

Emerging Online Learning Environments and Student Learning: An Analysis of Faculty Perceptions

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Abstract

New educational technologies and online learning environments (OLEs) are infiltrating today's college classes and campuses. While research has examined many aspects of this permeation, one research gap exists. How do faculty perceive the learning experience in courses that use OLEs compared to courses that do not? One important factor that may influence faculty perceptions are their reasons for teaching with OLEs. This paper seeks to understand how faculty perceive OLEs as a function of their reasons for teaching with this educational technology. This paper also investigates whether faculty evaluations of OLEs differ based on gender and by years teaching. The results of the analysis reveal several noteworthy patterns. First, it appears that favorable opinions about the learning experiences in online learning environments are not because faculty are motivated to learn about new technologies per se, but because they want to update their vitas and teaching skills. Second, the results suggest that it may be harder to convince older and more experienced faculty to use new technologies compared to younger and less experienced faculty. These results apply to both male and female faculty and provide practical implications for universities and support services on how to recruit and then support faculty who implement educational technologies.

Keywords

Higher education, Learning technologies, Online education

Background

Debates arise at our higher education institutions about the value of educational technologies and online learning environments (OLEs) as this technology infiltrates our classrooms and demands persist that our students become technologically literate. The push for a "wired" campus has become the norm. At the same time, concerns about teaching with technology in online spaces continue apace as the production of untested educational technologies escalates. Over the past 11 years, the Campus Computing Project has administered an annual survey to measure the relative importance of technology use on college campuses (Carlson, 2000). Over 500 private and public institutions have participated in the survey, including both two- and four-year colleges. Data from the surveys indicate that the use of technology in instruction has risen sharply in college courses since 1994. Further, 40 percent of the senior information-technology administrators who responded to this year's survey reported that incorporation of technology into the classroom was "the single most important issue" over the next two to three years. Incorporating technology into the classroom outranked other challenges, such as user support, replacing outdated hardware or software, providing distance education online, and integrating e-commerce on campus web sites (Carlson, 2000).

The rush to incorporate technology into college courses and the increasing use of OLEs present many crucial and pressing issues that research must address. The foremost of these issues is to understand the educational advantages and disadvantages of OLEs. For student outcomes, current research is ambiguous and finds mixed results. In a review of extant research, Ehrmann (1995) finds both positive and negative impacts of educational technologies on student learning. For example, computer-based tutorials improved learning outcomes by 20%, but the lag in time between the development and implementation of the software often means that the software is dated before it can be widely used. In a comparative study of instruction between online and face-to-face learning environments, Johnson et al. (2000) find no significant differences in learning outcomes or student satisfaction. A review by Moore & Kearsy (1996) also concludes that there is no real evidence that technology enhances student learning. Overall, Clark (1994) insists that technology and OLEs have no influence on student learning. He maintains that any increases in student learning are not due to technology per se, but to the teaching

method built into the use of the technology. Perhaps the lack of significant findings is because current research on technology and student learning is hampered in several ways. For example, the research base to inform practice is small and few theoretical frameworks guide current research (Menges & Austin, 2001).

Regardless, Chickering & Ehrmann (1996) argue that technology and OLEs may assist in the implementation of the seven principles for good practice in undergraduate education. In this sense, OLEs benefit both faculty and student development by advancing specific acts of teaching and learning such as (a) contact between students and faculty, (b) reciprocity and cooperation among students, (c) active learning techniques, (d) prompt feedback, (e) time on task, (f) communication of high expectations, and (g) respect of diverse talents and ways of learning. For example, the use of online instruction, email, and bulletin boards encourage student-faculty contact by increasing the accessibility of faculty, sharing of resources, and ease in which faculty and students can “safely” discuss controversial issues (Chickering & Ehrmann, 1996; Graham et al., 2001).

In a series of review articles, Emerson & Mosteller (1998a, 1998b) find that computer-assisted instruction is associated with positive student attitudes and shortened instructional time. They also find that the use of computer software is linked to learning gains and increased learning efficiency, but are still not replacements for creative and dedicated teachers.

For faculty, OLEs also present advantages and disadvantages. McInnis (2002) argues that OLEs increase the opportunities for faculty to organize student groups, instruct students and support student learning, and evaluate student performance. Yet, the innovations in technology that promote these opportunities also increase substantially the time and energy required of faculty to achieve the potential of OLEs. Further, the rapid proliferation of educational technologies and OLEs change the criteria by which faculty performance is judged. Faculty are now evaluated on the extent to which they use technologies and whether this usage is effective in improving student learning outcomes (McInnis, 2002). Nonetheless, Gilbert (1996) contends that faculty who experiment with OLEs undergo a conversion experience that makes them better teachers by encouraging reflection on teaching approaches and by initiating dialogue with colleagues on the merits of different teaching approaches.

To be sure, then, extant research on the effects of educational technology and OLEs is mixed, at best. An under-researched topic that can contribute to the debate about the advantages and disadvantages of OLEs is the perceptions of faculty who use educational technologies and teach in OLEs and the reasons why they use these tools. Understanding why faculty use OLEs and whether they perceive any educational benefits associated with OLEs will help frame other research that examines student learning vis-à-vis educational technologies.

Overall, Nantz & Lundgren (1998) find that faculty are limited in exploiting the potential of new technologies. Olcott & Wright (1995) note that faculty are reluctant to use new technologies despite the growing trend of more courses offered online and the use of online technologies, but the reasons for this are somewhat elusive. Several possible reasons that may explain a faculty member’s reluctance to teach with online technologies include lack of instructional support, increased workloads, and lack of monetary compensation (Carr, 2000; Northrup, 1997; Thompson, 2002). Other reasons may include the relative novelty and ambiguity about the benefits of educational technologies. Indeed, the current teaching practices of most college faculty represent a more traditional approach to teaching (e.g., lectures, class discussions), which generally occur inside the classroom and are monitored directly by the faculty (Willcoxson, 1998). These practices differ from those involved with using technology in OLEs, which occur outside the classroom and the direct monitoring by the faculty.

However, Thompson (2002) reports that faculty generally appear to be enthusiastic and satisfied about the benefits of and experiences with online educational technologies even though they identify several possible drawbacks. The largest teachers’ union, the National Education Association, released the findings from their survey on higher education members’ attitudes about distance learning. Data from 532 college faculty reveal that three-quarters of the instructors report a positive outlook about online learning (Carr, 2000).

Olcott & Wright (1995) suggest that one way to support faculty who use educational technologies in OLEs is through instructional support. Instructional support includes instructional design, course developers, technical support, and teaching and learning specialists (Lee, 2001). Indeed, faculty who change their professional behaviors must feel a sense of ownership of their new practices (Wood & Thompson, 1993). This suggests that the usefulness of change and using educational technologies may depend on an individual faculty member’s professional control in the way this technology is incorporated into their existing teaching repertoire. It is important that faculty view these technologies as a legitimate and effective component of teaching and learning. Indeed, others suggest that faculty may be more motivated to teach with educational technologies in online spaces if the activities are associated with teaching rather than with extrinsic or monetary rewards (Peirpoint & Hartnett, 1988; Taylor & White, 1991; Wolcott & Betts, 1999).

Another mechanism to support faculty who use educational technologies is to demonstrate the benefits of such technologies. Research shows that teachers' perceptions about new instructional practices influence their teaching decisions regarding instruction and curriculum and these beliefs affect subsequent student performance (Ennis, 1998; Ross, 1998). That is, for effective teaching and learning, it is not enough that faculty have knowledge about educational technologies, but that they believe in the effectiveness of that technology and, in turn, use the technology resourcefully (Creed, 1997; O'Donnell, 1994).

Taken together, this research suggests the following proposition: The reasons why faculty use educational technologies and OLEs may influence a faculty's perception of the learning experiences associated with such instructional practices. For example, faculty who embrace the opportunity to use educational technologies may regard the new technologies more positively than faculty who were simply asked to teach an existing course that used educational technologies. Likewise, faculty with a genuine interest in learning about new technologies may perceive the learning opportunities in OLEs more positively than faculty who use technologies for lesser pragmatic reasons (e.g., to make additional money). In addition, younger faculty who may have more experience with educational technology may hold more favorable views than older faculty who have less exposure to and training with educational technologies.

Overall, understanding the relationship between faculty reasons for using educational technologies and their perceptions of the learning experiences of educational technologies may shed light on how best to assist faculty in developing successful teaching strategies that incorporate educational technologies. Further, understanding how the various factors that influence faculty's decisions to teach using new technologies and how these factors shape their perceptions of OLEs can help universities with a smoother transition to the wired campus and result in a positive influence on student learning.

Present Study

This study seeks to understand the relationship between (a) faculty perceptions of the learning experience in courses that use OLEs and (b) their reasons for teaching and using OLEs. This paper also investigates whether faculty perceptions differ based on gender and years teaching. This study may inform faculty-mentoring and development programs on how to support faculty who use or plan to use educational technologies by aligning the incorporation of technology into their classrooms with their reasons for teaching with educational technologies. Technologies that assist online learning are relatively new, even to young faculty who recently finished graduate school. Therefore, it is important to examine how traditional and nontraditional reasons for teaching are associated with faculty's perceptions. For example, if traditional reasons for teaching are associated negatively with perceptions of the learning experiences in courses that use OLEs, then it is imperative to identify ways this new technology can fit well within a traditional educational setting that employs traditionally-trained faculty.

Sample

Data for this analysis come from The Center for Teaching, Learning, and Technology (CTLT) at Washington State University (WSU) as part of an ongoing assessment process developed to systematically evaluate the use and impact of innovative teaching practices. The CTLT, WSU faculty, and other educational professionals have developed a series of surveys (available on request) that focus on faculty and student learning goals, activities, and practices (GAPs). The GAPs survey process involves three surveys—one for faculty and two for students. The surveys were distributed online via a survey generator (*CTLSilhouette*) developed by the CTLT. All faculty using the centrally supported online learning technologies at WSU were invited to participate in the GAPs survey process. This study uses data from the Fall 2000 and Spring 2001 faculty surveys. The final sample represents a cross-section of 85 faculty, including 30 faculty who augmented their campus-based course with OLEs, 25 faculty who teach students at a distance with OLEs, and 25 faculty from other higher education institutions who use WSU-supported OLEs.

Dependent Variable: Usefulness of Online Learning Technologies

One question measured a faculty's perception of students' learning experiences in OLEs. The question was worded: "*In your opinion, a student's learning experience in a course that uses online learning environments compared to a course that does not is, overall...*" The possible response categories were coded so higher scores

represent evaluations that are more positive: 1 = *can never be as good*, 2 = *usually worse*, 3 = *slightly worse*, 4 = *about the same*, 5 = *slightly better*, 6 = *usually better*, 7 = *always better*.

Independent Variables: Reasons for Teaching with Educational Technologies

The surveys asked faculty members why they opted to teach courses that use OLEs. The final set of reasons that appeared on the surveys was generated from numerous faculty focus groups and advice from educational specialists. Specific wording of the question addressing their reasons for teaching with OLEs was: “*How important to you are the following reasons for teaching this course using online learning environments?*” The reasons addressed were: (1) *To teach nontraditional students with work experience*, (2) *I was asked to teach this course*, (3) *To learn or stay abreast of new educational technologies in the classroom*, (4) *To support program goals of my department, college, or school*, (5) *To make additional money*, (6) *It makes sense to use an online learning environment in my course (e.g., the course may be about new technologies)*, (7) *To develop new teaching skills*, and (8) *To improve my vita or resume*. The possible response categories were coded so higher scores represent greater importance: 1 = *not important at all*, 2 = *not very important*, 3 = *somewhat important* and 4 = *very important*.

Two demographic variables were used in the analyses: sex of the faculty (1 = female; 0 = male) and years of teaching experience (1 = first class, 2 = 0 to 2 years, 3 = 2 to 5 years, 4 = 5 to 10, and 5 = 10 or more years).

Data Issues

The data came from questions that were part of the *GAPs* survey emailed to the instructors. A random sample was not feasible because of the nature of the investigation. The data, thus, were generated from a convenience sample. However, statistical analyses on the distribution of the independent and dependent variables revealed no deviations from normality or clustering of responses. Further analyses indicated the faculty who responded were not from selective colleges, disciplines, or departments (results available on request). Admittedly, the nonrandom sample limits the ability to generalize to the larger population of college faculty. The results presented here, therefore, will be most useful when compared in context to other existing studies on the perceptions of faculty.

Analytic Strategy

Ordinary least squares regression was used to estimate the effects of the reason-for-teaching variables on faculty reports of students’ learning experience in courses that use OLEs. The first set of equations estimated the bivariate associations by regressing separately faculty evaluations on each predictor variable. The second equation regressed faculty perceptions on all of the predictor variables in one full model. The full model estimates the net effect of each reason-for-teaching variable while controlling for the other reasons for teaching. The two demographic variables are included in both analyses.

Scores on the dependent variable range from 1 – 7. Because of the debate whether these Likert-type scales represent ordinal or interval data, the equations were reestimated using both ordered and multinomial logistic regression methods (Long, 1997). The results were identical to those for OLS regression. The OLS regression results are presented because the substantive interpretation of the parameter estimates, including R-square, is better known.

Results

Descriptive data from Table 1 indicate that women comprise 65% of the sample and that the average faculty member has taught between 5-10 years. On average, faculty report a moderately positive evaluation of the learning experience in courses that use OLEs compared to courses that do not use OLEs—5.32 on a 7-point scale. Looking at the reasons for teaching courses that use OLEs, responses from the faculty show that three reasons were ranked the highest: to develop new teaching skills, to learn or stay abreast of new technologies and try them in the classroom, and to support program goals of my department or college. Two reasons for teaching were ranked consistently low by faculty: to make additional money, and because they were asked to teach the course.

Table 1: Summary of Descriptive Statistics of Study Variables

<i>Variables and Coding</i>	<i>Mean</i>	<i>Standard Deviation</i>
<i>Dependent</i>		
Perception of learning experience in courses that use OLEs versus courses that do not (1 = Can Never be as Good to 7 = Always Better)	5.32	1.16
<i>Predictors (1 = Not Important at All to 4 = Very Important)</i>		
To teach nontraditional students or students with work experience	2.53	1.19
I was asked to teach this course	2.15	1.02
To learn or stay abreast of new technologies and try them in the classroom	3.34	.82
To support program goals of my department or college	3.29	.81
To make additional money	1.84	1.10
It makes sense to use an online learning environment in my course	2.30	1.03
To develop new teaching skills	3.46	.71
To improve my vita	2.27	.92
<i>Demographic</i>		
Years teaching (1 = first class to 5 = over 10 years)	4.16	1.15
Sex (1=female, 0=male)	.65	.47

How do faculty's reasons for teaching affect their evaluation of the relative learning experience in courses that use OLEs? The bivariate regression coefficients in the first column of Table 2 show that faculty's perceptions of OLEs is significantly greater when they were more likely to teach a course (1) To learn or stay abreast of new technologies and try them in the classroom, (2) It makes sense to use an online learning environment in the course, (3) To develop new teaching skills, and (4) To improve my vita.

Table 2: Results of Regression Analyses

<i>Predictor Variables</i>	<i>Bivariate</i>	<i>Multivariate</i>
To teach nontraditional students or students with work experience	.007 (.107) R ² = .000	.032 (.108)
I was asked to teach this course	-.022 (.124) R ² = .000	-.074 (.124)
To learn or stay abreast of new technologies and try them in the classroom	.196** (.074) R ² = .077	-.127 (.090)
To support program goals of my department or college	.056 (.157) R ² = .002	-.010 (.151)
To make additional money	-.191 (.114) R ² = .033	-.410*** (.125)
It makes sense to use an online learning environment in my course	.313** (.119) R ² = .078	.337** (.107)
To develop new teaching skills	.749*** (.159) R ² = .212	.595** (.200)
To improve my vita	.345** (.134) R ² = .074	.342* (.151)
Years teaching	-.275** (.107) R ² = .074	-.314** (.098)
Sex	.182 (.269) R ² = .006	-.175 (.240)

Intercept R ²		4.845 .426
<i>Note:</i> Standard errors are in the parentheses. *p < .05. ** p < .01. ***p < .001 (two-tailed)		

The largest effect on a faculty's perception of OLEs occurs when faculty's reason for teaching the course is "to develop new teaching skills." This variable alone explains 21% of the variance. A coefficient of .749 suggests that a faculty's evaluation of the relative learning experience in courses that use OLEs increases nearly three-fourths of a unit for each unit increase in the importance of the reason for teaching the course. For example, the difference in evaluations would be 1.50 between faculty who feel it is *very important* to develop new teaching skills (coded 4) and faculty who feel it is *somewhat important* to develop new teaching skills (coded 2). The effects of the other three significant variables are smaller but all explain at least 7% of the variance in faculty's evaluations of OLEs.

On the other hand, faculty's perceptions of the learning experiences in OLEs are significantly lower the more years they have been teaching. Each unit increase in years of teaching experience is associated with a decrease of .275 in a faculty's evaluation of OLEs. For example, the difference between faculty with over 10 years of experience (coded 5) and faculty with 0 to 2 years (coded 1) of experience is -.875, or about a one-unit decrease. Differences in teaching experience explain 7.4% of the variance in perceptions.

The multivariate equation in Table 2 estimates whether any single reason for teaching has an effect on perceptions of the learning experience in courses that use OLEs compared to courses that do not, after controlling for the other possible reasons for teaching. In a sense, the multivariate model is a more accurate estimation of the relationships between reasons for teaching and perceptions of OLEs because faculty generally reported several important reasons for teaching. Thus, results from the multivariate regression equation will better simulate this reality by including simultaneously all of the important reasons for teaching. Overall, the multivariate results shed new light on the bivariate relationships and shows that reasons for teaching are a significant component of a faculty's perception of the learning experience associated with OLEs. Indeed, an R-square of .426 suggests that nearly 43% of the variance in faculty's perceptions of online learning environments is explained by their reasons for teaching and selected demographic characteristics.

Four of the statistically significant bivariate effects remain so in the multivariate model. Faculty's perceptions on the learning experience of OLEs is significantly more positive when they were more likely to teach the course because (1) It makes sense to use an online learning environment in the course, (2) To develop new teaching skills, and (3) To improve my vita. Faculty evaluations of OLEs are significantly lower the more years they have been teaching. However, two new patterns emerge in the multivariate results. First, faculty are more likely to report more positive perceptions of OLEs if they place little value on making additional money as a reason for teaching courses that use OLEs. This suggests that when all the other reasons for teaching are controlled, there exists a statistically significant negative relationship between money as a reason for teaching and perceptions of OLEs.

Second, the net effect of staying abreast of new technologies as a reason for teaching becomes statistically nonsignificant between the bivariate and multivariate regression models. This indicates that one or more of the other reasons for teaching explain the prior significant bivariate effect of technology. In ancillary analyses (results available on request), we estimated a series of regression models to determine which other variable(s) account for the bivariate effect of technology. Results show that the effect of technology remains significant until both "To develop new teaching skills" and "To improve my vita" are in the regression equation. What does this mean? While not definitive, it suggests that the effect of staying abreast of new technology on a faculty's perception of OLEs is indirect and may operate through the other two variables. That is, part of the reason why faculty learn and implement new technologies is so they can improve both their teaching skills and vita.

Discussion

Educational technologies are playing an increasingly larger role in college courses, and faculty members are beginning to implement these technologies into their classrooms and into online learning environments. The incorporation and effective implementation of online learning technologies may depend on how individual faculty perceive the merit of such technologies and how the use of these technologies fit with their current teaching practices and beliefs. The results of the present analysis reveal several noteworthy patterns. First, it appears that favorable evaluations about the learning experiences in courses that use OLEs are not because faculty necessarily want to learn about these new technologies per se, but because faculty wish to supplement

and update their vitas and improve their teaching skills. This has practical implications for how universities might recruit and then support faculty who teach with OLEs. Instruction on teaching with new technologies may be imbedded in workshops, seminars and programs that target career and professional development and that focus on improving student learning. Conversely, workshops that target technology in isolation may be less effective in encouraging faculty to use OLEs.

Why would universities want to recruit and train faculty to use educational technologies and teach courses that use OLEs? Several reasons emerge, including the absolute acceleration of such technologies, but also because educational technologies may open new avenues for more students to access opportunities and information, increase forms of interactions among teachers and students, and encourage collaboration across institutions (Menges & Austin, 2001). As the demographics of college students continue to diversify, universities and colleges have also realized that OLEs such as distance education and online instruction can reap financial benefits, and the recruitment of quality faculty to staff these types of courses can improve an institution's bottom line.

Second, the results suggest that older and more experienced faculty hold less favorable opinions on the learning experiences associated with courses that use OLEs compared to courses that use more traditional instructional practices. These results apply to both male and female faculty. This finding has relevant implications for policy and practice, suggesting that the recruitment and development process requires a considered and careful coordinated response to faculty readiness and unique purposes for teaching and learning. If more experienced faculty are to use educational technologies, they may need solid evidence about the effectiveness of such technologies. For these faculty, additional feedback, support, and training may increase their likelihood of using educational technologies.

This study confirms previous findings that faculty will employ new instructional practices if they are based on or enhance general acts of teaching. This study provides new evidence that these reasons are associated with their evaluations about the learning experience in courses that use OLEs. Ehrman (1995), Guskin (1994), and McInnis (2002) all argue that the role of technology in higher education should be to enhance acts of teaching—e.g., prompt feedback, faculty-student interaction, transmission of information, and development of active learning opportunities—that, in turn, enhance student learning. Indeed, Wolcott & Betts (1999) report the results of survey and interview data from about 600 faculty and find three interesting trends that support this interpretation. First, faculty reported that using educational technologies and OLEs required significant amounts of extra time and preparation—so-called “hidden work.” Second, to take on this extra work, faculty were not driven by external factors such as merit pay or promotions. Instead, and third, faculty choose to spend extra time and use OLEs to increase the opportunities to grow professionally. Even though many faculty were intrigued by technology, they viewed it more as a means to improve their teaching practices and overall student learning.

Future research on education and technology could extend this study in one important way. Specifically, do the reasons why faculty teach courses that use OLEs predict a quality learning environment? This is a different question than that of perceptions of the learning experience. More generally, all research on education and technology must become more comprehensive by including both faculty and students (Menges & Austin, 2001). Indeed, with an eye toward faculty and students, MacFarlane (1995) contends that the primary goals for faculty who use technology are to (a) structure knowledge to make it interactively accessible, (b) facilitate the process of learning, and (c) manage interaction among learners and between learners and knowledge. Finally, Saba (2000) argues that comparative studies that examine the effects of educational technology on student learning must be grounded in theories of learning and interaction.

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