e., online courses specifically designed for online programs taken by non-traditional or online only students, and those intended to fulfill the specific degree requirements of traditional undergraduate students.

Additionally, this study found that undergraduate students earlier in their college careers, (freshman and sophomores as opposed to juniors and seniors) are much more likely to want to take online courses. Therefore, institutions interested in expanding online course offerings could focus some of their efforts on increasing online course availability related to general education requirements. For institutions with large class sizes and where students are not able to receive personalized attention from the instructors or teaching assistants, this recommendation would be especially relevant. This result also implies that there may be fewer upper-division online course options for juniors and seniors. This presents another area of investigation for institutions wishing to expand online course offerings.

There are two considerations identified in this study that deserve more attention and research. First, the relationship between students' majors and their preferences for online courses needs to be explored further. This includes determining what specific kinds of courses students believe are well suited for the online format. There are a number of courses where hands-on activities (e.g., science labs) are a considerable part of the course. However, as technology continues to develop many of these courses may become practical in the online format.

Second, much more empirical work is needed to investigate the impact of web 2.0 technologies on students' desire to take online courses. This study found significant and positive relationships between a few web 2.0 technologies and students' likelihood of selecting online courses; however, a causal relationship was not established. There are two questions to consider. Do students who frequently use web 2.0 technologies to communication want to take online courses because it is a more familiar or safer environment? Are there other benefits that web 2.0 technologies can provide in the learning environment?

*(1)*Non-traditional students may only enroll part-time due to competing demands on their time.

*(2)*See Bejerano 2008; Bernard et al. 2009; Haythornthwaite and Andrews 2011; Howell, Williams, and Lindsay 2003; Jenkins et al. 2011; Oblinger, Barone, and Hawkins 2001; Russell 1999.

*(3)*A further explanation of the survey format, implementation, and response rate is provided in the proceeding data section.

*(4)*The model parameters were estimated using the PROC LOGISTIC procedure in SAS (SAS Institute).

*(5)*The +/- means that the student characteristic increases/decreases the probability that a student will select "very likely" when asked about taking an online class.

*(6)*The dependent variable, Likelihood of taking an online course, appeared in the model as four indicator variables, "likely," "neither likely nor unlikely," "unlikely," and "very unlikely." These four indicator variables are relative to the "very likely" response. With the exception of age, all independent variables

appeared in the model as indicator variables. For the single best response questions, what it is the indicator variables are relative to is shown in parentheses next to the italicized heading. The survey responses to rating and Likert scale student characteristics questions are reduced to binary indicator variables. The parameter estimates for these reduced responses are based on one of three types of indicator variables as follows and are shown in parentheses next to their respective italicized heading: 1) “higher preference” (for characteristics under Preference to learn difficult topics and Communication preference); 2) “good” (for characteristics under Online course perception); or 3) “highest frequency of use” (for characteristics under Computer/internet use).

References

Allen, I. E., & Seaman, F. (2010). Learning demand: Online education in the United States, 2009. Newburyport, Sloan Consortium Inc.

Bejerano, A. R. (2008). The genesis and evolution of online degree programs: Who are they for and what have we lost along the way? Communication Education, 57(3), 408- 414.

Bernard, R. M., Abrami, P. C., Borokhovski, E., Wade, C. A., Tamim, R. M., Surkes, M. A., & Bethel, E. C. (2009). A meta-analysis of three types of interaction treatments in distance education. Review of Educational Research, 79(3), 1243-1289.

Campbell, R., & Siegel, B. N. (1967). The demand for higher education in the United States, 1919-1964. The American Economic Review, 57(3), 482-494.

Fok, D., & Frances, P. H. (2002).Ordered logit analysis for selectively sampled data.Computational Statistics and Data Analysis, 40(3), 477-497.

Greene, W. H. (2008). Economic Analysis, 6th ed. Upper Saddle River: Prentice-Hall.

Hawkins, Christina. (2011). Institutional Research and Information Management, Oklahoma State University. Personal communications Institutional Research and Information Management. (2010). Fall 2010 student profile. Stillwater: Oklahoma State University.

Haythornthwaite, C., & Andrews, R. (2011). E-learning theory and practice. London: Sage Publications Ltd.

Howell, S. L., Williams, P. B., & Lindsay, N. K. (2003). Thirty-two trends affecting distance education: An informed foundation for strategic planning. Online Journal of Distance Learning Administration, 6(3), 1-23.

Jenkins, H., Purushotma, R., Weigel, M., Clinton, K., & Robinson, A. J. (2011). Confronting the challenges of participatory culture: Media education for the 21st century. Cambridge: MIT Press.

Oblinger, D., Barone, C. A., & Hawkins, B. L. (2001). Distributed Education and Its Challenges: An Overview. Washington, DC: American Council on Education.

Russell, T. L. (1999). No Significant Difference Phenomenon. Chapel Hill: University of North Carolina.

SAS Institute. (2008). SAS/ETS® User's Guide, ver. 9, 2nd ed. Cary, North Carolina.

Schommer-Aikins, M., Duell, O. K., & Barker, S. (2003). Epistemological beliefs across domains using Biglan's classification of academic disciplines. Research in Higher Education, 44(3), 347-366.

Sinclair, A., & Muffo, J. (2002). The use of Biglan categories in assessing general education courses. Paper presented at the Annual Forum for the Association for Institutional Research, Toronto mOntario Canada, 2-5

June.

Stoecker, J. L. (1994). The Biglan classification revisited. Research in Higher Education, 34(4),451-464

Table 1. Summary Statistics of Student Characteristics Questions				
Likelihood of taking online course[a]			Other student demographics	
Very Likely	32.17%		Female	54.95%
Likely	25.80%		Male	45.05%
Neither likely nor unlikely	16.42%		Mean age (years)	24.09
Unlikely	16.05%		"In-state" resident student	71.15%
Very unlikely	9.57%		"Out of state" resident student	19.25%
Student status			International student	9.61%
Freshman	17.76%		Enrolled in online degree program	10.42%
Sophomore	12.40%		Never taken Online Course	37.23%
Junior	16.57%		Taken at least one online course	62.77%
Senior	24.72%		Preference to learn difficult topics[b]	
Masters	18.50%		Discuss with students	8.61
Doctorate	10.05%		Use visual aids	8.25
Major by Biglan category			Other books	6.89
Hard pure life	4.50%		Hands-on activities	4.72
Hard pure non-life	3.72%		Meet with instructor	6.68
Hard applied life	14.30%		Course text	5.36
Hard applied non-life	15.71%		Attend class	8.01
Soft pure life	7.56%		Homework	7.88
Soft pure non-life	8.60%		Search the web	6.72
Soft applied life	12.92%		Resource center	7.23
Soft applied non-life	28.78%		Communication preference	
Undecided	3.91%		Face-to-face	9.00
Number of hours taken - fall 2010			Phone	6.59
Less than 6 hours	6.44%		Texting	6.24
6-8 hours	13.81%		Email	7.35
9-11 hours	11.99%		Social network	5.82
12-15 hours	52.49%		Instant messaging	4.83
16 or more hours	15.26%		Live internet video	5.61
Number of hours working - fall 2010			Computer/internet use[c]	
Not working at a job	35.63%		Time social networking sites (hours)	1.79
Work less than 10 hours	8.49%		Time browsing web (hours)	1.59
Work 10-20 hours/week	24.42%		Time playing video games (hours)	1.15
Work 20-30 hours/week	15.00%		Online Course Experience	
Working more than 30 hours/week	16.46%		Good online course experience	3.63
			Good knowledge of multimedia	2.57
			Good online course knowledge	2.82

a. Percentages are based on total sample population.
b. Scores are averages based on a 10 point rating scale, 10 = the highest and 1 = the lowest
c. Times reported are per day averages, 1= 4 or more hours per day and 6 = no time spent on the activity
d. Scores are the average based on a 5 Likert item scale, 1 = very good, 2 = good, 3 = neither good nor poor, 4 = poor, and 5 = very poor

Table 2. Comparison of Student Demographics

Category	Respondents	Actual[a]
Freshman	17.76%	20.51%
Sophomore	12.40%	17.69%
Junior	16.57%	19.71%
Senior	24.72%	22.51%
Masters	18.50%	12.72%
Doctoral	10.05%	7.00%
Female	54.95%	48.22%
Male	45.05%	51.78%
Resident[b]	71.15%	72.06%
Out-of-state	19.25%	19.99%
International	9.61%	7.95%
Female	54.95%	48.22%
Male	45.05%	51.78%
a. From the Oklahoma State University (OSU) Fall 2010 Student Profile (Institutional Research and Information Management 2010)		
b. Actual residency is based on all OSU campuses enrollment		

Table 3. Frequency of Students Taking Online Courses by Age

Frequency of taking online courses	Age < 25 years old[a]		Age ≥ 25 years old[b]	
	Number	Percent	Number	Percent
Never taken an online course	703	44.10%	286	29.21%
Taken 1 online course	326	20.45%	167	17.06%
Taken 2 online courses	182	11.42%	137	13.99%
Taken 3 online courses	169	10.60%	100	10.21%
Taken 4 online courses	105	6.59%	91	9.30%
Taken 5 or more online courses	109	6.84%	198	20.22%
Note: Data are based on student responses to survey questions.				
a. Only Includes undergraduate students who have not enrolled in an online degree programs.				
b. Includes all graduate students and students 25 years or older.				

Table 4. Ordered Logit Parameter Estimates of Student Characteristics in Likelihood to Take

Table 4: Ordered Logit Parameter Estimates of Student Characteristics in Likelihood to Take Online Course Model

Parameter	Pooled		Undergraduate		Graduate	
	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error
Likelihood of taking online course						
Intercept	-3.2719***	0.3885	-2.9057***	0.4958	-3.1186***	0.7030
Intercept	-1.5782***	0.3842	-1.1360*	0.4917	-1.5666**	0.6945
Intercept	-0.5240	0.3828	-0.0574	0.4907	-0.5291	0.6913
Intercept	0.8940**	0.3838	1.3338***	0.4923	1.0430	0.6931
Student status						
Freshman[a]	1.4336***	0.2326	0.5985***	0.1472	-	-
Sophomore	1.3598***	0.2274	0.5180***	0.1399	-	-
Junior	1.0138***	0.2135	0.1768	0.1224	-	-
Senior	0.8697***	0.2004	-	-	-	-
Masters	0.4521***	0.1575	-	-	0.4115**	0.1801
Major by Biglan category						
Hard pure life (relative to soft applied non-life)	-0.2420	0.1836	-0.0499	0.2063	-1.1575**	0.4506
Hard pure non-life	-0.3530*	0.2027	-0.1659	0.2615	-0.7085**	0.3541
Hard applied life	-0.1289	0.1200	-0.0712	0.1437	-0.2726	0.2403
Hard applied non-life	-0.3190***	0.1192	-0.4160***	0.1397	-0.1582	0.2453
Soft pure life	-0.1492	0.1545	-0.0776	0.1777	-0.2910	0.3276
Soft pure non-life	-0.2301	0.1439	-0.2589	0.1640	-0.1136	0.3150
Soft applied life	-0.3006**	0.1260	-0.3917***	0.1440	0.1090	0.2761
Preference to learn difficult topics						
Discuss with students (relative to low preference)	-0.0847	0.1543	-0.2510	0.1762	0.3697	0.3488
Use visual aids	0.1752	0.1349	0.3161**	0.1596	-0.0819	0.2630
Other books	-0.0786	0.0935	-0.00868	0.1081	-0.3685*	0.2006
Hands-on activities	0.1349	0.0854	0.0756	0.0998	0.3835**	0.1757
Meet with instructor	0.1743*	0.0890	0.1711*	0.0996	0.1636	0.2113
Course text	0.0675	0.0852	0.0198	0.0984	0.2145	0.1807
Attend class	-0.1229	0.1219	-0.1024	0.1394	-0.2909	0.2657
Homework	-0.0393	0.1108	-0.0734	0.1292	-0.0356	0.2294
Search the web	0.2363***	0.0867	0.2388**	0.0995	0.1762	0.1882
Resource center	0.0022	0.0987	0.0385	0.1142	-0.2622	0.2094
Other student demographics						
Gender (relative to male)	0.0134	0.0405	0.0187	0.0478	-0.0224	0.0799
Age	0.0161**	0.0079	0.0190*	0.0113	0.0062	0.0118
a. student status is relative to doctoral students in pooled model and seniors in undergraduate model.						
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.						

Table 4. (Continued)

Parameter	Pooled		Undergraduate		Graduate	
	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error
"In-state" resident (relative to international)	0.0595	0.1556	0.5496**	0.2686	-0.0963	0.2322
"Out of state" resident	0.0669	0.1656	0.6848**	0.2833	-0.2189	0.2534
Number of hours taken - fall 2010						
Less than 6 hours (relative to work > 30 hours/week)	0.2575	0.1599	-0.00954	0.3185	0.03900	0.2815
6-8 hours	0.0449	0.1124	0.5789**	0.2765	-0.2275	0.2440
9-11 hours	0.0465	0.1055	-0.0581	0.2017	-0.1069	0.2425
12-15 hours	-0.1589	0.0981	-0.2307*	0.1263	-0.1817	0.3046
Number of hours working - fall 2010						
No job	-0.2547***	0.0722	-0.1908**	0.0805	-0.3848*	0.2064
Work less than 10 hours	-0.3785***	0.1084	-0.3384***	0.1185	-0.4190	0.3342
Work 10-20 hours/week	-0.0713	0.0739	-0.0225	0.0913	-0.0508	0.1529
Work 20-30 hours/week	0.1302	0.0873	0.2807**	0.1128	0.0776	0.1656
Online degree program (relative to not online deg. Program)	0.3760***	0.0801	0.2974***	0.0985	0.4876***	0.1486
Number of online courses taken						
Never taken Online Course (relative to taken 5 or more)	-0.0830	0.0894	-0.1567	0.1067	0.0765	0.1742
Taken 1 online course	-0.6322***	0.0826	-0.7311***	0.0973	-0.3907**	0.1654
Taken 2 online courses	-0.3356***	0.0964	-0.2300**	0.1174	-0.5810***	0.1787
Taken 3 online courses	-0.0404	0.1078	-0.0256	0.1256	-0.1369	0.2211
Taken 4 online courses	0.3132**	0.1272	0.3020*	0.1552	0.3868	0.2366
Online Course Experience						
Good online course experience (relative to poor experience)	2.3473***	0.1098	2.3103***	0.1310	2.5528***	0.2136
Good knowledge of multimedia (relative to poor knowledge)	0.3458***	0.0834	0.3511***	0.0995	0.2191	0.1617
Good online course knowledge (relative to poor knowledge)	0.4126***	0.0848	0.4536	0.0997	0.4189**	0.1685
Communication preference						
Face-to-face (relative to low preference)	-0.4638**	0.1878	-0.6400	0.2072	0.4649	0.5087
Phone	0.0310	0.0867	0.0591	0.1007	-0.0219	0.1772
Texting	0.1314	0.0893	0.1155	0.1082	0.2203	0.1666
Email	-0.0115	0.1038	0.0113	0.1188	-0.1670	0.2310

Social network	0.2021*	0.1076	0.2487**	0.1237	0.0641	0.2345
Instant messaging	0.1014	0.1507	0.3123*	0.1857	-0.1416	0.2743
Live internet video	0.2081**	0.0817	0.1343	0.0957	0.3314**	0.1653
Web-interaction term	-0.2081	0.1788	-0.4448**	0.2142	0.1783	0.3582
Computer/internet use						
Frequency of social networking (relative to low frequency)	0.3298*	0.1875	0.2548	0.2044	0.8042	0.5161
Frequency of browsing web	0.1482	0.2222	0.2406	0.2435	-0.3578	0.5781
Frequency playing video games	-0.2490	0.2092	-0.2435	0.2470	-0.2074	0.4179
R-square	0.4208		0.3978		0.5045	
Log likelihood	-6748		-4896		-1782	
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.						

Online Journal of Distance Learning Administration, Volume XV, Number V, Winter 2012
University of West Georgia, Distance Education Center
Back to the Online Journal of Distance Learning Administration Contents