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Changing Demographics of Online Courses

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Professors of online courses often consider the type of learning styles the students may have when designing online learning opportunities. This study explored different issues that may impact the learning styles of learners who self-select online courses. The "Grasha-Riechmann student learning style scales" was used to determine the learning styles of students in both online and on-campus courses. The preliminary results indicate little variance in the learning styles of students taking classes either in online or face-to-face classes. Convenience is an important consideration in selection of both types of classes.

Keywords: learning styles, distance learning, online students

Improving Technology and Computer Skills in Online Courses

The distance learning sector of postsecondary institutions is expanding, with an estimated 12.2 million students enrolling in distance education programs in the US (Parsad, Lewis, & Wastat, 2009). Approximately, 66% of postsecondary institutions recognize the desire of students to enroll in online courses by offering distance learning through a variety of delivery methods (Parsad et al., 2009). The expanding distance educational offerings can be attributed to improved technology and student population demand for convenience in taking classes. At one time, learning in an online class was thought to be an isolating experience in which independent learners were the most successful students. With improved communication tools, instructors are able to promote students' social presence in distance learning classes which appeal to students with a variety of learning styles.

In the 1990s, online distance learning options were becoming available with the release of Netscape, allowing Internet users to browse the Internet using a visual interface (Friedman, 2005). Email and discussion boards were introduced promoting new methods of communication for clarification of instructional material or directions, providing students with quicker feedback and offering easy submission of assignments. Websites allowed students to quickly access instructional materials at their convenience. Course management systems streamlined distribution of the course information, communication and grading for instructors. With improved technology, professors can create lessons with interactivity and provide opportunities for students to work collaboratively.

Along with increased internet accessibility and improved computer capability is the expanding availability of instructional options. Courseware management packages now include more options embedded within the products, and multimedia development software is easier to use. Not only are digital pictures a must today, but free services are also available to share pictures, audio and video electronically. Communication has expanded with new technology tools allowing social networking through MySpace pages, Second Life and YouTube. Course management tools now incorporate social networking tools, such as discussion boards, meeting spaces, Web collaborative tools, blogs and wikis to enhance students' ability to communicate and work collaboratively.

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Students are using social networking tools as part of their everyday lives. Instructors can maximize their students' use of communication and collaborative tools to create social presence and community within classes while meeting the needs of students with a variety of learning styles.

Learning Styles in Distance Learning Environments

The context of the distance learning environment seems to be a good match for independent learners. The open structure of distance learning courses allows learners to progress through the instruction based upon their prior knowledge and interest in selecting the links they wish to follow (Protopsaltis, 2008). Independent learners are confident in their learning abilities and prefer to have control of their learning to target content that they consider important, therefore, doing well in loosely structured constructivist environments (Grasha, 1996). During the early implementation of distance learning, online classes were viewed as an "isolated environment" lacking interaction with fellow students or instructors (Mannix, 2000). Since independent learners prefer to work alone rather than with other students, it was believed that these learners would be more likely to choose online classes.

Research indicates that learning style differences could exist between traditional face-to-face students and distance learners. Independent distance learners have demonstrated the ability to achieve higher scores and higher course completion rates (Gee, 1990; Diaz & Cartnal, 1999; Terrell, 2002, 2005). Campus students are more likely to be active learners, while online learners are more reflective (Morrison, Sweeney, & Heffernan, 2003). Online students tend to have an abstract conceptualization learning modality (Garland & Martin, 2005).

Although some studies identify differences, other studies do not, which creates confusion in the interpretation of the data about individual differences between distance and on-campus students. A possible reason for the discrepancy could be the type of instrument being used to identify individual preferences. For example, studies that used the "Myers-Briggs cognitive style inventory" were unable to determine a dominant learning style (Mupinga, Nora, & Yaw, 2006; Russell, 2002). Although no differences have been identified in those students between the personality types, individuals of the various types approached learning with different motivations even though the behavior appeared to be similar. The distinctive patterns of interactions by the learning preferences with learning materials do not seem to lead to a learning style preference when selecting online versus traditional formats (Russell, 2002). Neuhauser (2002) used the "learning modality preference inventory" (assesses visual, auditory and kinesthetic preferences) to observe no difference in learning between the distance and traditional class settings. Finally, in a meta-analysis of studies using the "Kolb learning style inventory", Santo (2006) found no significant difference in learning styles across various settings in the retention rates of students or students' satisfaction. This could be attributed to the complexity of the instrument, since it requires the merging of factors from the cycle of learning with a set of styles resulting in no differences being identified.

Another possible explanation for the confusion concerning the type of learners who enroll in distance learning classes could be attributed to the new improved communication tools and instructional strategies that promote social presence in these courses. Students today incorporate electronic forms of communication in their everyday lives using instant messages, email, chat rooms and web conferencing. Instructors are better at designing activities that engage the students with course material, create discussions between and among students and instructors, and provide opportunities for collaboration in the online environments. These activities collectively promote social presence and appeal to learners with collaborative and participant learning styles. As a result, learners do not feel as isolated; rather, they are connected to their peers and instructors.

Finally, increased accessibility may explain why students are self-selecting distance learning classes rather

than face-to-face. Students select distance learning options because of convenience rather than the delivery model that closely matches their learning style, thus student rationale for class selection blurs the line defining who is taking online classes (Calvert, 2005). Today, learners are more likely to have a previous experience in distance learning prior to college by enrolling in online high school class offerings and/or participating in distance learning training opportunities. Postsecondary institutions are also offering more hybrid courses with some of the content and instructional activities online. Since students are feeling more comfortable with distance learning environments, they are beginning to demand more distance learning course offerings (Simonson, Smaldion, Albright, & Zvacek, 2006). As a result, it is becoming difficult to describe a prototypical online student taking Web-based courses, since the demographics within a class are becoming more homogenous (Bocchi, Eastman, & Swift, 2004).

This study has a twofold purpose. First, it identifies the learning styles of the students taking courses in both the online and the face-to-face environments when the students are able to self-select the class format. Data collected assisted in determining if the line between online and face-to-face classrooms are blurring with learning styles becoming similar across the formats. The second purpose is to examine the reasons that students are selecting a particular format to determine if the students' rationales for class selection are contributing to the learning style variability if differences exist between the two types of classrooms.

Methodology

The research methodology is quasi-experimental with qualitative and quantitative components. The control variable is the type of classroom. The face-to-face classroom was held in a computer lab with a multimedia teacher station. In the online classes, students provided their own computers to access all instructional materials through the blackboard. Tutorials were available to the students on how to use instructional technology to support instruction. Instructors assisted with technical challenges and course content.

Participants

The university is in the southeastern part of the US with a service area that crosses both urban and rural areas. The university has one main campus with six extension campuses covering 150 miles of coastline. Even with the seven campuses, students may have to travel an hour to reach the nearest campus because of traffic congestion in urban areas or distance in rural regions.

Students enrolled in the undergraduate instructional technology class lived within driving distance from one of the campus sites (since many of their courses were on campus). The technology course is required for all undergraduate education programs. Students in the program range from young adults attending college after high school to older non-traditional students wanting a career change. The instructional technology course is offered at four of the campuses or online. Students self-selected the class based upon delivery format and registered for their own classes.

The undergraduate instructional technology course introduced pre-service teachers to the different types of technology available in K-12 classrooms and how to utilize the technology to support learning in the classroom. The course is offered every semester with 50% of the courses offered as face-to-face and the other 50% online. The instructors for the course teach both formats. All courses in both delivery modes use a blackboard template for standardization across the courses. Ninety-six students participated in the study, 72 on campus and 24 distance-learning students. More on-campus students participated, because they were given the survey in class as part of their in-class assignments. The online students were not required to participate, because anonymous

surveys are difficult to track.

Instrument

The "Grasha-Reichmann student learning style scales" was selected for two reasons. First, it is developed for adult learners. Second, the instrument is designed to identify six types of students who exhibit a set of behaviors as they interact with learning material. One of the types identified by this instrument is the independent learners. The following is a description of the six types of learners:

(1) Independent learners are confident in their own learning enabling them to think for themselves. They prefer to learn content of high interest on their own;

(2) Dependent learners usually learn only what is required. They view instructors and classmates as sources for support;

(3) Avoidant learners are not interested in participating in learning activities in a classroom, in learning the content in a course or in attending class;

(4) Participant learners enjoy going to class and taking part in all activities offered;

(5) Collaborative learners prefer to work with others, because they enjoy sharing ideas with others and maximizing the talents within the group;

(6) Competitive learners are learning in order to outperform others in the class, so they can be the center of attention and receive recognition for their accomplishments.

The survey instrument also requested demographic data and had a reflective component. Demographic information was obtained to determine if other factors could be contributing to differences in learning styles. An open-ended question asked the students why they selected the online or the face-to-face delivery format.

Procedures

Before the study was implemented, the instrument was put into an online survey tool for ease of access by both the face-to-face and the online students. Data were collected for two semesters, summer and fall. The summer sessions were only six weeks, so during the fourth week, the instructors of both the online and on-campus classes sent an email with the survey link and the informed consent to the students in their classes. The same email was sent out again to students during the tenth week of the fall semester.

Several methods of data analysis were used. First, ANOVA (Analysis of Variance) was calculated to determine if statistical differences existed between the two groups. Then, a means analysis was conducted to determine if differences existed that may not have been statistically significant. Finally, a comparison of the number of students identifying a learning style difference within each group was made to note differences that could not be identified on an interval scale. The open-ended question explored the reasons for enrolling in either online or face-to-face. A content analysis process was used to identify patterns in the responses within each group.

Results

Learning Style Preferences

The response rates were difficult to determine, because the request was sent out to a variety of classes. Participation was dependent upon the professor forwarding the messages about the study to the students and the students' willingness to complete the survey. The response was higher for the computer lab groups, because the survey was completed during class time. In the end, the total of 96 participants included 24 from the online group and 72 from the face-to-face group. Only nine of the participants were male, with an even distribution of the males across both groups as compared to the number of females with three males in the online classes and

six in the face-to-face classes.

ANOVA was run to determine if a statistical significance could be determined between the different learning styles of the groups of students taking the class in a computer lab on campus and the distance learning group that was online. For this analysis, the scores ranged from 1 to 50 were treated as interval data with the intervals treated equally across each of the learning styles. The analysis indicated that no significant differences existed between the two groups based upon learning styles (see Table 1).

Table 1

Analysis of Variance of Learning Styles Between Class Format

Learning style	df	F	p
Independent	5	1.266	0.287
Avoidant	5	1.730	0.183
Collaborative	5	0.333	0.716
Dependent	5	1.497	0.229
Competitive	5	1.062	0.350
Participant	5	1.157	0.313

Notes. Online participants, 24; Computer lab participants, 72; $^{*}p < 0.05$.

To give a clearer picture of the learning styles within the groups, the mean scores were compared to determine whether differences existed, even though there were no significant differences between the two groups (see Table 2). The comparison yielded interesting results. The means between the two groups were very close, with less than 1-point difference on a 50-point scale difference between the two groups on the avoidant, collaborative, dependent and participant learning styles. The two differences with greater than a 1-point spread indicated a possible slight preference for the independent, with a 2.1 spread difference in the mean and a slightly stronger preference by competitive learners for online with a 4-point difference.

Table 2

Mean Comparison Between Class Formats

	Independent	Avoidant	Collaborative	Dependent	Competitive	Participant
Computer lab	34.6875	28.3125	38.7500	38.1875	25.3125	41.5000
Online	36.7000	28.4000	38.0000	38.9000	29.1000	42.3000

Notes. Online participants, 24; Computer lab participants, 72.

Finally, a third analysis was conducted, because “Grasha-Riechmann student learning style scales” do not have equal intervals for the different learning styles. The scales identified a learning style as low, moderate or high based on a unique set of range scores for each learning style; in other words, the range of scores across the different styles were not identical. In this analysis, the students’ scores were classified as low, moderate or high based upon the ranges provided by Grasha-Riechmann. The percentage of students within each category was determined and was then compared across the classroom types (see Table 3). Only when the data were aggregated in this way could an indication of a preference in the competitive learning style for online students and a dependent learning style for the classroom students be found. Only a slight preference was indicated for the independent learning style by online students. However, if the moderate and high categories were combined, no significant difference between the online and computer lab classes was noted. That could explain the lack of significant difference in the ANOVA and mean comparisons.

Table 3

Percentage Comparison Across Classroom Types Based Upon Learning Preference

	Independent		Avoidant		Collaborative		Dependent		Competitive		Participant	
	CL	ON	CL	ON	CL	ON	CL	ON	CL	ON	CL	ON
Low	0.03	0.00	0.15	0.08	0.04	0.04	0.03	0.00	0.10	0.00	0.00	0.00
Moderate	0.76	0.63	0.67	0.71	0.24	0.17	0.55	0.75	0.68	0.58	0.46	0.50
High	0.21	0.38	0.18	0.17	0.72	0.79	0.42	0.25	0.23	0.42	0.54	0.50

Notes. CL = Computer lab; ON = Online.

Rationale for Selecting Class Format

One final analysis was conducted to assist in the interpretation of the qualitative data. The survey included an open-ended question asking why the students had selected the computer lab or the online class. The answers to the question were analyzed using content analysis to determine patterns in the responses for each group.

The most frequently reported reason for selecting an online class was convenience. These students valued flexible scheduling and the convenience of working on class material when they were available as evident in the responses of 9 out of 24 or 38%. Four students mentioned that they preferred to work at their own pace. Their description of work patterns indicated either an independent learning style by articulating a desire to work on their own or the competitive learning style by expressing a need to work ahead of or finish class assignments before other students (Grasha, 1996).

For those taking classes on campus, the reasons for the selection were based more on the learning style. A person with a dependent learning style liked to use the teacher or fellow students as resources in developing his/her understanding of the course content (Grasha, 1996). The most frequently stated reason for taking the classes on-campus was the availability of the teacher to assist the students. As one student explained, “I prefer being in a classroom with a professor to help if there is a problem or if I do not understand something”. Another student described his dependent characteristic in another way, “I am a procrastinator, so online courses can be very dangerous for me. In-class sessions make sure I do my work and learn the material”. Three of the students did mention the need for hands-on activities, which was a learning style not explored in this study.

Another interesting pattern was noted in the analysis of students taking computer lab classes. Convenience was a strong determining factor for students taking an on-campus class. However, the convenience variable was location rather than time. Twelve students stated the on-campus class was the only option available to them. If more space had been available in the online classes, these students would not have taken the face-to-face class. Another eight students took the class, because they were already on campus, noting it was easy to go down the hallway after a previous class to attend the lab class. Combining these two responses, 28% of the students referred to convenience as the reason for taking the computer lab class.

Discussion

The four different analyses of the data allowed a different perspective of the type of learners that are taking online courses compared with those electing to take on-campus courses. The ANOVA results were important in identifying no significant statistical difference in the learning styles within the two groups when students self-selected the delivery mode. The mean analysis identified how closely the match between the learning styles of the two groups actually was with just a few points difference in the means. Only when the data were analyzed based upon the high, moderate and low ratings of the learning styles, could differences be noted. Interpreting this

data should be done cautiously, because only one point can make a difference between an identification of a high to moderate rating or a moderate to low rating for a learning style preference. With the rating system, the online learners were slightly more competitive than the computer lab students. This number could also have been influenced by the learning style itself. Competitive online students would be more likely to participate in a voluntary survey, believing that the participation would somehow impress the professor.

The qualitative data were revealing in identification of why students were selecting a class format. If the students selected the online course based upon learning style, the reason was driven by the desire to learn at their own pace. Either an independent or a competitive student would select distance class options for that reason. Independent learners would want to control their learning. A competitive student would have wanted to work at his/her own pace to complete the work as quickly as possible. The computer lab students seemed more likely to select the format based upon their learning style. Students with dependent learning characteristics were more likely to want teacher support provided in the computer lab. This could be a unique factor, since technology classes were viewed as a hands-on class and a course in which students might prefer to have immediate assistance with the technology.

Both groups mentioned convenience more often than learning style as the reason for their selection of the type of class to attend; however, the convenience variable was different for each group. As noted in the literature, students were selecting the online class because of the convenience those classes represented (Calvert, 2005). The convenience variable for the online group was flexible time management when interaction with class material occurred. The convenience variable for on-campus students was location. If they were already on campus taking another class, going down the hall was as convenient to them as taking the class online. Many of the students in the on-campus classes indicated the online classes were full as a contributing factor to their taking the face-to-face version. For these students, time was not a factor in their decision. The face-to-face class was convenient, because it was the only option available. As a result of selection of courses based upon convenience, versus learning style does support Calvert's assertion that convenience was blurring the differences in the two groups of learners (Calvert, 2005). The blurring of those lines was indicated by no statistical difference in learning styles between the two groups.

Implications

This study supports the trends identified in the literature. Improving technology allows the professor to address a variety of learning styles. The professor cannot assume the students have a strong independent learning style when developing distance courses. Courses should be developed to accommodate the different learning styles, just as the instructor would do for an on-campus class. The study also supports the observations that students are making decisions based upon convenience for both online and face-to-face classes, although the convenience factors are different with online students concerned about time management and on-campus ones concerned about location. Those students taking on-campus classes, however, are more likely to consider their learning style when selecting the campus classes.

Limitations

This study has limitations similar to other studies of this nature in that the sample is small and it is based upon what is convenient for the researcher. This prevents the study from being generalized to a larger population. Studies that include students from a variety of postsecondary institutions, types of programs,

program levels and regions may present a different picture of who are enrolling in distance learning classes.

Future Study

Further blurring of lines between online and face-to-face classes is occurring with more distance classes delivered using social networking and videoconferencing tools. Social networking tools, such as net-books and smart-phones, allow for instantaneous interaction between students and instructors from anywhere. Videoconferencing allows for interactions between students and instructors in the same real-time environment as face-to-face classrooms. With new technology tools available, professors are going to be able to address learning styles in distance classes in numerous ways. Learning styles may become less of an issue, as online delivery becomes less text-based and more verbal and multimedia-based. Understanding of learning styles research could be redirected from who are attending classes to how students with different learning styles use the different types of tools available to interact with instructional materials.

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