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A CASE STUDY OF WEB-BASED LEARNING: THE MICHIGAN VIRTUAL UNIVERSITY IT TRAINING INITIATIVE

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Abstract

The World Wide Web is achieving greater popularity as a vehicle for instruction in both the business and university communities. A recent, notable development is the trend for universities or state governments to partner with software vendors to offer online IT training courses that often lead to certification. For instructors, this raises an issue of how these partnerships can be utilized to enhance IT education. This paper presents one possibility for doing this. It addresses a course project for incorporating online courses at Michigan Virtual University's website into a graduate IT course. The results of this effort based on student survey feedback are also reported. Even though most students were new to online learning, participants reported a high level of satisfaction with this experience and most said they would consider taking additional online courses. This report should benefit educators at other institutions as their universities or states partner with IT vendors to offer online courses and seek ways to take advantage of these opportunities.

Keywords: Online learning, web-based instruction, e-learning, IT education, IT certification

Introduction

Web-based instruction, also known as online instruction or e-learning, is clearly growing in popularity. According to a report by WR Hambrecht & Co. and International Data Corp. (IDC), U.S. firms spent \$3 billion on IT-based delivery of training in 1999; this was projected to grow to \$11 billion by 2003 (Koprowski, 2000). Additionally, the IDC estimates that the worldwide market for e-learning will grow to more than \$18 billion by 2005 (Moore 2001). Among the many forces fueling the move toward more online instruction are shrinking company budgets in tight economic times and a reduced interest in business travel. EDS is among the companies who have contracted with DigitalThink to provide e-learning to its 140,000 employees worldwide (Moore 2001). Besides DigitalThink, other leading content providers of web-based corporate training include Learn2.com, NETg, Prosoft Training, SkillSoft, SmartForce, and KnowledgeNet (Sauer 2001).

Not only is online instruction spreading in industry, but institutions of higher education are also dramatically increasing their web-based course offerings. Today, working adults constitute a significant percentage of the college population. E-learning provides 24/7 availability to fit learners' schedules, eliminates geographic boundaries, and offers a self-paced, interactive, multimedia learning environment (Liaw and Huang 2002; Haugen, LaBarre, and Melrose 2001). Thus, web-based instruction has the ability to serve educational audiences such as working adults who would otherwise not have access to higher education (McEwen, 2001).

An important, emerging educational trend is the partnership between universities (or state governments) and IT training vendors to offer web-based instruction for IT certification. For example, in June 2001, the University System of Georgia, which covers nineteen public colleges and universities in the state, signed a deal with KnowledgeNet to create a program to help students obtain IT vendor certifications, called the Georgia Global Learning Online for Business and Education (Weil, 2001). Duke University began offering IT vendor certification through its continuing education program even two years earlier than this; Boston University's Corporate Education Center is also among the universities who offer IT certification courses (Weil, 2001). These

"hybrid programs" try to leverage the advantages of both the university environment and vendor training. As more workers become interested in supplementing their degrees with practical training and certification, they often also want access to universities' resources such as the use of libraries, help with job placement, and financial aid. According to a 2000 study of IT vendor certifications by the U.S. Department of Education, partnerships between higher education and industry to offer IT vendor certification are expected to flourish in the coming years (Weil, 2001).

As online partnerships grow between universities or states and software vendors, educators are faced with the issue of how to incorporate these learning opportunities into new or existing courses. This paper explores a particular online learning agreement between the State of Michigan and software vendor, NETg. The workings of this program, Michigan Virtual University's IT Training Initiative (ITTI), are examined next. The subsequent sections of the paper focus on how the ITTI was utilized in a graduate IT course to enhance student learning and the results of this effort. The experience reported here should benefit other institutions as their universities (or states) link up with software providers in various arrangements to offer more web-based instruction.

The MVU IT Training Initiative

The Information Technology Training Initiative is one of the major programs offered by Michigan Virtual University (MVU) at its website (www.mivu.org). The MVU is a private, not-for-profit Michigan corporation that was established to deliver online education and training opportunities to the Michigan workforce. The MVU was founded by Governor John Engler, the Michigan Economic Development Corporation, and several major industries in the state to provide education and training to the state's workforce. The underlying motivation was to maintain a skilled workforce to preserve existing jobs and draw new companies and jobs to Michigan. The MVU also generates revenues through course fees and contract services offered to certain audiences, sponsorships, and grants. One of the MVU's latest initiatives is Bee Freeway, which makes online courses available at no cost to Michigan businesses with 25 or fewer employees and employees of non-profit organizations.

The MVU's IT Training Initiative is a program to provide the Michigan educational community with access to more than 700 Web-based, self-paced IT courses. These courses are provided free of charge to enrolled students, faculty, and staff at Michigan high schools, community colleges, colleges, and universities. This program began "on the heels" of the state's Teacher Technology Initiative, which provided free laptop computers to K-12 teachers in Michigan. With these laptops in place, the state recognized the need to provide greater training in software-related skills to teachers. As noted, the scope of the ITTI extends beyond K-12 teachers to students, faculty, and staff in higher education.

The ITTI began delivering online courses in early 2001, after entering into a contract with software vendor NETg, a division of Thompson Learning educational publishers. NETg is a leader in creating interactive multimedia training products, especially in the field of information technology. NETg serves more than 4,000 customers worldwide, and it was named IT Training Company of the Year (2000) by the Institute of IT Training. NETg's clients include large organizations such as Boeing, Yahoo, and AT&T. The ITTI signed a three-year contract with NETg to make available more than 700 course titles (ITTI, 2002).

These courses, developed by NETg, provide interactive, hands-on learning experiences, and include the use of graphics, sound, video and real-world simulations. Most courses begin with a pre-assessment, a set of multiple choice, matching and demonstration questions that help the students determine their levels of skill. The program uses the results to create a "precision learning track" that guides students through the topics on which they need training without covering information they already know. At the end of each module, students take a mastery test to track their progress and reinforce their understanding of the skills covered.

NETg has partnered with industry leaders such as Microsoft, Netscape, Oracle and Novell to co-develop courses. This provides early access to beta software, first-to-market training opportunities, and the most direct paths to company-specific certifications. NETg specifies paths that, when followed, prepare individuals to sit for certification exams including Microsoft, Novell, Oracle, Cisco, Netscape and A+ products (ITTI, 2002).

The ITTI contains both software-oriented courses as well as courses dealing with management and communications topics to facilitate professional development. Technical courses include offerings about: Microsoft Office Products, Oracle, SAP, Novell, and Cisco. Multiple levels of coursework are available in many cases for certain software packages. For example, Microsoft Access has learning units for: the fundamentals, proficient users, and expert users. Courses of a more conceptual (non-technical) nature address topics such as: e-business, project management, virtual teams, and communications skills. Once a user successfully

registers at the site there are no limits on the number of courses that can be taken. Most learning units are designed to be the equivalent of 6-7 hours worth of instructor-led classroom instruction.

As stand-alone, self-paced courses, the courses are free to eligible users through their education institutions. Some colleges may charge a fee if the course has been integrated into a tuition-based curricula with additional content and instructor facilitation. The ITTI does not grant degrees, but taking ITTI courses can be taken toward satisfying IT certification requirements.

The technical requirements for users to participate in ITTI course offerings are modest. They include having an IBM-compatible system, 486 or Pentium PC; 8 Mb of RAM (16 Mb for Windows NT); a mouse; Windows 3.1 or higher; a Windows display mode of at least 640x480 resolution with 16 colors (256 colors recommended); Internet access via a network or 56k modem; and an MPC-compliant sound card and headphones or speakers if the students want to hear audio. Technical support is also available from the ITTI to answer specific user questions.

Alternatives for Leveraging the ITTI's Learning Units

The IT Training Initiative offers many possibilities for online learning. One option is that users can take ITTI courses that work toward obtaining an IT certification. This can save a user hundreds or thousands of dollars compared to what vendors charge for similar training. This factor is important as IT certifications grow in popularity. An analyst at the U.S. Department of Education estimates that by 1999 IT vendors had issued 2.4 million certifications to almost 1.6 million people (Wilde 2000). A study last year found that certifications in products and technologies by Microsoft, Cisco Systems, and Oracle made up the top seven spots of most important vendor certifications (Roberts 2001).

Second, a user can take an ITTI course to maintain an existing professional certification. For example, if Michigan K-12 teachers complete and achieve a satisfactory success rate of 80% on the post-assessment test of an ITTI learning unit, they earn continuing education credits toward maintaining teacher certification. This serves as an important motivator for teachers to complete ITTI learning units.

A third reason a user may take an ITTI course is "on his own" for personal development purposes – even though it does not count toward obtaining or maintaining a certification. For example, a user might just be interested in learning more about a certain software package such as Microsoft FrontPage. Learning can be documented through printouts of the successful completion of a course, similar to what teachers do to verify their completion of learning units. The user, however, might need to educate prospective employers about the ITTI learning experience and what knowledge was mastered since many employers may not be familiar with the ITTI.

Fourth, an ITTI learning unit can be utilized as a "help file" about a software package. That is, instead of taking an entire course, a user who is working on an Microsoft Access project, for example, could look up specific topics in the ITTI's Access courses. A detailed table of contents is available with most ITTI learning units that should help a user find needed information fairly quickly. The information and examples presented may be clearer than in other sources.

Finally, an ITTI learning unit can be incorporated into a traditional, instructor-led course through projects or assignments. For example, a specific topic that is not contained in an existing textbook in Microsoft Excel could be added through use of that part of an ITTI learning unit. Alternatively, individual or group projects that involve completing an entire ITTI course can be undertaken. This strategy of utilizing the ITTI is explored in this paper. The next section describes a group project that was completed in a graduate IT course that utilized various ITTI learning units. The results of this project provided by student survey feedback are subsequently reported.

Using ITTI Learning Units: A Group Project Example

A group project involving ITTI learning units was assigned in a graduate information systems course in Information Resources Management at a large public university in Michigan. The goals of this project were to: (1) to increase students' awareness of the free training opportunities available at the MVU website; (2) learn state-of-the-art information about an IT-related topic; (3) gain experience working in a project team; and (4) improve students' abilities of "learning how to learn" through Web-based vendor instruction. The project required all students in the group to satisfactorily complete their assigned ITTI course, to submit a written portion of the project, and to make a class presentation about the assigned topic/learning unit.

The project was initiated in the first week of the Fall 2001 semester. At that time, students were required to form groups of three and they were asked to submit a rank-ordered list of their ITTI course preferences based on an initial list provided by the instructor. The instructor reviewed the group submissions, honoring group preferences as much as possible. The instructor then communicated the list of approved courses for the groups via the class listserv a couple of days later. Due to the nature of the course, Information Resources Management, the ITTI courses selected focused chiefly on non-technical units that fit in with the general theme of the management of technology in organizations. The approved ITTI courses addressed by the groups included: building an e-commerce business case, supply chain management and e-procurement, e-commerce security, virtual teams, and modules on project management. Group member evaluations were also submitted with the written portion of the project to ensure that group members contributed fairly equally to the project.

Written Requirements

The written portion of the project, which was submitted by groups in week six included the following components:

Documentation of "satisfactory completion" of the learning unit. These printouts, done from within the ITTI course by every person in the group, indicate the user's name, the status of the unit (i.e., whether or not it has been completed), and post-test assessment scores. Consistent with the standard used for Michigan K-12 teachers to earn certification credits, "satisfactory completion" was defined as completing the course and achieving at least an 80% proficiency rate on the post-unit assessment.

Definition of key terms. The groups presented a list of key terms defined from the ITTI unit. This was designed to help clarify their thinking about their topic and to aid in the preparation of their presentation.

Test questions. Groups were required to write several multiple-choice, true/false, and short answer essay questions about important topics in their learning unit/topic and to include these questions in their class handout. The intent of these questions was to motivate other class members to listen attentively to the presentations. However, later it was decided not to use these questions on the exam for a couple of reasons: (1) the materials submitted in a number of cases were not of sufficient quality; and (2) if these questions were included on the exam, the amount of material it addressed would have been overwhelming when coupled with that of the rest of the course.

Article reviews. Three article reviews were submitted from each person in the group about the assigned ITTI topic. Since nearly all groups had three members, this amounted to nine articles per group. Each review included a complete citation of the article, a one to two page summary/critical analysis of the article, and the full-text of the article. Students were encouraged to find articles that provided "real-life" company examples of concepts discussed in their ITTI learning unit.

Critical Success Factors (CSFs) for effective online learning. Students were encouraged to think about the relative effectiveness of their online learning experience in more detail through this requirement. As stated in the project, an IT manager must periodically make decisions about training, whether it concerns his/her own personal development or those of other employees. With so many different training delivery modes available today (such as classroom-based training, video training, CD-ROM training, and online web-based instruction), it is important to consider what is likely to make online learning successful. If these factors are not present in a particular situation, presumably a different training mode should be selected.

Thus, the groups were asked to reflect on their experiences with this project and to identify and discuss seven to ten critical success factors for effective online Web-based learning. These factors were expected to encompass three broad areas: the learner, the learning unit, or the environment/other factors. For each factor identified, the groups were expected to discuss whether and to what extent this factor was present in their own learning experience. The groups also were required to give an overall recommendation for the unit – that is, whether they would recommend the unit to others, and if so, to whom?

Presentation Requirements

Groups were randomly assigned to make 30-40 minute presentation about their ITTI training unit/topic during weeks four through seven of the semester. The presentation was to summarize the key points of the training unit and appropriate written portions of the project. Students were instructed to be selective about what information they presented, since there was not adequate time to address all of the contents of the learning unit. The students were told to make this presentation as useful and informative as possible to other class members. This included integrating the information from articles about their topic with the information

in the unit itself. Groups created handouts for all class members, and the presentations were evaluated based on its content, delivery, and the quality of presentation slides.

Results

An anonymous survey was completed by all twenty-two class members at the conclusion of the project. The most significant findings of the survey are summarized below.

Method of access. Most students (95.5%) reported that they accessed their learning unit via direct Internet connections from either on-campus or off-campus. Only one participant used an off-campus, dial-up connection. More than two-thirds of the subjects (68.2%) reported that they completed their learning unit using audio, while the remainder did not.

Prior Awareness of the ITTI and Online Learning Experience. Since one goal of this project was to increase students' awareness of the training opportunities offered by the ITTI, a survey question asked if students had ever heard of the ITTI prior to this project. Only 18.2% of the participants said they were aware of the ITTI previously compared to 81.8% who were not. Among those who had a prior awareness of the ITTI, only two students (9.1%) reported that they had completed an ITTI course previously. A total of four students (18.2%) said they had ever completed a web-based training course prior to this project (at the ITTI or elsewhere). Thus, this project was a new experience for the majority of students.

Overall Satisfaction and Perceived Quality of the ITTI Training Unit. The mean rating for overall satisfaction about the ITTI learning unit was 5.91 on a seven-point scale (that ranged from 7 for "extremely satisfied" to 1 for "extremely dissatisfied"). Another survey question asked participants to rate the overall quality of the unit. For this, 21 of 22 users (95.5%) reported that the unit either met or exceeded their expectations, while only one user felt otherwise.

Specific Satisfaction Measures. The participants were asked to rate their learning unit on various specific dimensions using a five-point scale, ranging from 5 for "excellent" to 1 for "poor." The results for these measures are summarized in Table 1. As indicated in the table, while all items received a positive rating of more than 3.4 on the five-point scale, the highest ratings were obtained for ease of use and clarity of information.

Table 1. Ratings for Learning Unit Dimensions

	Mean	SD
Ease of use	4.32	0.8
Clarity of information	4.05	0.8
Useful	3.95	0.7
Interesting	3.59	0.9
Quality of assessment questions	3.50	1.0
Degree of user interaction	3.45	1.1

Future Intention to take other ITTI Course(s). Beyond increasing awareness, another goal of the project was to increase the likelihood that students would take other ITTI courses to improve their professional development. For this item, 54.5% of respondents said that they were "definitely interested" in taking another ITTI training course, while the remainder (45.5%) reported that they "would consider" taking another ITTI course. No participants said that they were "definitely not interested" in taking another ITTI course.

Satisfaction with this Project Compared to a Project Alternative. If this project were not used in this course, one alternative for a group project would be for the students to work in a group on a more traditional research paper using library sources about a specific topic. To gauge students' relative preferences for these project alternatives, one survey item stated, "I would rather do a group research paper than this project." Only 9.1% of students agreed with this statement, while 13.6% said they gave a response of "don't know/no opinion." Over two-thirds of students (77.3%) disagreed with this statement, suggesting a preference for this project over a more traditional group research project.

Areas for possible improvement. In the survey, participants were also asked what problems they experienced in doing the project and what aspects of it could be improved. One item mentioned by a few respondents was that they wanted a greater ability

to print screens within the learning unit. While certain portions of the learning unit could be printed, others could not. A few participants also experienced problems with the website saving their assessment scores to some portions of the unit due to a temporary problem with the server. That is, when these students returned to access their work in a subsequent learning session, some of their work was not saved.

From an instructors' point of view, the project by all accounts was a success. However, two aspects of the project dealing with the group presentations could be improved. First, most groups did not devote enough attention to integrating what they learned about their topic from other sources outside of their learning unit. As noted earlier, the groups were supposed to find "real life" company examples to integrate into their presentations. While this was present to a degree in most presentations, overall it could have been significantly improved. Second, there was tendency to try to present too much information in the allotted time. The participants were instructed at the beginning of the project not to try to present "everything" in their learning unit, since there was not enough time to do so. Instead, more groups should have focused on limiting the length of their presentation and only focusing on the most essential aspects of their topic. Thus, if this project is used in the future, these points will be emphasized even more strongly. They can be accomplished easily with more up-front planning and teamwork.

Conclusions

This paper proposes one possibility for utilizing web-based vendor training to supplement the content of a traditional, instructor-led IT course. Overall, the results of this study suggest that the inclusion of the ITTI learning units by way of this group project achieved a number of positive outcomes. Students reported a good level of satisfaction with the quality of their learning units. The project also succeeded in expanding students' awareness of the many opportunities offered at the MVU website. Further, by spending time at this site in this project, students were considering taking additional MVU courses that could benefit them in the future. As university or state-vendor partnerships in IT web-based training expand in the future, IT educators will be challenged with how to utilize these opportunities most effectively. This paper presents one option for enhancing the quality of students' IT educational experience via online learning.

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