

JOURNAL OF THE

UNITED STATES DISTANCE LEARNING ASSOCIATION

December 2002

Editorial Board

Elizabeth Perrin Ph.D.
Editor

Donald G. Perrin Ph.D.
Executive Editor

Stephen Downes
Editor at Large

Paula Moriera
Editor, Training and Technology

Brent Muirhead Ph.D.
Editor, Online Learning

Call for Papers

The **USDLA Journal** is a referred publication of the United States Distance Learning Association. It focuses on distance and open learning and their integration into education and training worldwide. Specific topics include: research, innovations in teaching and learning theory and practice, curriculum design, technology, learning from television, online learning, interactivity, peer learning, learning objects, administration and evaluation of distance education programs, legislation, policy frameworks and analyses, institutional change, education-industry partnerships, and other topics related to learning at a distance.

The USDLA Journal is published online monthly. An interdisciplinary panel specializing in distance education reviews all submissions.

Copyright Information

All articles remain the intellectual property of the individual. The presentation is copyrighted by USDLA unless separately acknowledged. Permission to copy or disseminate this article is granted if the following conditions are met:

- Copies are not made or distributed for commercial advantage.
- USDLA Journal, volume, number and date (and original source for republished articles) is acknowledged.
- USDLA is notified if you provide a link to articles or the USDLA website. To disseminate copies for commercial advantage requires written permission. Contact: eperrin@pacbell.net, T 909/369-4059 or F 909/779-0803.

Submission of Articles

Length: Article submissions are usually from 2,000 to 5,000 words in length. Articles of greater length are published when the topic and treatment merit it.

Format: Papers should conform to APA standards. Please include a brief biography of the author or authors, mailing addresses, and email/phone contact numbers. Indicate address (usually email) to be published with article.

Copyright Clearance: If you include materials that require copyright clearance or permissions, please provide contact and email address.

Word Processing: Word, Rich Text Format (.RTF) or ASCII Text is preferred. Attach files to email or send as a diskette with one laser-printed copy.

Graphics: Where relevant, include separate files for photos, line illustrations, charts as email attachments or on diskette. .GIF or .JPG files are preferred. We can convert from most Adobe and Microsoft graphic formats.

Contact Info:

Please direct inquiries concerning articles for submission as follows:

Drs. Donald & Elizabeth Perrin, Editors, USDLA Journal
3345 Pachappa Hill, Riverside, CA 92506

T 909/369-4059 | F 909/779-0803 | C 909/236-2658
eperrin@usdla.org or dperrin@usdla.org

IN THIS ISSUE

DECEMBER 2002

PODIUM

Online Issues	1
Donald G. Perrin	

FEATURE ARTICLES

Course Web Sites: State-of-the-Art	3
Svitlana Grankovska and Jesse Heines	
Ensuring E-learning Success: Six Simple Tips for Initiative Leaders	13
Frank J. Troha	
Tips for Developing Media-rich Online Courses	17
S. Junaidu and J. Al-Ghamdi	
Blended Learning and Learner Satisfaction: Keys to User Acceptance?	29
Larry R. Irons, Robert Keel, Cheryl L. Bielema	
The Brazilian Virtualizing Project: Using Virtual Education to Bring Public School Teachers Closer to Modern Reality	41
N. R. Modro, L. C. Paas, and A. M. Rodriguez	
Writing for Academic Publication	51
Brent Muirhead	
Self-Efficacy & Motivation Effects on Online Psychology Student Retention	55
Robert Irizarry	

PODIUM

Online Issues

Donald G. Perrin Ph.D., Journal Editor

Most colleges and universities now offer some online courses; virtual high schools are established in several states; and business, industry, corporations, government, military, and health sciences are deeply committed to distance learning in its many forms, synchronous, asynchronous, blended; CBT, interactive multimedia, internet, online; and video via tape, disk, cable, two-way interactive, broadcast, and satellite. Questions of quality and equivalence with traditional courses are largely resolved, and the tide has reversed so that on-campus courses now benefit from the interactive technologies developed for distance learning.

Innovation continues, and competition brings new and improved course materials and technologies on an almost daily basis. Distance learning is no longer a group of early adopters touting their achievements, but a mainstream option for learning anywhere and everywhere, any-time and all-of-the-time; for almost anybody and everybody who are willing to work to meet the predetermined standard. Learning management systems automate routine tasks and record keeping; authoring systems facilitate translation of content and pedagogies into interactive learning media; and there are teaching and learning options for every learning style.

The nay-sayers and luddites (Dr. Noble not withstanding) have been quieted by the success of Distance Learning. It opens up educational opportunities for millions of people who could not otherwise attend classes or earn certificates and degrees. It solves logistical problems of training in the workplace. It provides opportunities for students to better schedule their education, work, and life with family. It provides a major resource for home schooling, which now serves over one million students in the United States.

Five years ago, the State of California faced a need for buildings to support increased enrollment that was three times the available construction budget. It determined that Distance Learning would have to fill the gap. Today, almost every institution of higher education in the State of California has a distance-learning component.

This issue of USDLA Journal is about research and evaluation of online learning. It delves into faculty developed web sites, institutional support, pedagogy, and learning options for students. It considers course structure, motivation, interactivity, media, blended learning, learner satisfaction, learner retention, and course management.

Editor's Note: This paper is a statistical study of course websites. It provides a valuable snapshot of "state-of-the-art" features, pedagogical values, and areas waiting for development. It explores use of authoring programs, institutional support, password access, and the basis for faculty decisions including time, options available, and institutional support.

Course Web Sites: State-of-the-Art

Svitlana Grankovska and Jesse Heines

Abstract

230 course Web sites were visited to assess state-of-the-art characteristics based on 16 key factors. Analysis of these sites revealed that most provide only one-way communication from instructor to students. Few provide ways to send feedback to the instructor other than via e-mail, and even fewer provide ways to interact with other students. Faculty at various institutions were surveyed on course Web site development and maintenance. That survey revealed that time is the biggest obstacle to improving course Web sites or having them at all, even when using commercial tools. Most faculty develop and maintain their own sites, even when help is available from a university Web office.

Searching for Information on Course Web Sites

Course Web sites have not been discussed at length in either electronic and paper publications. We therefore performed an extensive Internet search to try to identify their state-of-the-art. The majority of sources found were guides and books with guidelines for creating course Web sites.

Course Web Site Design Guides

The University of Oregon [10] offers an online document that discusses the anatomy of course Web sites and provides a general overview of the content of selected sites. This guide provides tips on design and a simple step-by-step process for creating a course Web site.

Similar publications are available from other universities. Dartmouth College [1] offers a set of articles on course Web site design as well as an online guide. Important questions about online teaching in general, and course Web sites in particular, are considered from many perspectives. The authors discuss how to create sites, issues of privacy in online classrooms, student online forums, etc. This set of articles is a valuable resource for both novice and advanced course Web site designers.

Patti Shank [9], at the University of Colorado, Denver, has posted a tutorial entitled *How to Build a Course Web Site*. She provides a number of Macromedia Dreamweaver templates and easy-to-follow directions on how to use them to get a site up quickly and painlessly. This tutorial can help an instructor new to this technology get up to speed and put his or her own site together quickly. The introduction provides insight into the

importance and versatility of course Web sites and encourages professors to provide them for their courses.

We found similar tutorials on Web sites at the University of Michigan [5], the University of Washington [11], Berkeley University [4], and the Massachusetts Institute of Technology [7]. All of these share several common features, such as a short overview of the typical components of course Web sites, useful templates, and a list of tips and directions for using tools like Macromedia Dreamweaver. Example course Web sites are also available in most cases to enhance understanding and provide ideas for one's own site.

A more extensive tutorial, entitled *Web Style Guide: Basic Design Principles for Creating Web Sites*, is available from Yale University [6]. This guide incorporates a separate chapter dedicated exclusively to course Web sites creation. It is comprehensive and provides detailed examples, templates, and explanations. Lots of options are presented for choosing the type of site a faculty member may want and how to make it most effective for students. The guide also addresses more subtle aspects of Web sites such as readability and ease of use.

Papers on Course Web Sites

We found very few formal papers that discussed the different aspects of designing course Web sites. Heines [3] analyzed student grades to evaluate the effect of a course Web site on student performance and surveyed students to assess the utility of a site's various components. The study demonstrated that a readily available course Web site "significantly enhanced student's learning of course content." Based on these results, one might conclude that course Web sites can improve overall teaching effectiveness.

Gehringer [2] discussed the issue of password-protected access to course Web sites and debated whether or not such sites should be so restricted. The author conducted a survey of faculty members at several universities and suggested a number of reasons for protecting course Web sites with a password. Gehringer concluded that it is difficult to decide whether to restrict course materials on the Web. On the one hand, public sites can make it impossible for a university to commercialize these sites. On the other hand, restricted sites can make it impossible for prospective students to familiarize themselves with a course of study and thereby aid their decision about attending the university. Perhaps it is best to partially hide information, making general information public but allowing professors considerable discretion in deciding what resources to make available only to current students.

Reeves and Dehoney [8] analyzed the content of class pages and interviewed professors about such content. They weighted the importance of different Web site components and concluded that the outcomes of using course Web sites exceeded expectations seemingly in proportion to the degree to which instructors used the unique qualities of the Web. Collaborative forms of instruction appeared to be one of the strongest points stressed in the interviews.

Analysis of Existing Course Web Sites

We also used popular search engines such as *Google* and *Yahoo!* with the keywords “course Web site” and “course Web page” to find over 230 course Web sites. (These links are listed in the on-line version of this paper at http://teaching.cs.uml.edu/~heines/techrpts/papers/GrankovskaHeines_USDLAJournal_online.pdf) These sites were scrutinized on the presence of 16 categories of information, some of which had subcategories (see Table 1).

Our analysis revealed that nearly 100% of the sites (229 out of the 230) have course syllabi that include a course description, grading policy, and instructor and teaching assistant contact information and office hours. This appears to be the minimum content for a course Web site. It allows students to familiarize themselves with the course before enrolling, fostering wiser curriculum choices and better preparation for class. About 87% (201) of the syllabi we viewed post weekly course schedules, while the rest seem to prefer to set only tentative class schedules to allow flexibility for changes and updates as the semester progresses. Although knowing the schedule ahead of time appears desirable, adaptive schedules can more easily take diversity of student interests or the volume of material actually covered in preceding lectures into account.

A majority of sites (178, 77%) post homework assignments and 62% (143) provide online access to lecture notes in HTML, PowerPoint, or PDF formats. Quick and easy access to these components is highly desirable not only for students who miss class, but also for those who have trouble keeping up and even those interested in delving deeper into subject matter not covered during normal classes. In addition, such components are of great help to foreign students whose language skills impede their understanding of lectures.

**Table 1. Summary of Web Site Analysis Results.
(N is out of 230 Web sites examined.)**

Information Category	N	%
1. course syllabus with:		
a. grading policy	223	97.0
b. course description	229	99.6
c. weekly schedule of topics	201	87.4
d. instructor and TA contract information	229	99.6
e. schedule of office and/or help hours	229	99.6
2. assignments	178	77.4
3. lecture notes	143	62.2
4. additional documents and/or resources:		
a. class handouts	161	70.0
b. links to resources on this site as well as others ...	201	87.4
5. FAQ page	16	7.0

6. grade display program	42	18.3
7. interactive lessons	3	1.3
8. sample tests	75	32.6
9. sample student work	69	30.0
10. course BBS	37	16.1
11. class roster containing:		
a. student e-mail addresses	21	9.1
b. student pictures	1	0.4
12. suggestion box (anonymous or not)	12	5.2
13. course announcements	55	23.9
14. course mailing list	10	4.3
15. the site development tool and technique (if discernable):		
a. commercial development tool (as opposed to home grown)	41	17.8
b. team development (as opposed to an individual effort)	14	6.1
16. two-way communication (as opposed to one-way)	59	25.7

We found that the prevailing format for online lecture material is Microsoft PowerPoint. Even though this format is convenient for presentations, its file sizes are typically large, creating problems in downloading if a student has only a slow or unreliable Internet connection. Converting this material to HTML would require additional time, but might make it more accessible.

The vast majority of sites (201, 87%) post links to resources located on other sites that provide additional information to interested and/or advanced students. This useful feature can breach gaps in subject matter understanding and promote creativity and independent thinking.

We found frequently asked questions (FAQ) pages to be quite rare on course Web sites. Such pages can: (1) replace one-on-one student-instructor meetings, releasing students from trying to catch their instructor during short office hours and cutting down the number of times commuting students need to come to the university, (2) provide a way for students to find answers to their questions before posing them to the instructor in person, hence avoiding multiple questions of same nature from different students, and (3) save class time by referring students to FAQ pages for administrative issues. Questions and answers can be accumulated over the years and evolve into fruitful discussions with useful examples and explanations from different angles.

Only 18% (42) of the sites we visited had grade display programs, and only a handful of those offered password protection to control access to grades on a per student basis. Most simply presented a list of last names and corresponding grades. A grade display program

can also indicate a student's relative class standing during the semester. Unfortunately, the source code for sophisticated programs is not readily available, and creation of such a program can require considerable programming skills.

Next we considered the availability of interactive lessons. We found that most professors who teach their courses "live" do not provide the same material online in interactive form. While interactive lessons can be quite useful, their effectiveness is highly sensitive to both learning environment and quality of material presented. For instance, a lack of examples designed to demonstrate a concept can lead to shallow understanding. In general, it takes a great deal of talent, imagination, and understanding of human psychology to create easy-to-use yet informative and helpful online lessons. For example, student-instructor dialogs are an important tool for achieving overall comprehension of a subject. These are usually present in live classrooms, but they can be difficult to duplicate in online classrooms.

Since most courses have tests and exams, advanced information on upcoming tests and/or examples of problems and their solutions or hints appear to be another useful feature of course Web sites. However, some faculty intentionally remove such information at the end of the semester for various reasons. Only 30% (69) of all Web sites we examined provided such information. Sample homework solutions from previous years or solutions to similar problems also fall into this category. Although this component is not a critical one, a considerable number of instructors adhere to the teaching axiom of providing students not only with theoretical knowledge, but also with solutions to numerous practical problems that demonstrate application of the theories.

As the Internet has evolved, new and advanced features such as interactive forums have appeared and gained wide popularity. Forums support discussion by a group of people and can serve as an information database, even though retrieval of the answer to a specific question may be difficult. Few sites (37, 16%) have this feature. One possible reason for such limited use of these forums may be their initial cost, as relatively few instructors have the time or skill to build their own. Nevertheless, forums provide a great opportunity for students and faculty to continue information and data exchange during non-class hours. They also encourage students to share their knowledge with each other in a convenient form, especially when someone who has a question posts it online and someone else who knows the answer (or where to find it) replies to all who may be interested.

Few sites (21, 9%) post the course roster and students' email addresses and other personal information on Web so that it is available to public. Roster listings can help students get to know each other and lead to more interaction and shared learning. On the other hand, some consider such listings an invasion of students' privacy.

Even fewer sites (12, 5%) have anonymous or non-anonymous suggestion boxes. Suggestion boxes give students a good chance to provide feedback to instructors during the semester. Anonymous suggestion boxes allow shy students to speak out even if they are outshone or intimidated by others with more straightforward or bold personalities.

A handful of sites (10, 4%) offer a class mailing list. Such a list can serve as an alternative to a FAQ page by making the instructor's responses to student questions available to the entire class. This way, those not participating in the discussion still see its

progress and result. A mailing list can also operate more quickly than a FAQ page. Furthermore, a mailing list is convenient for limiting distribution of information to current students. On the other hand, a FAQ page preserves discussion threads for future students and hence can reduce the stream of questions and answers by letting students search the existing entries.

In most of cases, it is difficult to determine whether a course Web site was created through personal effort of a single instructor or his or her staff (if any), or if it was created using templates provided by the academic department or the university. It is worth mentioning that many universities do provide their faculties with the choice of using standard templates for course Web site development or implementing their own site with any features and options they deem useful.

Faculty Survey on Course Web Sites

For the second part of our research we created an online survey, posted it on the Web, and advertised its URL to all subscribers of the ACM SIG CSE list server (approximately 750 people), all University of Massachusetts Lowell faculty (approximately 425 people), as well as approximately 100 other known faculty members in various institutions. 150 people completed the survey, a response rate of approximately 12%. The survey is shown in the on-line version of this paper referenced above. A summary of the results is shown in Table 2.

125 (83.3%) of the faculty who responded to our survey indicated that they have course Web sites, while 25 (16.7%) indicated that they do not. Most (73.6%) of those who have course Web sites have them open to public, allowing their information to be shared over the Internet. 19 (15.2%) have restricted access to their Web sites for various reasons, including the availability of grade displays, answers to quizzes and exams, etc. (See [2] for an in-depth discussion of this issue.)

Of the 25 faculty who do not have course Web sites of their own, 17 (68.0%) expressed the desire to have one in the future, while 5 (20.0%) have no such desire. The reasons provided by the latter group included an unwillingness to spend time creating and maintaining a site and a lack of confidence that such effort would be of significant aid to the students in the courses they teach.

A majority of faculty surveyed (93/150, 62.0%) responded that their institutions have a Web development group to assist them, but only 14 of these 93 respondents (9.3%) indicated that they took advantage of that group's services.

25 of the respondents (16.7%) reported that their institutions have guidelines for constructing course Web sites, while 97 (64.7%) stated that their institutions do not. Such guidelines typically provide faculty with clear ideas for the content, layout, and implementation. This information can help reduce the time needed to create sites and make development efforts more efficient and helpful to students. In addition, well thought out guidelines can make the structure and organization of course Web sites more consistent across a university.

Table 2. Summary of Survey Results

Data Summary	Yes	%	No	%	No Resp.	%
Total number of respondents	150					
UMass Lowell Faculty	36	24.0				
Faculty from Other Institutions	114	76.0				
Number of respondents [<i>with</i> <i>without</i>] course Web sites	125	83.3	25	16.7	0	0.0
Number of respondents with course Web sites that are [<i>public</i> <i>private</i>]	92	73.6	19	15.2	14	11.2
Number of respondents without course Web sites who [<i>would</i> <i>would not</i>] like one	17	68.0	5	20.0	3	12.0
Number of respondents [<i>with</i> <i>without</i>] access to a Web development group	93	62.0	34	22.7	23	15.3
Number of those respondents who [<i>used</i> <i>did not use</i>] their development group	14	9.3	79	52.7	0	0.0
Number of respondents whose institutions [<i>have</i> <i>do not have</i>] guidelines	25	16.7	97	64.7	28	18.7
Average percent of content developed by respondent him/herself		89.1			0	0.0
Average percent of infrastructure developed by respondent him/herself		83.9			8	6.4
Number who built site using a commercial course Web site tool	20	16.0				
Number who built site using a general purpose Web site development tool	28	22.4				
Number who built site using a locally developed tool	6	4.8				
Number who built site without a development tool	94	75.2				

Number of respondents claiming lack of each of the following as a “serious obstacle to making their course Web site everything they want it to be” or a “significant part of the reason why they do not have a course Web site”

	Total		Have CWS		No CWS	
Time	122	81.3	106	84.8	16	64.0
Know-How	32	21.3	21	16.8	11	44.0
Technical Assistance	25	16.7	17	13.6	8	32.0
Tools	22	14.7	20	16.0	2	8.0
Promotion and Tenure Recognition	18	12.0	17	13.6	1	4.0
Other Factors	18	12.0	10	8.0	8	32.0
Interest	5	3.3	3	2.4	2	8.0
Content Assistance	4	2.7	3	2.4	1	4.0

The average percent of course Web site content that faculty reported they developed themselves was 89.1%. They also claimed to have developed an average of 83.9% of the infrastructure themselves. These figures may be interpreted to demonstrate a large need for flexible course Web site templates. Such templates might save faculty considerable time and foster greater consistency. Furthermore, they might simplify the use and navigation of the sites by students.

20 of the 125 faculty who have course Web sites (16.0%) use commercial tools specifically designed for course Web site development such as Blackboard and WebCT. Others provided several reasons why they shied away from such tools, including cost and support. 28 of the 125 (22.4%) use general purpose site development tools such as Dreamweaver or FrontPage. (There is some overlap in these numbers, i.e., some faculty use both types of tools.) Six (4.8%) used locally developed tools. The majority (94/125, 75.2%) reported that they do not use any development tools at all. The reasons reported for this approach include the lack of access to such tools and a lack of time to learn how to use them.

One of the most telling aspects of our survey was that we asked all respondents, regardless of whether they have course Web sites, to indicate which of a series of factors were “serious obstacles to making their course Web site everything they want it to be” or “a significant part of the reason why they do not have a course Web site.”

Overwhelmingly (122 of the 150, 81.3%), respondents identified lack of time as the major factor. The second factor was lack of know how (21.3%), followed by a lack of technical assistance (16.7%), and lack of tools (14.7%). Lack of recognition for efforts spent on developing course Web sites by promotion and tenure committees was identified by 12.0% of the respondents, as were “other factors” (also 12.0%). Only 3.3% said they lacked the interest to create a course Web site, and only 2.7% indicated that help with content was a factor.

Discussion of Survey Results

Based on our discovery of so many publicly available course Web sites, many college faculty obviously consider such sites an important, helpful aid to their students. We did not find any college or university or department that *required* its faculty to develop course Web sites, but our survey confirmed that many see them as important teaching accessories. The majority of responding professors who did not have course Web sites expressed a ready desire to have one in the near future. Explanations for not having Web sites varied, but a majority cited lack of time, insufficient knowledge of creating Web pages, and sparse technical resources and assistance as the main factors.

The survey also revealed that only a handful of universities provide their faculty with guidelines for creating course Web pages. Among these, Yale University and the University of North Carolina provide some of the most detailed guidelines. Computer services or academic departments of some universities also offer useful templates for course Web site development. However, these templates are typically not available to the general public. Such templates provide a fast track to creating sites for professors who are not familiar with such techniques: he or she can get started simply by filling out a number of fields and uploading some files specific to his or her subject.

The level of institutional support for creating and maintaining course Web sites varies greatly from strong guidelines and extensive templates to no support at all. As a result, one can find sites that vary from simple pages that present only course descriptions and syllabi to those that list lecture notes, homework assignments, sample tests and exams, solutions to selected problems, elaborate graphical user interfaces, and sophisticated interactive forums to support online student discussions.

Further progress in course Web sites development will emphasize the importance of invoking Internet resources to increase productivity and the effectiveness of instruction. Interactive visual presentations may help students comprehend the subject, get familiar with what is to be taught in future classes, and broaden their knowledge by reading additional materials or analyzing solutions to problems. Interactive discussion forums provide a great opportunity for students to exchange knowledge and help each other advance their understanding.

References and Web Resources Cited

- [1]Dartmouth University Academic Computing. Practical accessibility: core concepts (2002). <http://www.dartmouth.edu/~webteach/articles/access.html>.
- [2]Gehring, Edward F. To see or not to see: access restriction on course Web sites. *Proceedings of the American Society for Engineering Education Annual Conference and Exposition* (2002).
- [3]Heines, Jesse M. Evaluating the effect of a course Web site on student performance. *Journal of Computing in Higher Education* 12(1):58-83, Fall 2000. <http://www.cs.uml.edu/~heines/academic/papers/2000jche/>.
- [4]Heyer, Oliver. Course Web site creation (1998). <http://www.itp.berkeley.edu/~eshuh/OliverFITIcomplete/sld001.htm>.

- [5]Holler, Susan, and Look, Helen. The planning process for developing a course Web site (1999). <http://www.knc.lib.umich.edu/guides/CourseWeb/plan.html>.
- [6]Lynch, Patrick J., and Horton, Sarah. Web Style Guide. Yale University Press (1999). <http://info.med.yale.edu/caim/manual/index.html>.
- [7]Massachusetts Institute of Technology, Academic Computing Support. Introduction to creating course Web pages (2000). <http://web.mit.edu/acs/webguide/intro.html>.
- [8]Reeves, T. C. and Dehoney, J. Cognitive and social functions of class Web sites. *WebNet World Conference of the WWW, Internet and Intranets* (1998), Orlando FL.
- [9]Shank, Patti. How to build a course Web site (2002). http://www.trainingcafe.com/members/course_site/.
- [10]University of Oregon Teaching Effectiveness Program. Course Web-sites (2001). <http://darkwing.oregon.edu/~tep/technology/websites.html>.
- [11]University of Washington, Catalyst Project Team. Course Web site templates (2000). http://catalyst.washington.edu/tools/course_templates.html.

About the Authors:

Jesse M. Heines is an Associate Professor in the Department of Computer Science at the University of Massachusetts Lowell, where he specializes in implementation and evaluation of graphical user interfaces. He holds a B.S. in Earth Sciences from the Massachusetts Institute of Technology, an M.S. in Science Education from the University of Maine, and an Ed.D. in Educational Media and Technology from Boston University. Prior to joining UMass Lowell, Jesse spent ten years with Digital Equipment Corporation, where he founded the Computer-Based Course Development Group. He has done post-doctoral work at The Open University in Great Britain, Brown University in Rhode Island, and most recently at the Massachusetts Institute of Technology, where he was a Visiting Scholar in the Center for Educational Computing Initiatives. His e-mail address is heines@cs.uml.edu.

Svitlana A. Grankovska is a graduate student in the Department of Computer Science at the University of Massachusetts Lowell. She holds a B.S. in Financial Management from Kharkiv University in the Ukraine. Her interests include Web-oriented design and programming, particularly applications that involve JavaScript, Java, JavaServer Pages, and XML. She has been working with Prof. Heines for the past 12 months. Her e-mail address is sgrankov@cs.uml.edu.

Editor's Note: Dr. Troha shares a list of directives for success that can be applied in almost every arena of education and training. It is an interesting mental exercise to apply these *tips* to an ongoing enterprise or one in the process of development. Then we can apply them in real world situations.

Ensuring E-learning Success: Six Simple Tips for Initiative Leaders

Frank J. Troha

Leading a major e-learning or blended learning initiative is a relatively new, complex and high-stakes challenge. Success depends on a variety of factors, not the least of which is the project leader's ability to manage threats in the form of miscommunication among key constituents, excessive rework, missed milestones, cost overruns, poor quality deliverables, etc. To help ensure the success of your organization's learning initiatives, consider how you might apply these proven tips:

1. **From design, to development to deployment, consider everyone your learning initiative will impact, identify the key players within each constituency and involve them from the very start.** The success of your initiative will depend just as much on the input, cooperation and support of various key individuals at various levels in your organization as it will on the work you and your project team members contribute. A recent e-mail from a senior instructional designer illustrates the point: "When we asked our internal subject matter experts to review our work for accuracy of content, they instead ripped it apart from an instructional strategy standpoint and said we'd need to redo everything. They resented our 'springing' a near final product on them. We had been designing and developing in a vacuum. The SME's felt left out and wanted to inflict some pain." He went on to write bruised egos, lengthy delays and other kinds of negative fallout ensued, *though all of it could have been easily prevented with a little forethought.*
2. **Precisely define - and get agreement on - roles and responsibilities from the get-go.** Too often it is just assumed everyone will be reasonable, play fair, keep his or her promises and generally look out for the good of the many instead of the self-interests of a few. Rather than gamble on everyone doing what you believe to be the right thing, assume everyone will do just the opposite if you neglect to take preventive measures now rather than later. For example, *the fact that management is willing to fund a major learning initiative does not imply it will later be willing to hold recalcitrant learners accountable for finishing their coursework and applying their learning on the job.* Such contingencies need to be anticipated, defined and accepted by all concerned parties up front. Similarly, in the aforementioned case of the senior instructional designer and the subject matter experts, the apparent failure to explicitly define and agree on roles and responsibilities at the start of the project helped lay the groundwork for a turf dispute. The subject matter experts, instead of assessing the accuracy of course content (as is customary), critiqued the course's instructional strategy and insisted it be revamped.

3. **Do not bring in e-learning providers until you have a thorough understanding of your target audience's needs, management's expectations, the scope of the initiative, likely constraints (e.g., limited resources), learning objectives, content to be covered, evaluation strategy and a host of other basic design matters.** If you and your initiative team members believe you lack the time or expertise to gather such vital information, hire an outside consultant – *with no connection to e-learning providers* – to do it for you. Similarly, if you and your team lack instructional design skills, hire a competent, independent ID consultant who can help you scope out a preliminary design document (see Figure 1: Main Components of an Instructional Design Document). The rationale for doing so cannot be overstated. Until you -- and all other internal key players -- are at least generally agreed on where you need to end up, where you are now, what resources you have and what resources (from both inside and outside of the organization) you will likely need, you are in no position to intelligently communicate your organization's needs and desires to prospective e-learning providers, much less speak on behalf of your constituents.

- | |
|--|
| <ol style="list-style-type: none">1. Course Title2. Purpose Statement3. Audience Description4. Duration5. Prerequisites (if any)6. Learning Objectives7. Constraints8. Content / Learning Activities Outline
(For <i>each item of content</i> to be addressed, indicate how it would be conveyed to audience members and the estimated time required.)9. Transfer of Learning Strategy10. Evaluation Strategy11. Content Sourcing (What We Have vs. What We Need) |
|--|

Figure 1. Main Components of an Instructional Design Document

Add any other sections that are needed to clearly and comprehensively communicate your design, including all project management documentation.

4. **Carefully select the right provider for the job.** Buying e-learning or blended learning services is fraught with challenges. To improve the odds of choosing the most appropriate provider, consider the following guidelines.
 - a. **Develop and confirm precise, comprehensive selection criteria (e.g., past experience addressing similar topics for similar organizations, fee**

structure, service standards, references, etc.) before meeting with any prospective providers. Without such internally developed and approved criteria, you are likely to wind up comparing apples with oranges. Additionally, unless key internal stakeholders are involved in setting and approving the selection criteria you will use, you may – come hiring time – encounter resistance to the provider you favor.

- b. **Use the preliminary design document and selection criteria to interview prospective providers.** The preliminary design document should enable you to clearly and efficiently communicate what you have in mind to prospective providers as well as respond informatively to any questions they ask you. Further, the document should position you to pose this crucial question to potential providers: *To take our design to the next level, what exactly would you recommend and why?* The prepared selection criteria would prompt other important questions, such as: *How long would it take your organization to deliver what we need? How much would it cost? What might cause the price to exceed that figure? What guarantees can you provide in terms of our satisfaction with the quality of your work and client service? Will you prepare – at no cost to us -- a sample unit or lesson, to demonstrate what you would do for us? If you are awarded the project, how do you see us collaborating during design, development and deployment?* By virtue of applying the agreed upon preliminary design document and selection criteria, you and everyone else involved in the selection process can compare apples with apples and base your choice of provider on an objective, internally-accepted scorecard.
 - c. **If you are new to e-learning or blended learning, start small.** According to Forrester Research (www.forrester.com), only 30% of employees bother to complete an e-learning course. With statistics like that (and others that are equally worrisome), it is not only wise to choose outside help carefully, it is imperative that you limit your initial financial commitment to a small initiative or a portion of a larger one.
5. **From start to finish, keep all key individuals informed and appropriately involved.** A successful e-learning or blended learning initiative requires careful project planning, solid instructional design, the development of all instructional components based on an approved design document, ongoing attention to project management issues (e.g., budget, scheduling and communications), various formative evaluations prior to launch, deployment of the learning and ongoing evaluation and maintenance of the learning system. With so many activities affecting so many people, you simply cannot afford to neglect ongoing communication with all key players throughout the process. *But, doesn't such communication open a Pandora's box of questioning, second-guessing and time consuming follow-up?* Ironically, failing to communicate regularly is more likely to delay progress – *or much worse*. A couple of noses out of joint over being left out of the loop has been known to foment a crisis. Worth noting is the fact that precisely defining and agreeing to roles and responsibilities up front helps to preempt a significant, if not substantial, number of queries later on.

6. **Strive for self-sufficiency and control.** Though live, instructor-facilitated, face-to-face classroom instruction will not likely be replaced by e-learning, rest assured e-learning is here to stay. As you gain experience with e-learning and blended learning, consider bringing as much of the total effort as practicable in-house. Besides saving money, you will become less dependent on the efforts of outside providers who have much less of a stake than you in the success of your initiatives and their impact on your career. Already some of today's Learning Content Management Systems make updating existing e-courses a snap for anyone who cares to invest a few minutes in learning how to do so. Further, most in-house training personnel are capable of preparing preliminary designs for e-learning and blended learning courses. By virtue of producing a design in-house, the involvement (and cost) of an outside design consultant can be limited to providing feedback on the preliminary design and enhancing its overall effectiveness. (For a free report detailing how to independently produce preliminary designs for e-learning and blended learning courses, send your request to: frank@franktroha.com.)

Perhaps you have personally experienced some of the many threats that plague major e-learning and blended learning initiatives. If so, I think you would agree upon reflection that all such threats can be successfully prevented or mitigated. Foresight, diligence and know-how, including the application of the six simple tips shared here, are all key to initiative success and well worth your time and effort.

About the Author

Frank J. Troha, Ph.D., is an independent e-learning and blended learning design consultant, assisting a wide variety of U.S. corporations. For information about his background and advisory services, contact:

Frank J. Troha, Instructional Design and Development Consulting
One Landmark Square, No. 411, Port Chester,, New York, 10573 USA
Office 1-914-922-0114 FAX: 1-914-933-0115 email: frank@franktroha.com
Websites:

Instructional Design Services: www.franktroha.com

Blended Learning Design: www.blendlearn.com

Blended Learning Workshop: www.blend-learn.com

Copyright © 2002 by Frank J. Troha. All rights reserved.

Editor's Note: The web is a visually rich and interactive medium for communication, teaching, and learning. Needs assessment, instructional design, visualization (including sound) and interactivity impact effectiveness of learning.

Tips for Developing Media-rich Online Courses

S. Junaidu and J. Al-Ghamdi

September 26, 2002

Abstract

This paper examines the salient features of online courses necessary for effective learning. It focuses on the major milestones encountered when developing media-rich online courses. Issues of concern and their implications are highlighted at each development milestone. Tips are provided based on the practical experience of the authors in online course development. The paper includes a case study to help developers estimate the time investment required for developing multimedia-intensive course contents.

Introduction

From the literature, the phrase 'online course' seems to mean different things to different people. For our purpose, the following definition[1] describes an online course:

A multimedia-rich course delivered completely online. It engages the learner interactively, actively and effectively.

The course should be multimedia rich in the sense that it should contain text, animations, voice, and possibly video clips. The online course should be comprehensive enough such that it can be considered a replacement of the tradition face-to-face method of teaching. It should be a self-contained learning package with concepts adequately illustrated and explained in voice narrations. The course should provide sufficient interaction with the learner in order to give a 'human touch' to online learning.

The remainder of this paper is structured as follows. The following section outlines the salient features an online course should have for effective learning. Section 3 presents the major milestones in online course development and highlights what needs to be done in each milestone in order to realize the salient features outlined in Section 2. Section 4 discusses course management issues after completing and deploying the online onto a learning management system. A case study is provided in Section 5 indicating how much time online course development may require. The paper concludes with a summary and acknowledgement in Sections 6 and 7, respectively.

1. Salient course features for effective learning

This section presents important characteristics that should be reflected in course contents in order to make learning effective. While these issues may apply to both traditional face-

to-face and online courses, they are especially important in an online learning environment. As we discuss these issues we point out how we addressed them in the three online courses that we developed.

Puts learners into perspective

Before beginning course development, online course developers should have a clear understanding of their target audience, the learners. We should know learners' level of motivation, current knowledge level, their language skills and computer literacy. This will keep an online course developer focused towards developing better instructional material with a minimal chance of causing boredom and frustration.

We teach in English in our university where English is not the first language of the students. This requires us to put extra effort in contents presentation and transcript writing. We base our students' current level of knowledge on the knowledge units of pre-requisite courses of our online courses. Our audience analysis reveals that our target students are highly computer literate with 98% owning personal computers.

Spells out learning contract clearly

The course rationale, measurable objectives, learner responsibility and learning outcomes should be clearly spelt out. Grading policies and related matters should also be highlighted early enough. Students should know what they are expected to be able to do after graduating from the course. From our experience [Junaidu, 2002], time management issues are especially important for effective online study.

The first unit in each of our online courses is devoted to spelling these issues out clearly for the students. On the first day of the semester, we give the students a broad introduction to the course structure and organization giving them a battery of study tips based on the course's graduate students' experiences.

Covers course contents adequately

Without proper planning, online course developers may find themselves overwhelming the learners with material. All knowledge units to be covered and their extent of coverage must be carefully stated and course contents developed accordingly. Course contents must be up to date and appropriate choice of examples should be made to enhance the realization of the set learning outcomes.

Computer science, our teaching subject, is a fast changing field, like many other specializations. We have to keep ourselves current, as course developers, to ensure that we prepare and present course contents that incorporate the latest technologies. This will give a relatively longer lifetime to our online courses before revision or redesign becomes necessary.

Contains sufficient motivating elements

Probably the most critical factor in learning is the motivation of the learner [Macromedia, 2001]. As online course developer, you must ensure that online learners are properly motivated. You should include instructional elements that catch and hold learners' attention. Attention is like a flashlight in a dark room; we observe the details of objects in the bright beam but notice less about objects in the dim shadows.

We incorporate graphic images, which serve as metaphors, alongside newly introduced concepts with a view to catching learner's attention. We also use small pop-up screens, in a measured way, to indicate when certain important events occur, like reaching the *base case* when executing a recursive program.

Illustrates concepts adequately

Studies show that combining various media can increase the receptiveness of the human senses (Durand, 1997), shortening learning time and improving results. An online course should make use of multimedia elements (animations, sound, graphics, color etc) to illustrate and explain important concepts. Multimedia allows a variety of learning styles and preferences to be accommodated. This is where the online author can really appeal to learners' intuition and, potentially, do better than what can be done in the traditional face-to-face method of instruction.

Animations are one of the central vehicles for realizing learning effectiveness in our online courses. Although animations require high time investment to be built, their effectiveness at enhancing learning is worth the time investment. We built animations that take only about ten minutes to preview but take about 15-20 hours to assemble.

Engages learners actively

There is a general belief that "interactive engagement methods" enhance the effectiveness of teaching [Dannenber, 1997]. Interactive engagement methods include: collaborative peer instruction, problem sets, tests and quizzes, computer-based simulation, and model building.

In addition to the rich media used to explain concepts, each lecture unit of our online course consists of an average of two interactive quizzes within it and a set of review exercises at the end of it. Our courses are deployed and delivered using WebCT, a rich learning management system, supporting a number of ways of achieving real-time interaction and assessment.

Provides regular feedback

In addition to intra-presentation feedback, an online course should provide feedback to learners through facilities provided by course delivery tools like e-mails, discussion groups, chats, online quizzes etc. Other means of assessment are projects, written assignments, case studies, and essay questions all coordinated using the delivery tool of choice.

Regular assessment and feedback is necessary to assess whether learning has taken place and to identify problems early and institute corrective majors quickly.

Our college has also supplied the facilitators of our online courses with Web cameras (Web Cam). These Web Cams are attached to the facilitators' computers so that the students can see the facilitators, from remote computers, as they provide real-time feedback to students' concerns.

We give three surveys to the students to get input on the effectiveness of our courses. Three surveys are given; one at on the first day of the semester, one in the middle and the other towards the end of the semester. These provide useful seeds for improving our courses.

Addresses originality issues adequately

Online course authors may find ready-made animations or video clips that they can incorporate into their course contents, if their authoring tool permits. Appropriate written permissions should be sought and acknowledgements or references should be given to all material for which the author is not the originator.

In our online courses, most animations were developed internally using our authoring tool, Macromedia Authorware. In a few cases, we incorporate external animations, in the form of Java applets, into our course contents.

2. Course Development Milestones

We now identify and discuss the major steps in the process of developing media-rich online course contents. At each of these steps or milestones, we highlight the issues involved, mention some of the choices available to the developer, implications of the different choices and proffer practical suggestions.

Contents preparation

Developing an online course can require a total re-engineering of an existing course and course contents, for the online course to be valid for a relatively long time. That is, syllabi may need to be redesigned or reviewed and course contents redeveloped. The task is not just that of mere transfer of our existing 'dusty course contents' into electronic form but requires bringing the course up to date and mimicking, within the online course contents, certain classroom learning situations.

This task, therefore, requires a multitalented team of a content expert, a visual designer, a programmer, a multimedia and a presentation expert. Sufficient time should be allotted to the design of the course content, choice of examples, animation elements and the general flow and smoothness of the course contents.

With proper design, content experts can reach more students in less time, raising the likelihood that students will have access to the best instructors [Dannenberg, 1997]. An important byproduct of well-designed online courses is that the concept of 'bad instructors' can be eliminated totally.

Our online course development team members work closely with each other to the extent that we assumed all the various specialties of a development team. For example, all members contributed in the content development process. We conduct weekly meetings during which individual members present a two-lecture-worth material they prepared. This affords our course contents the thoroughness of a team view with the attendant benefit that subsequent tasks follow smoothly since each member has sufficient knowledge of the course contents. The alternative approach of assigning certain tasks to specific specialties may save time but will lack the team view advantage and its associated benefits.

Choice of authoring tool

The second important milestone in online course development requires the choice of an authoring tool. An authoring tool is a software environment used for developing,

implementing and deploying learning contents. At this stage we need such a tool to translate our design and prepared content into the learning experience we envisioned. Obviously, the choice of an authoring tool will be dictated by many issues including [Macromedia, 2001]:

- Where the content will be delivered
- Kind of media to be incorporated
- Level of interactivity needed
- Level of students' data tracking needed
- How much content to produce and maintain
- Authors' technical skills

Based on the needs, expertise and budget of your development team, these considerations will help you choose authoring tools most suitable to your purpose. For example, if your online course is to be delivered completely on the Internet with complete logging of students' activities, you will need authoring tools that support the creation of relatively small applications with low bandwidth requirements. For detailed tracking of students activities the online contents must be deployed on a learning management system that supports the necessary features.

In the early phase of our online course development we experimented with applications, like Microsoft PowerPoint, FrontPage, Camtasia etc and realized that they are limited to support our needs for media-rich online course development. In the end, we settled on Macromedia's suite of authoring packages. Each tool in the suite can be used to develop online course contents covering all aspects of animations, data tracking etc at an intermediate level. Advanced aspects in particular tasks are better done using the tool in the package specifically designed for that task. For example, Macromedia Flash is best when developing content for delivery in low bandwidth communication channels.

Animations

Research has shown that learners learn more effectively when they are engaged in doing things [Anderson, 1985]. Interactivity in online classes is more crucial because of the absence of face-to-face contact with the instructor. Learners will learn most effectively when their learning environment causes them to have continuous high-levels of interaction.

As we have mentioned earlier, animation decisions are best made at content preparation time. Before implementing these decisions, we have to have an appropriate presentation template. That is, a presentation template should be designed to contain a modest number of navigational elements. This may require a visual design specialist to design page layouts, specify colors, design navigation buttons and icons, create logos and other emblems, and to draw the most important graphics for the content [Macromedia, 2001]. Such a specialist must have a keen design sense as well as mastery of the authoring software for producing high-quality electronic artwork that looks good and downloads quickly.

The first page of each of our lecture units includes a hierarchical menu structure with hyperlinks to provide for fast navigation through the course material. By providing a rich navigation model, we enable learners set their learning pace and select their learning style by taking the course in a sequential, top-down, bottom-up, or exploratory order. Results of our questionnaires on our online courses indicate that learners are in constant need of having more control on navigation through course material.

The chosen authoring tool should provide a convenient environment for creating animations internally. We make use of Macromedia Authorware to develop most of our animations internally. The advantage is that we can have any level of control over the animation elements as we desire. Alternatively, developers may choose to import external animations and video clips into their presentations provided the authoring tool supports incorporating external multimedia elements. Although this may save time, it may not give developers the right granularity units of control that they may desire.

Another dimension to interactivity in online courses is that since online learners must monitor their own progress, we must help them by building in plenty of opportunities for them to do so. We include an average of two interactive self-test exercises in each lecture unit to achieve additional interactivity. This helps learners monitor and evaluate their accomplishments. We note that quizzes and practice exercises should be authentic; they should reflect the course learning goals, provoke learners to think and require learners to apply knowledge.

Although animations can be very effective, presentations should be kept simple, short, precise and straight to the point. You should design and present material to teach but not to impress. For example, although the use of images and interactive animations are essential elements in online courses, they must be used in a measured way. Presentation elements that dazzle the learner without conveying or teaching much should be avoided.

Presentation transcript

The next milestone is to do with the presentation transcript. There is an important relation between the material displayed on the presentation window and the voice narration. Content presentation can be in the traditional slides format or in an electronic-book style where the voice narration is identical to the display material. Our online courses are implemented in the traditional slides format. Even though our display material consists of bulleted points of major items, results of our course surveys show that about 25% of the students attempted to study from the printable slides alone. We therefore feel that presentations in the form of electronic book style will not be as effective as the slides format. Furthermore, even in the slides format the voice narration must contain additional information that adds value to the displayed material.

The next question is, is a written presentation transcript necessary? From our experience, a written transcript is necessary for a smoother and, consequently, better quality voice narration. This is especially important when the target students, or a reasonable percentage of them, are deficient in the language skills. In that case transcript must be written with more care so that words are selected carefully to facilitate learning.

The level of details with which transcripts are written depends on who will eventually do the recording. If the recording is to be done by the writer of the transcript or by another

person also familiar with the course contents, then the transcript will be straightforward. If, however, the recording is to be done by someone with no content expertise, then the transcript must be more elaborate indicating where emphases are needed etc.

Recording

After writing the presentation transcript, the next issue is the selection of an appropriate sound editor. The chosen sound editor must support the production of editable sound files from the recorded material. The sound files will need to be edited to properly interleave animation elements with the corresponding voice narrations explaining the animations. In the early part of our course development we tried tools like the MS Windows' sound recorder, MS PowerPoint recording facility, Camtasia, CoolEdit etc. We settled on Sonic Foundry's Sound Forge for our recording purposes. Sound Forge produces .WAV files that are then converted into shockwave format to reduce the size of the sound files. Lately, we have been recording our voice narrations using AT&T Natural Voices' text-to-speech engine. This requires learning a new language, XML (eXtended Markup Language), in order to add markups to control the speed, tone as well as add custom pronunciations.

An important and tedious issue to handle with regards recorded sound files is the issue of synchronization. That is, how do we ensure that we interleave voice narrations with text and animation elements in a way that ensures complete synchrony between them? One choice for us was to use functions provided by Authorware to place break points within a sound file to ensure synchronization. To get this right, one will have to run the piece, record the time needed to play before a break and then use the appropriate Authorware function to specify the play duration. This is very tedious and difficult to get right. Furthermore, this method of synchronization is not susceptible to content modification; adding or removing contents or explanation requires changing the synchronization settings.

Having gone through this process, we discovered that it is much easier to subdivide the sound files into smaller files, one for each animation or text unit. For example, we have a separate sound file corresponding to each bulleted point in the presentation slide. Although this will lead to a multitude of files especially for graphics with animations, the pay-off with regards to synchronization is invaluable. Synchronization in this case requires simply interleaving a pair of text or animation unit with its associated sound file in the Authorware flow-line of the presentation.

Finally, we observe that for recorded material to be uniform and free of variation, we recommend the creation of a multimedia laboratory, where possible. This will standardize the recording platform and provide a conducive environment for doing this job well. We faced problems with inevitable background noise and varied sound support on the different computers on which the recording was done.

Packaging

The final milestone in our online course development process is packaging and deployment. Right from the stage of choosing an authoring tool, we would have decided where and how our course content would be delivered. We may choose to deliver on CD, on the intranet or over the Internet. Whatever was our choice we need to package our

developed content for delivery using the software that delivers our content most successfully.

We use the streaming technology of Macromedia Authorware to package our courses both for CD delivery as well as for the Internet. This technology includes a Web packager that enables us to package all libraries and external media internally into our piece. We can also package our piece so that it is completely stand alone without requiring a Web browser to run. Alternatively, we can package our piece so that our piece can be run using Web browsers. In this case users need a Web Player plug-in that is freely available from Macromedia's Web site[2]. When publishing for the Web Player, we can break our compiled piece into segments of appropriate sizes. Depending on the speed of our network connection, we can customize the size of the segments for faster download from the Web server. There is also an option of using Authorware's advanced streamer that can profile learners' pattern of viewing the course material and downloads contents ahead of time probabilistically and seamlessly.

After packaging and deployment, the remaining task is that of course management that we now discuss.

3. Course Management

At this stage, the online course content is now published on a learning management system. We should select such tools that provide a rich set of options that enable us to manage delivery of course material appropriately. For example, WebCT and Blackboard, the learning management platforms licensed in our university, provide means for monitoring interactions, students' tracking, online quizzes and exams and for handling other course administrative matters.

In addition, WebCT and Blackboard contain course survey tools that we can take advantage of in order to get feedback on the online course. Online course developers should conduct surveys to analyze the usability of their system, its efficiency, how it meets learners satisfaction etc. This is an important exercise because online courses rely on continuous and periodic improvements and learners' surveys are one of the best ways of getting such input.

4. Time Requirement: A Case Study

Our case study is based on a single lecture from one of our online courses. The case study lecture is on *introduction to recursion*. This lecture is a representative of our lectures in that its animations requirement is modest. The main purpose of the lecture is to introduce students to recursion, the runtime stack and how the runtime stack is used to implement function invocations.

The lecture consists of three examples of simple popular recursive algorithms. These are the Factorial function, a string reversal algorithm and the Fibonacci function. The animations for the first two algorithms are very similar: each illustrates the step-by-step execution of the program, creation and placement of activation records on the runtime stack and also how the contents of activation records change and how they are disposed

as recursive calls return. Figure 1 shows a snapshot of our animation page for the Factorial function.

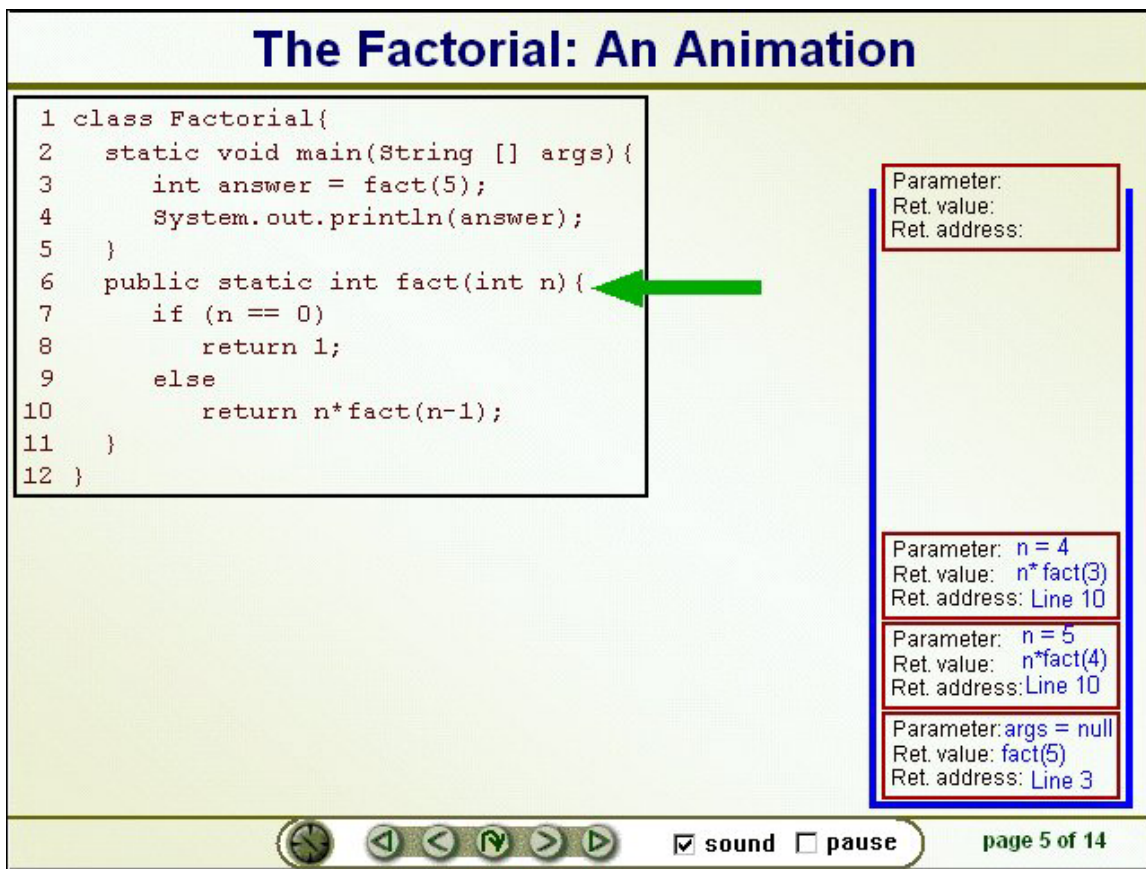


Figure 1: Factorial Function Animation Snapshot

The blue rectangle, open at the top, in Figure 1 represents the runtime stack growing upwards. Each brown rectangle represents an activation record, a workspace for a function call. Each activation record consists of a copy of the parameter with which the function called, an expression indicating what value would be returned and where execution will continue when the function returns. Note that if we require the students to observe how an item changes during the execution of the program, we must make that item as a separate animation element and associate it with a corresponding voice narration that explains it. For example, to show how the expression `fact(4)` changes in the second activation record when the function returns, we must make `fact(4)` a separate unit to illustrate how it changes when the method returns.

The case study lecture belongs to the second online course we developed. That means the timing in Table 1 is based on that of a developer with modest experience in the use of the authoring tool. The implication is that with less experience, the time requirement may be more. Another variable to consider is the extent of animation in the content to develop in addition to the authoring expertise of the developer.

Activity	Approximate time required (hours)
Content preparation	10
Transfer to Authorware	5
Interactive quizzes	5
Animations	25
Writing transcript	5
Recording and synchronization	20
Total	70

Table 1: Time Requirements for a Single Lecture Case Study

Content preparation is based on the prepare-present-evaluate-prepare cycle discussed earlier. Transfer to Authorware is the time required to transfer the completed lecture material into the Authorware presentation template. Each lecture unit consists of, on average, two interactive quizzes with an average of four questions. There were three interactive animations in the case study created entirely using Authorware as we highlighted earlier. It took about five hours to write the complete presentation transcript for the case study lecture. Recording and synchronization issues took the next greater part of the time, after animations, for this lecture. With a recording expert, the time needed to re-record poor quality voice narrations may be saved.

5. Summary and Conclusions

A central issue in online course development is quality of design. Good audience analysis, proper content design, concepts illustration, rich and continuous learner interactivity are necessary pedagogical elements for effective online learning. Detailed and careful planning should be made to ensure that the online course covers the course knowledge units adequately and without overwhelming learners. Organization of course content should reflect both global and sequential aspects of course contents. Course materials should be up-to-date.

This paper presented the essential features a good and effective online course in this paper and discussed detailed steps that are followed when developing a media-rich online course. In each of the course development milestones, we highlight the issues to be considered and alternative choices available to the developer. We briefly discuss the consequence of each choice in terms of its advantages and disadvantages. We also highlight what choice we made in our online course development projects and why those choices were made.

We discussed the important role of learning management systems for leveraging course communication, monitoring and evaluation. Regular surveys are necessary using learning management systems and results of those surveys serve as seed for future course enhancements.

An important investment in online courses is that of time. We have presented a single lecture case study to provide prospective online course developers with a feel of how much time it takes to develop media-rich online courses. The figures shown in our case study are a conservative estimate and can be more or less depending on the nature of the course contents.

Acknowledgements

This research was carried out under the auspices of a University project in the King Fahd University of Petroleum & Minerals. We acknowledge the foresight of the University authority for funding such projects.

We acknowledge the efforts of our colleagues in the Online Project with whom we have shared ideas and whose other engagements could not enable them partake in the writing of this paper.

References

1. [Junaidu, 2002] Junaidu, S., and Al-Ghamdi, J., *Developing an Online Data Structures Course using Authorware*. To appear, Journal of the United States Distance Learning Association, October 2002.
2. [Macromedia, 2001] Macromedia, Inc., *Getting Started with E-learning*, Macromedia, Inc., 600 Townsend Street, San Francisco, CA 94103.
3. [Durand, 1997]. Lernen Auf Abruf. (Learning on Demand). Wirtschaftswoche No. 42 dated 9.10.97, 179.
4. [Dannenberg, 1997] Dannenberg, R.B., and Capell P., *Are Just-In-Time Lectures Effective At Teaching?* School of Computer Science, Carnegie Mellon University, Pittsburgh, PA 15213, USA.
5. [Anderson, 1985] Anderson, J.R., and Reiser, B.J. *The LISP Tutor*, Byte 10, 4:8-14, April, 1985.

Endnotes

=====

[1] This is the definition adopted by our Academic Development Center for awarding grants for online course development.

[2] Check <http://www.macromedia.com>

About the Authors

Sahalu Junaidu is an Assistant Professor of Computer Science. He received his Ph.D. from St. Andrews University, Scotland in 1998. His areas of interest include parallel computing, computer networks and e-Learning. He has been a faculty in the Information and Computer Science Department of King Fahd University of Petroleum & Minerals since 1999. He has been co-leading an online course development team for the last 14 months.

Contact Sahalu at sahalu@ccse.kfupm.edu.sa

Jarallah AlGhamdi is the Dean of the College of Computer Sciences and Engineering at King Fahd University of Petroleum & Minerals. He received his Ph.D. in Computer Science from Arizona State University in 1994. He worked in research in software engineering and in particular in software metrics. He worked in computer science curriculum development and is working in e-Learning extensively in the past two years.

Contact Jarallah at jaralla@ccse.kfupm.edu.sa.

Editor's Note: Technology tools designed for distance learning are frequently adopted to enhance on-campus classes. This study compares the acceptance of web enhancements to learning for on-campus and off-campus learners, and acceptance based on amount of use. Blended learning in this instance means a combination of face-to-face instruction ((f2f) with online learning using a learning management system. The perceived value of web resources was significant, especially for off-campus students, and there was a positive correlation with degree of use. Speed of the internet connection was not significant in this study.

Blended Learning and Learner Satisfaction: Keys to User Acceptance?

Larry R. Irons, Robert Keel, Cheryl L. Bielema

Abstract

User acceptance of blended learning instructional strategies is an important benchmark in ongoing efforts to develop distance learning programs. Student satisfaction is a key component in developing user acceptance. This paper reports on a study of blended learning in a state university in the Midwest. The particular blend of learning modalities reported here consists of 1) face-to-face instruction and 2) a learning management system (MyGateway) that provides asynchronous coordination and 3) a variety of group communication tools for students.

The research uses a survey instrument administered to a stratified random sample of 666 students. The analysis of the data uses the independent samples t-test to assess the relationship of two independent variables (access location and use) to three dependent variables (learning activity, satisfaction, student/teacher communication). Access location is defined in terms of on-campus access or off-campus access. Use is defined in terms of the degree (high use/low use) to which the co-present instructor actually incorporates MyGateway into the course.

The analysis finds that access location does not predict student perceptions of the three dependent variables. Degree of use, however, does predict student perceptions of the three dependent variables. The more students use the learning management system the greater their likelihood of agreeing with positive statements about items in the survey relating to each of the dependent variables.

Introduction

Discussions of blended learning are starting to examine the benefits derived from learning situations characterized by interactive media and mixed modalities of instruction. Particular attention was recently brought to bear on the results of online learning when mixed with co-present instructors and/or a learning community. The research and discussion focuses on differentiating blended learning by comparing outcomes between it and traditional, classroom learning, or e-learning alone (Barbian, 2002). Regardless of the comparisons made by researchers and developers, those studying blended learning agree that learner acceptance is a baseline requirement for a successful implementation.

This paper assumes that satisfaction, as opposed to frustration, with blended learning provides a basis for learner acceptance and repeated use (Hara & Kling, 1999). We provide an analysis of learner satisfaction[1] with a learning portal implemented at a mid-western university that is predominantly a commuter campus. The learning portal is referred to herein as “MyGateway.” It is based on the Blackboard Learning System. [2] The faculty use MyGateway largely as part of a hybrid, or blended, course delivery strategy to enhance teaching. Typical uses involve posting announcements, assignments, discussion forums, online tutorials, and chat sessions. In addition to these learning resources learners can manage their calendar, check grades, etc. So, the study reported here deals with only one modality of blended learning, i.e., combining a learning management system with traditional classroom instruction. It does not examine learner satisfaction with blended learning in any of the mixed modalities that classes can use when blending e-learning courses unto themselves. As Table 1 shows, a variety of mixed modalities of learning are possible in “blended” learning. This analysis focuses on only one (grayed cells) of several potential blends.

Table 1

	Blended Learning Modalities*	
	Traditional Blend	e-Learning Hybrid Blend
Co-present classroom	+	-
Asynchronous computer-mediation (e.g. web sites, learning management systems, streaming content)	+	+
Synchronic computer-mediation (e.g. interactive video, collaborative software)	+	+

* A plus sign (+) indicates a possible combination whereas a minus sign (-) indicates no possible combination. We do not include asynchronous (e.g. cassette tapes, self-paced manuals) and synchronic (e.g. teleconferencing) distance learning resources that are not computer-mediated in this typology.

We do not claim that the findings reported here are relevant to choosing among learning management systems. Rather, our purpose is more limited in scope, and analytic in nature. This paper reports on a study of student class participation, satisfaction, and communication with the teacher in one specific type of blended learning in a university class. Our analysis considers both access (*the primary location where students access MyGateway*) and use (*low use or high use*) of the learning portal (MyGateway) as key independent variables in predicting learner satisfaction, participation, and communication within distance learning classes.

We focus on *access* because of the longstanding assumption that one of distance education’s most promising features is the way it makes learning resources flexible and available to learners regardless of location (Valore & Diehl, 1987). Access has always been an issue for distance learning, from early reliance on the postal system, distributing books, self-paced manuals and other learning materials like audio-cassettes or albums, to later reliance on the general availability of analog technologies like television and telephony. In each case, access to learning resources was important. The same concern

for access to learning resources appears relevant to interactive video classes, especially those integrating learning management system portals such as MyGateway into the curriculum. For instance, roughly equal access (between the host and remote sites) to studio classrooms equipped with interactive video feeds does not ensure equal access to Internet connectivity, especially in rural areas (Irons, Jung, & Keel, 2002). On the other hand, computer-mediated communication via the Internet can also provide a base for engaged students, even at remote sites, to increase their sense of involvement by using discussion groups, chat rooms, and other asynchronous technologies (Bielema, 1996). We use access location to the learning portal, MyGateway, as an independent variable in our analysis of student satisfaction.

We also focus on *use* because, flexibility of access aside, the ability of learners to apply technology in support of their learning activity depends largely on their ongoing response to using it (Storey, Phillips, Maczewski & Wang, 2002). If using a particular technology is not relatively straightforward and demonstrably effective in ways that are relevant to the student's learning activity, users (in this case students) will not continue using the technology when presented with other options. Thus, we predict that such students will agree with negative statements about MyGateway and not agree with positive statements about MyGateway.[3] Our concern with use is different from a concern with usability *per se*. We are focusing on the results of sustained exposure (high use) to a learning management system in a blended learning class, as opposed to limited or incidental exposure (low use). Further, our concern is for how students perceive the learning management system to affect their participation in the class (learning activity), satisfaction with the class, and communication with the teacher as compared to a traditional face-to-face class in which a learning management system is not used.

Methodology

A stratified random sample (10 percent of the courses using MyGateway) was selected according to levels of faculty use of the learning management tool, MyGateway (N = 45). The courses were designated *low use* if faculty had logged 9 days or less in Control Panel accesses; *high use* if faculty had logged 10 or more days of Control Panel accesses by the middle of the semester (sample median was 8, mean 11). Questionnaires were completed in the class during the evaluation period at the end of the semester.

Completed surveys by undergraduate and graduate students numbered 666 with a 70% response rate. Students responding in *high use* courses numbered 318, while 348 students in *low use* courses responded. Given our interest in access, the survey also asked students about the computing and network resources available from their primary access location.

Questionnaire

The questionnaire for the current study consisted of 46 items, with 16 of those items designed for the data analysis reported here using a seven point Likert scale (see Table 2). The Likert items asked students to indicate their agreement on a seven-point scale ranging from (1) *strongly agree* to (7) *strongly disagree*.

Table 2. Questionnaire lead-ins and question text

Question	Lead in Statement Headings and Survey Item Text
Because of using MyGateway in this class (in comparison to courses that did not use MyGateway) I was more likely to:	
Q8	Seek clarification when I did not understand something.
Q9	Review lecture notes to gain clarification
Q10	Receive instructor comments on assignments quickly
Q11	Discuss ideas from this course with other students
Q12	Actively participate in the course
Q13	Work on assignments with other students
Q14	Complete assignments on time
Q15	Access other online materials related to the content of this course
Q16	Spend more time studying for the course.
Q17	Communicate with my instructor.
In general:	
Q32	I prefer communicating with my instructor via [personal] email, outside My Gateway.
Q33	I am very satisfied with this course because it used MyGateway
Q35	It takes more effort to complete a course that uses online resources like MyGateway
Q36	I would like to have "MyGateway" used in other courses
Q37	I am more likely to take another course because it uses MyGateway
Q38	I am more likely to complete my degree at because of the advantages of using MyGateway in my courses

Computers and Access for Students

Students were asked about their primary computer access location and capabilities available to them. Over 60 percent (61.6%) of the respondents reported owning a new computer (e.g., Pentium). Slightly fewer students in *low use* courses than those in the *high use* courses indicated having the newer computers. Only 9.8 percent of students reported that they do not own a computer.

Table 3. Primary Access Location

Access Location	Low Use	High Use
Off campus, via modem	29.2	31.3
Student or dept. computer labs	12.4	12.9
Student Housing	4.2	3.5
Other UMSL computers	3.3	2.7

If a student's primary access was from off-campus, they were asked specifics about the type of Internet connection: dial-up telephone via modem, dial up with DSL, cable modem, or other. See Table 2 for connection details of both groups.

Again, the two groups of students were similar, with cable modems used a little more frequently by the *high use* students than those in the *low use* group.

Table 4. Type of Internet Connection to University Servers

Internet Connection	Percent, Low Use	Percent, High Use
Dial-up Modem	37.4	37.7
DSL	6.2	6.2
Cable Modem	4.4	5.7
Other	1.8	0.6

Blended Learning: Location and Use

We analyze the relationship of access location and use to learner satisfaction with MyGateway by:

1. distinguishing students who primarily use it on campus from those who primarily use it off campus
2. distinguishing low use from high use classes.

An independent samples t-test was used to measure each of these independent variables' (access location and use) predictive power in relation to specific items from a survey instrument. The items used in the full survey were intended to assess the learning portal from a larger array of concerns. The items studied herein were developed to measure the degree to which two independent variables (access and use) are significant predictors for *increased learner satisfaction* (questions 33, 35, 36, 37, 38, see Table 2), *increased learning activity* (questions 9, 11 – 16, see Table 2), and *increased student/teacher communication* (questions 8, 10, 17, 32, see Table 2) in the courses studied. We examine each of these below and assume that as the degree of satisfaction with a technology increases the more learning activity occurs, along with increased student/teacher communication.

Access Location and MyGateway Student Evaluations

Our first concern in analyzing access location is to estimate its ability to predict the responses offered by students using MyGateway. To the extent that students have to travel to campus to use computers with access to the network, we expect those students to experience disadvantage in learning activities, lower satisfaction, and poorer student/teacher communication. So, our first three hypotheses test these relationships:

H1: Access to learning resources over the Internet from off-campus locations increases student participation in learning activities in blended learning classes.

H2: Access to learning resources over the Internet from off-campus locations increases student satisfaction in blended learning classes.

H3: Access to learning resources over the Internet from off-campus locations increases student/teacher communication in blended learning classes.

Specifically, we measured the relationship of access location (either on- campus or off-campus) to students' responses to items involving *learning activity*, *student satisfaction*, and *student/teacher communication*.

Table 5. Access Location Items (independent samples t-test)

Question	Lead in Statement Headings and Survey Item Text	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
	Because of using MyGateway in this class (in comparison to courses that <u>did not use MyGateway</u>) I was more likely to:					
Q9	Review lecture notes to gain clarification	.76	692	.447	.11	.15
Q10	Receive instructor comments on assignments quickly	.31	697	.757	4.74	.15
Q11	Discuss ideas from this course with other students	-.43	679	.663	-6.86	.16
Q12	Actively participate in the course	-.27	688	.782	-4.106	.15
Q13	Work on assignments with other students	.37	673	.708	5.76	.15
Q14	Complete assignments on time	-.246	687	.806	-3.79	.15
Q15	Access other online materials related to the content of this course	.57	692	.567	8.09	.14
	In general:					
Q32	I prefer communicating with my instructor via [personal] email, outside My Gateway.	-1.11	697	.270	-.16	.15
Q33	I am very satisfied with this course because it used MyGateway	-.39	687	.696	-5.79	.14
Q35	It takes more effort to complete a course that uses online resources like MyGateway	3.75	695	.000	.55	.14
Q36	I would like to have "MyGateway" used in other courses	-.50	712	.617	-6.69	.13
Q37	I am more likely to take another course because it uses MyGateway	-1.81	699	.070	-.29	.16
Q38	I am more likely to complete my degree at because of the advantages of using MyGateway in my courses	1.11	689	.268	.17	.16

Question 35 was the only item from the survey that indicated a significant relationship ($p < .05$) between the access location of students and their response. Question 35, a student satisfaction item, stated: "It takes more effort to complete a course that uses online resources like MyGateway." Judgments about the success or failure of those efforts are not predicted by access location. The type of off-campus connectivity available to the student does not affect the relationship, i.e. whether the connection was dial-up or broadband (DSL or cable modem). Students accessing MyGateway from home, regardless of connectivity, were statistically more likely to *disagree* with Question 35. Alternatively, those students accessing MyGateway at campus locations were more likely to *agree* with Question 35. Thus, we find only limited support for the hypothesis that students who commute to campus to use MyGateway resources experience lower satisfaction. Qualitative comments from students on the personal benefits of using MyGateway support the notion that flexible access to materials, support staff, and teachers was a source of satisfaction. One comment in particular was instructive on this point:

Especially because [the university] is a commuter campus, it is useful to be able to access course information, contact instructors and stimulate "community" interaction (via discussion boards).

Degree of Use and MyGateway Student Evaluations

In addition to access location, the survey items allow us to analyze differences between students in classes with low use of MyGateway and students in classes with high use. Our working hypothesis is that increased exposure to classes using MyGateway results in higher degrees of learning activity, satisfaction, and student/teacher communication. To the degree that the hypothesis is not supported we would expect lower acceptance of blended learning courses.

H3: Increased use of the learning portal increases student participation in learning activities in blended learning classes.

H4: Increased use of the learning portal increases student satisfaction in blended learning classes.

H5: Increased use of the learning portal increases student/teacher communication in blended learning classes.

The hypotheses, simply stated, claim that the more people use the learning portal, MyGateway, the higher their participation in learning activities, satisfaction with their classes, and student/teacher communication when compared to traditional classes—rather than the other way around.

Use of MyGateway in Relation to Learning Activity

Every learning activity item measured by the MyGateway survey indicates that students in *low use* classes are more likely ($p < .05$) to *disagree* with positive statements about learning activities in MyGateway classes. Thus, students in classes with *high use* of MyGateway were more likely to review lecture notes for clarification (Question 9), discuss ideas with other students (Question 11), actively participate in the course (Question 12), work on assignments with other students (Question 13), complete assignments on time (Question 14), access other online materials related to course content (Question 15), and spend more time studying for the course (Question 16).

Table 6. Learning Activity Items (independent samples t-test)

Question	Lead in Statement Headings and Survey Item Text	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
	Because of using MyGateway in this class (in comparison to courses that did not use MyGateway) I was more likely to:					
Q9	Review lecture notes to gain clarification	6.65	694	.000	.10	.15
Q11	Discuss ideas from this course with other students.	3.31	681	.001	.50	.15
Q12	Actively participate in the course	4.00	690	.000	.58	.14
Q13	Actively participate in the course	2.49	675	.013	.38	.15
Q14	Complete assignments on time	5.30	689	.000	.79	.15
Q15	Access other online materials related to the content of this course	5.19	694	.000	.71	.14
Q16	Spend more time studying for the course	3.81	690	.000	.56	.15

It is notable that even though students agreed that they were spending more time studying for the course, they nonetheless recognized the benefits of greater use of MyGateway in their courses. Students responding to open-ended questions on the benefits of using MyGateway reinforced the answers to the survey items. The two most often mentioned benefits were the availability of grades and course materials. The ability to easily communicate with instructors and other students was also emphasized, along with convenience of web access. Specific pluses mentioned included help in staying connected to the class, getting instructor feedback quicker, increased organization and opportunities for clarification.

Use of MyGateway in Relation to Student Satisfaction

Two items related to student satisfaction with courses using MyGateway indicate that students in *low use* classes are more likely ($p < .05$) to *disagree* with positive statements about their satisfaction with MyGateway classes. Thus, students in classes with *high use* of MyGateway were more likely to agree that they are very satisfied with the course (Question 33) and that they would like to have MyGateway used in other courses (Question 36). Interestingly, responses to Question 35, which are significant when measuring access location are not significant when measuring use. Even though students who travel to campus to use the Internet think more effort is involved, their responses are not affected by degree of use. In comparing high and low use groups, MyGateway has no discernable effect on re-enrollment (Question 37) or student retention (Question 38).

Table 7. Satisfaction Items (independent samples t-test)

Question	Lead in Statement Headings and Survey Item Text	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
In general:						
Q33	I am very satisfied with this course because it used MyGateway	5.77	700	.000	.83	.14
Q35	It takes more effort to complete a course that uses online resources like MyGateway	-.52	697	.604	-7.65	.15
Q36	I would like to have "MyGateway" used in other courses	2.86	715	.004	.37	.13
Q37	I am more likely to take another course because it uses MyGateway	1.28	703	.201	.20	.16
Q38	I am more likely to complete my degree because of the advantages of using MyGateway in my courses	1.23	692	.220	.19	.16

Use of MyGateway in Relation to Student/Teacher Communication

Three items related to student/teacher communication in courses using MyGateway indicate that students in *low use* classes are more likely ($p < .05$) to *disagree* with statements about their degree of communication with faculty in MyGateway classes.

**Table 8. Student/Teacher Communication Items
(independent samples t-test)**

Question	Lead in Statement Headings and Survey Item Text	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
	Because of using MyGateway in this class (in comparison to courses that did not use MyGateway), I was more likely to:					
Q8	Seek clarification when I did not understand something	4.506	700	.000	.62	.14
Q10	Receive instructor comments on assignments quickly	5.603	700	.000	.83	.15
Q17	Communicate with my instructor	4.859	701	.000	.71	.15
	In general:					
Q32	I prefer communicating with my instructor via [personal] email, outside MyGateway	.714	702	.475	.11	.16

Thus, students in classes with *high use* of MyGateway were more likely to agree that they were able to seek clarification (Question 8), receive instructor comments on assignments quickly (Question 10), and communicate with their instructor (Question 17). Additionally, students did not express (Question 32) a preference for using their personal email to communicate with the instructor, implying that the MyGateway learning portal's communication resources are sufficient.

Conclusions

The data presented above indicate that increased use of the Blackboard Learning System implemented as a learning portal, MyGateway, results in higher estimates of learning activity, higher degrees of satisfaction, and higher student/teacher communication than in courses not using the portal. Thus, the data from the current survey lend support to the contention that the more students are exposed to learning portals like MyGateway the higher their estimation of its positive affects. We suggest that the findings here are not only applicable to the MyGateway implementation of the Blackboard Learning System. Rather, we contend that similar findings are likely in any learning portal implementation when students get accustomed to using it (i.e., use it in direct support of the course work), especially when the course consists of a blend between traditional co-present classrooms and asynchronous, computer-mediated learning portals like MyGateway.

References

- Barbian, J. (2002) "Here's Proof" online learning magazine 6,6, pp. 27-31.
- Bielema, C. L. (1996) Factors affecting implementation of interactive, computer-mediated instructional techniques for instructors and learners at a distance (Doctoral

dissertation, University of Illinois, Urbana-Champaign) Dissertation Abstracts International, 57(11), 4703A.

Hara, Noriko & Kling, Rob (1999) "Students' Frustrations with a Web-Based Distance Education Course" *First Monday* 4, 12. Retrieved from http://firstmonday.org/issues/issue4_12/hara/index.html

Irons, L., Jung, D. & Keel, R. (2002) "Interactivity in Distance Learning: The Digital Divide and Student Satisfaction" *Educational Technology & Society* 5, 3, pp. 175-188. Retrieved from http://ifets.ieee.org/periodical/vol_3_2002/jung.pdf

Storey, M.A., Phillips, B., Maczewski, M. & Wang, M. (2002) "Evaluating the usability of Web-based learning tools," *Educational Technology & Society* 5, 3, pp. 91-100. Retrieved from http://ifets.ieee.org/periodical/vol_3_2002/storey.pdf

Valore, L. & Diehl, G.E. (1987) *The effectiveness and acceptance of home study*. Washington, DC: National Home Study Council.

Endnotes

[1] A word on terminology is needed here. We use the term student when referring to specific characteristics of participants in the current survey who were, after all, university students. The term learner is used when discussing analytic findings with general implications for blended learning. The term "blended learning" is used as an umbrella concept to encompass various preexisting categories that provide less analytic utility as the multiple modalities depicted in Table 1 become increasingly common. Such terms as e-Learning, online learning, web-based learning, and distance learning are increasingly ineffective categories with efforts to distinguish between them rather futile.

[2] Heidi J. Larson provides a useful overview of the Blackboard Learning System on the Training Media Review web site, <http://www.tmreview.com/review.asp?id=876&mem=true>

[3] Storey, Phillips, Maczewski & Wang (2002) asked students and faculty to compare Blackboard to WebCT's learning management system on issues of navigation, customization, student management and content creation and noted an overall preference for Blackboard. Further, it is interesting to note that the authors contend that most "usability principles were violated by the tools [Blackboard/WebCT] we evaluated and negatively impacted students and their attitudes towards these tools" (p.92).

[4] It is important to note that the failure of connectivity (i.e., dial-up vs. broadband) to predict the outcomes expected from our hypotheses may result from the fact that the MyGateway system classes do not typically employ rich media as part of the blended learning situation. Thus, as classes increasingly use rich media, such as streaming video and animation, it will remain important to consider access location and connectivity when studying blended learning classes.

About the Authors

Larry Irons combines industry and academic livelihoods in his professional career. He is Managing Partner of I.C. Technologies, a consulting services company focused on using performance support, eLearning and communities of practice to achieve client goals. Larry has researched distance learning since the early 1990s, participating in several industry/academic/government-sponsored projects. His consulting and research interests both focus on how communication technologies are designed and used. Larry received his Ph.D. in Sociology from Washington University in St. Louis in 1992.

Larry can be contacted at: larryi@ic-t.com

Robert Keel has taught sociology for the past 26 years. He currently is a lecturer in the Department of Sociology at the University of Missouri-St. Louis. For the past 8 years he has worked to develop Internet-based class resources for his classes at UM-St. Louis. He also works as a faculty liaison and specialist in information technology for the UM-St. Louis Information Technology Services department.

Robert can be contacted at rok@umsl.edu.

Cheryl Bielema, Instructional Designer, manages the Faculty Resource Center, University of Missouri-St. Louis, consulting with and training faculty in the integration of technology. She collaborates with the Center for Teaching and Learning, jointly sponsoring teaching and technology workshops for faculty and staff. Bielema worked previously at the University of Illinois, Urbana-Champaign, in distance learning as well as in UI Extension. Her teaching experience is in Curriculum and Instruction and Educational Technology. Her Ph.D. is in Human Resource Development, University of Illinois.

Cheryl can be contacted at bielema@umsl.edu.

Editor's Note: UNESCO has named Brazil as one of nine high-population underdeveloped countries which together make up more than half of the world's population. This paper describes a project to introduce computers and distance education in order to upgrade educational standards in Brazil. The Virtualizing Project is the result of a partnership of government, a research laboratory, and university for teacher training and promoting computer access in public schools.

The Brazilian Virtualizing Project: Using Virtual Education to Bring Public School Teachers Closer to Modern Reality

N. R. Modro, L. C. Paas, and A. M. Rodriguez

ABSTRACT

The internet's continued expansion in recent years has far outpaced the growth of knowledge teachers have about it. In Brazil this problem is being tackled via the federal 'Proinfo' program, which promotes computer access in public schools and facilitates relevant teacher training, using varying distance education strategies. This paper describes a specific Proinfo project called Virtualizing, a distance education initiative aimed to upgrade public teacher's knowledge about the use information technologies in the classroom. The project, created in collaboration with one of Brazil's biggest distance education organizations (LED) combines face-to-face workshops with internet-based instruction and is based on a state-of-the-art learning platform called VIAS-Knowledge. This paper describes the educational design aspects of the project, the learning platform and one of the courses.

I. Introduction

Brazil is categorized as part of UNESCO'S E-9 group: nine high population, underdeveloped countries which together, making up more than 1/2 of the world's population and have certain characteristics in common: strong demographic pressures; substantial remote populations; unwieldy education systems; relatively low levels of central government funding for education; and, persistent problems in reducing adult literacy [3]. Through a process of long-overdue institutional change, Brazilian policy makers are concurrently seek to deal with these problems, as well as ones faced by many of the most highly developed countries - how to appropriately use information technologies in the classroom and advance teacher's skills in the right direction.

An important part of the Brazilian education reform began in 1995 with the creation of a federal department called the "Secretary of Distance Education" (SEED). The goal of SEED is to use information and communication technologies toward supporting and improving the quality and dissemination of education in this country with a population of 170 million people spread across nearly 1/2 of South America's land mass. Under SEED's "Proinfo" program, computers and access to the internet were issued to all public schools in Brazil, under the condition that the schools present an appropriate pedagogical strategy [8]. To this end, each municipal government was allocated funding to establish a "Nucleus of Educational Technology" (NTE), making computer labs and networks available for teachers, and offering educational programs for teacher training.

Another important advance occurred in 1997, when the Brazilian Ministry of Education decreed that all K-12 school teachers have an undergraduate degree, and all university teachers a master's degree, by the year 2006. This meant that at least 50% of the Brazilian teachers and professors would have to upgrade their skills in a relatively short time, resulting in a huge and widespread demand for teacher training, as well as need to create solutions for efficient and effective teacher education.

The Distance Education Laboratory (LED) of the Federal University of Santa Catarina (South Brazil) has been meeting this challenge for several years by forming partnerships with educational institutions all over Brazil, implementing programs using Teleconferencing, Videoconferencing and Internet-based distance education programs, making it possible for teachers to avoid leaving their posts to learn. Although the subjects taught via the LED are varied, they are mainly related to information technology and education, according to each institution's specific needs and budget.

This paper describes one such solution, called the Virtualizing Project, in which the authors participated as instructional and systems designers.

II. Virtualizing Project

The Virtualizing project is a partnership between the Ministry of Education of the Municipality of Florianopolis and the Distance Education Laboratory (LED) of the Federal University of Santa Catarina (UFSC). Its principal objective is to encourage, via immersion in an e-learning environment, a culture of technology use and appropriate pedagogical strategies for the municipality's public education system. The project first ran from April 25 to August 30, 2002, with the enrollment of 180 teachers representing 19 elementary and junior high schools. Teachers from various subject areas were selected from schools that had already acquired computers through the federal Proinfo program.

III. Vias Knowledge

VIAS Knowledge (VIAS-K) is an educational platform that offers a broad set of interactive models, including learning environments for users, multimedia content, tools for collaboration, support and system management. The platform unites state-of-the-art information technologies with appropriate pedagogical methodologies [1,2,and 5]. It aims to attend to the growing demand for education in Brazil and is modeled toward continually improving efficiency during the learning process [6]. VIAS-K was conceived in October of 1999. In March of 2001 it was ready to support its first users - a 1 year distance education program for 600 students (teachers from the areas of math's, chemistry, biology and physics who had not yet finished undergraduate studies).

Since many of the learners are new to computers and networks, an important aspect of the VIAS-K learning environment is its user support system. In addition to online support tools and information, every course offered via VIAS-K relies on the added support of live course tutors. The tutors help students and professors to use the technology and act as facilitators in the communication and learning process [3]. Another aspect of the VIAS-K platform worth highlighting is its model for accessing the system. The first screen the

student accesses is a Portal of information related to the course, managed and automatically updated by administrative members (in this case, member of the Ministry of Education) through online forms allowing for the upload of text and graphics. The Portal model serves to keep the group informed as a whole, with timely and relevant information, as well as providing news to the public in general. The Portal also contains the point of login for students, professors and tutors. Upon entering a valid user ID and password, users have direct and unlimited access to course content and support tools. Fig 1. illustrates this access dynamic.

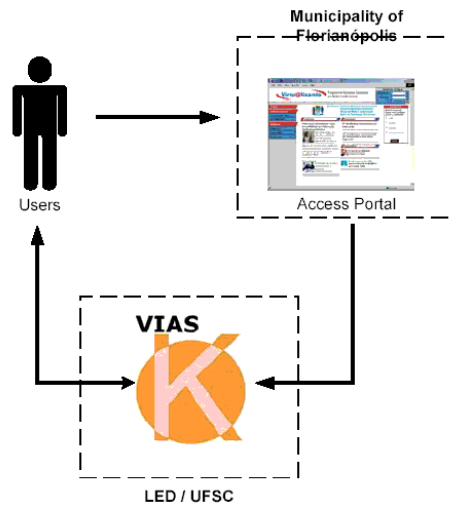


Fig 1. VIAS-K access procedure

Fig. 2 presents the VIAS-K main page and its elements:

1. navigation content tree (a graphic organization of educational content - or the learning objects organization – see details in section 3.1);
2. content area (once a topic is selected in the navigation content tree, it is shown in this area);
3. user identification;
4. tools (divided into 5 categories: personal tools, administrative tools, collaboration tools, support tools and online help); and
5. logout area.

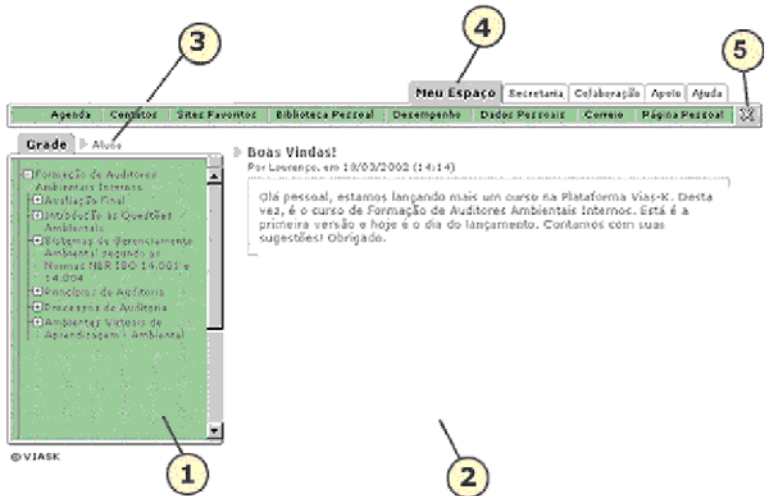
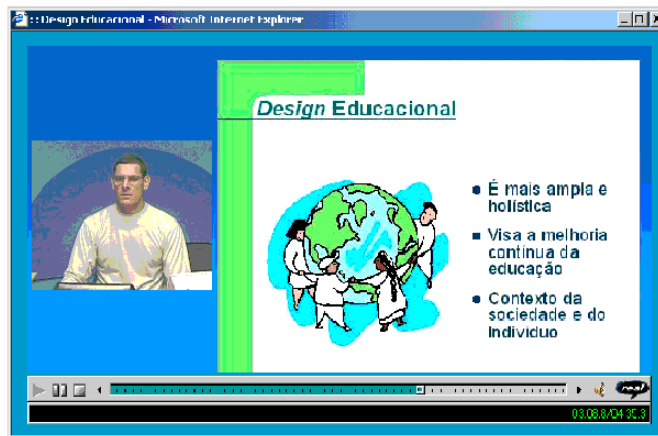
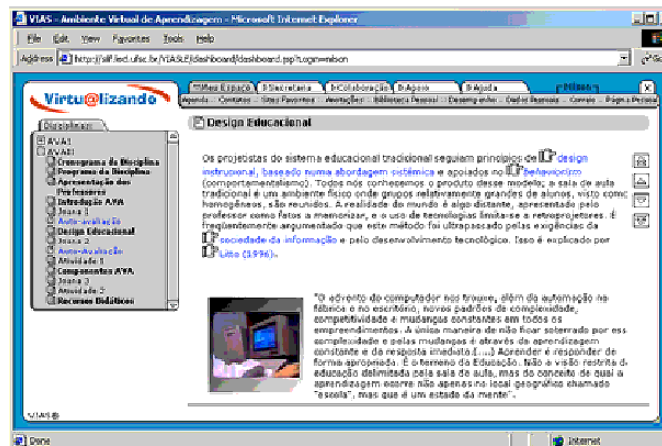


Fig 2. VIAS-K main page and its elements

Figures. 3A, 3B, 3C, 3D that follow show screen shots from the Virtualizing program.
3A.



3B.



3C.



3D.

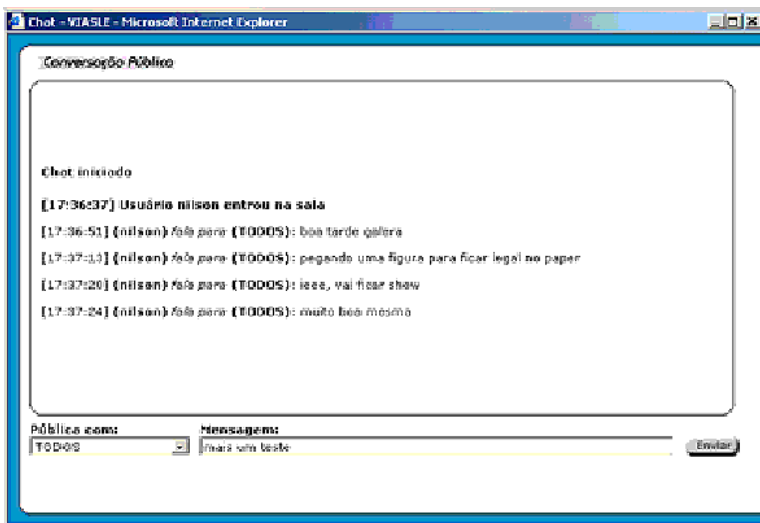


Fig. 3 Virtualizing Program screen shots: a) online video being viewed; b&c) content in hypermedia documents; d) chat tool in action.

A. Learning Objects and VIAS-K

Learning Objects are an instructional design technology that brings a potential of reusability, generatively, adaptability, and scalability [8, 9, and 10].

An conceptual model of Learning Objects was introduced by Cisco [6] and a Learning objects can be represented by blocks divided in content items, practice items, and assessment items. This small blocks of information, are stored in databases and are useful to communicate knowledge or skills, and can be any media type.

VIAS-K applies this concept and for every user configure an content learning tree (fig. 4). In addition, VIAS-K connects learning objects, collaborative tools and the content learning tree.

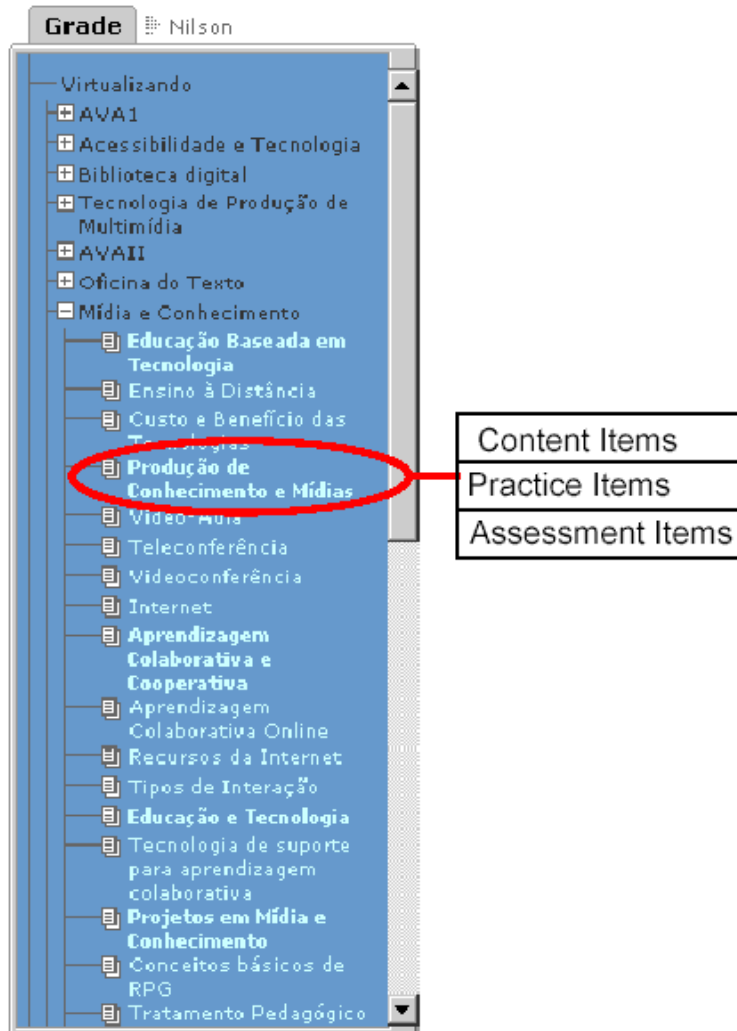


Fig. 4 VIAS-K and Learning Objects relationship. © VIASK

IV. Instructional Design Strategy

The basic principal of the Virtualizing program's instructional design strategy is *knowledge construction through practice*. In order for teachers to learn about information technologies, they should have hands-on experience using these technologies, as well as opportunities to read about, reflect on, and discuss the use and expansion of such technologies in education and society. Also, since the target learners were all adults, and teachers, it was important to devise an approach which would offer immediate results which could be applied, and offer a high degree of learner control and responsibility. To this end, each of the 180 participants chose a course (from a selection of 6) according to their interests / needs. The courses mixed face-to-face and on-line learning, as shown in table 1 below:

TABLE 1: VIRTUALIZING COURSE STRUCTURE

#	Courses	Number of Participants	Total Hours	Hours	
				F-t-F	On-line
All	Virtual Learning Environment I	180	20	14	6
1	Media and Knowledge	30	40	17	23
2	Accessibility and Technologies	30	30	9	21
3	Digital Workshop: constructing texts	30	20	6	14
4	Digital Libraries and KnowledgeManagement	39	40	17	23
5	Virtual Learning Environments II	30	30	9	21
6	Multimedia production technologies	30	20	6	14

To start the program, all participants of the Virtualizing program were required to take the course "Virtual Learning Environments" - I (AVA - I), for ten hours per week for a period of 2 weeks (April 25th to May 10th, 2002). The main concepts covered included basics of on-line learning and how to use the program's virtual environment (VIAS K). Since nearly all of the teachers in the program had little experience with informatics, this course was designed to give "low pressure" hands-on practice with activities such as uploading and downloading files, submitting opinions to the forum, operating the chat tool, locating course materials, etc.

The authors, involved in the instructional design and systems design process of VIAS-K for the Laboratory of Distance Education, were responsible for designing a subsequent course AVA II for the Virtualizing program, #5 in table 1.

V. Course AVA II

The course Virtual Learning Environments II (AVA II), has the objective of extending the teachers' knowledge of virtual learning environments and digital resources in general. Its goal is to empower the learner with the skills and strategies useful for managing classrooms in today's information society, as well as dealing with needs specific to their own students, in a Brazilian context. The course was divided into 6 modules: Introduction; Components of Virtual Learning Environments; Educational Design for the Information Society; Strategies for Technology Use in the Classroom; Using the Web for Learning Resources; Methodology for Constructing Virtual Learning Environments.

Each module was geared towards constructivist design principles, such as offering participants opportunities to reflect on knowledge construction, value multiple perspectives, and actively seek out solutions relevant to their subject area or classroom [1]. For example, the first 3-hour face-to-face meeting involved an informal, open discussion on teachers' experiences and opinions about information technologies, and the specific problems or goals each teacher had for his/her classroom and/or school. The AVA II course instructors then explained the constructivist design principles, and structure of the course content and activities, encouraging participants to actively seek knowledge and collaborate with their colleagues in completing course activities. A cognitive styles test was applied to the group, openly comparing the results, in order to exemplify the diverse learning styles and personalities within the group. Besides being fun, this activity helped the group to understand each other better, as well as showing

them that their own students have diverse preferences for learning. Participants were encouraged not to judge which learning style was better, but to be aware that people are different and to be conscious of their own strengths and weaknesses in the learning process.

Taking into account diverse learner styles, the AVA II course instructors sought to present the content in diverse ways. The information in each module was offered in 3 distinct manners:

1. A descriptive hypermedia document, containing images exemplifying ideas and links to various related sites/documents;
2. A fictitious narrative about a grade school student's experiences interacting in a futuristic learning environment;
3. Tests for auto-evaluation, and instructions for relevant individual or group activities. Activities included contributing reflections on provided literature in an online discussion forum and chats, evaluating online educational material and creating an annotated bibliography of internet sites relevant to each participant's subject area, creating a basic home page for the subject area (via online forms), and devising a strategy for a classroom activity which would use the internet.

The content was made available on the VIAS-K platform in a non-linear manner - each user could access any part of the modules in any order he/she wished, with no component being compulsory. However, a suggested course chronogram was provided, designed so that topics covered in synchronous meetings (chats, videochats and face-to-face) coincided with AVA II course content and activities in a progressive way. Evaluation was informal and results-oriented (critical feedback without giving a grade), geared toward encouraging and helping participants to successfully complete the course activities. Completion meant that teachers should create an online activity for their students (such as a Webquest) and create a basic home page for their classroom. Step-by-step instructions and online forms were provided for those who preferred this style of learning, while resources and extra guidance were provided for those who wished to create their own from scratch.

A motivational strategy was designed based on project exposure - each participant was expected to publish his/her site on the Virtualizing Program Portal, thereby making their findings available to local colleagues as well as teachers around the world.

Sustainability and Growth as Long-term Objectives

The authors designed AVA II with long-term objectives in mind. Each time the course AVA II is completed by a group, the number of teachers' sites published on the Portal will increase, annotated lists of internet resources will be updated and participants experiences documented, thereby creating a rich data base of useful and relevant information. These long-term objectives are designed to give a sense of continuity to the program, and are expected to be a motivational factor as the knowledge constructed by participants in the program is exposed and shared.

VI. Final Considerations

The basic premise of the Virtualizing program is that the best way for teachers to upgrade their computer skills is through immersion in digital environments, backed up by adequate face-to-face time in order to reflect and build knowledge with the help of colleagues, instructors and support staff. For many participants of the program, logging on to the system and accessing course materials were major first steps. In the course AVA II, many of these novice internet users took seemingly giant leaps forward by conducting searches and evaluations of educational internet sites, and creating their own home pages and classroom strategies for internet use - something most of them couldn't conceptually imagine being able to do in the weeks preceding the course. The hands-on, guided approach helped to demystify the media as well as give a sense of empowerment to the teachers. A flexible instructional strategy, geared toward developing applicable and relevant skills is especially important for adult learners.

It should be emphasized that an indispensable element of the instructional design is the mixture of face-to-face and online activities and the support of tutors, to clarify difficulties and avoid feelings of isolation that can arise in educational programs conducted purely at a distance.

In terms of helping to remedy the challenges shared by E-9 countries, the Virtualizing project represents a brave step in the direction of the future. This project represents a practical as well as theoretical part of the important process of educational reform in Brazil. The use of distance education technologies in an appropriate manner helps teachers to continually advance their knowledge while not having to leave their teaching posts. Via this hands-on approach, public school teachers are not only expanding their computer skills, but also learning about new teaching strategies and knowledge resources which are applicable to any subject domain.

VII. References

Books:

- [1] T. Boyle (1997). Design for Multimedia Learning. Prentice Hall Europe, Hertfordshire, HP2 7EZ.
- [2] F.T. Tschang, & T. Della Santa (2001). Access to Knowledge: New Information Technologies and the Emergence of the Virtual University UNU/IAS. Elsevier Science Ltd. Oxford, UK.

Technical Reports:

- [3] H. Perraton & C. Creed (2001). *Distance Education in the E-9 Countries*. E9 Initiative, UNESCO.75352 Paris 07 SP
- [4] J. A. Valente (1993). *Diferentes Usos do Computador na Educagao*. [Online]. Available: http://www.proinfo.gov.br/prf_txtie2.htm
- [5] J. Visser. (1999) *Changing Learning Environments: The Real and Not so Real of Reality and Virtuality*. [Online]. Available: <http://www.unesco.org/education/index.html>

- [6] MEC - Ministério da Educação (2002). Programa Nacional de Informática na Educação. [Online]. Available: <http://www.mec.gov.br/seed/proinfo.shtml>
- [7] CISCO Systems, Inc (2000). *Reusable Learning Object Strategy: Definition, Creation Process, and Guidelines for Building*. [Online]. Available: <http://www.cisco.com>
- [8] Urdan, T. A. & Weggen, C. C. (2000). *Corporate e-learning: Exploring a new frontier* [On-line]. Available: http://wrhambrecht.com/research/coverage/elearning/ir/ir_explore.pdf
- [9] Hodgins, Wayne. (2000). *Into the future* [On-line]. Available: <http://www.learnativity.com/download/MP7.PDF>
- [10] Wiley, D. A. (2000). Connecting learning objects to instructional design theory: A definition, a metaphor, and a taxonomy. In D. A. Wiley (Ed.), *The Instructional Use of Learning Objects: Online Version*. Retrieved MONTH DAY, YEAR, from the World Wide Web: <http://reusability.org/read/chapters/wiley.doc>

Papers from Conference Proceedings (Published):

- [11] J. O. Freitas, J. G. Martins, R. M. Barcia, R.C. S. Pacheco, A. Martins, G. Tissiani. (2001). VIAS Teaching Environment. *7TH. International Conference on Virtual Systems and Multimedia*,. Berkeley, CA, USA.

About the Authors

Nilson Ribeiro Modro was born in Parand, Brazil. He studied Computer Science at University of Santa Catarina State. In 2000 he completed his Masters Degree in Artificial Intelligence at the Federal University of Santa Catarina in Florianópolis, Brazil. Nilson is currently undertaking a Ph.D. on "Media and Understanding" at the Federal University of Santa Catarina, and he is busy researching, developing and teaching about learning tools suited for the demands of an information society at the Laboratory of Distance Education (UFSC).

Leslie Christine Paas was born and raised in Winnipeg, Canada, and has traveled, worked and studied in several countries. In 1997 she completed her BA (joint major in Communication and Latin American Studies) at Simon Fraser University, Vancouver, Canada. In 1999 she earned a Masters Degree in Media and Knowledge at the Federal University of Santa Catarina in Florianópolis, Brazil, where she is currently writing her Ph.D. thesis in the same area. Leslie has always been fascinated by information and communication technologies, and different cultures. She is applying her knowledge and interests by working in the area of education for Sustainable Development.

Alejandro Martins Rodriguez was born in Montevideo, Uruguai. He has an undergraduate degree in Industrial Engineering, and Masters and Ph.D. degrees in Production Engineering from Federal University of Santa Catarina. Since 1996 he has been teaching and researching Artificial Intelligence, Operational Research techniques and use of computers and new technologies at education at Federal University of Santa Catarina, Brazil.

Editor's Note: There is always more to learn about writing. After a score of courses, I continue to learn by observing, listening, reading, and ... writing. An idea does not look the same when you see it on paper. You edit it, sharpen it, reduce ambiguity, enrich meaning, add examples, and massage the format. Writing is both an art and a science. In this article, Brent Muirhead addresses fundamental aspects of planning and preparation for academic publication. I heartily endorse these for beginners and professionals alike. Incidentally, the same principles apply to editors and those who write Editor's Notes. DP.

Writing for Academic Publication

Brent Muirhead, Online Editor, USDLA Journal

Introduction

The process of writing for academic publication is a unique professional challenge. Individuals would like to write but are not quite sure how to get started. The author shall provide advice on how to develop a practical writing plan that will increase opportunities for publication.

Establishing a Writing Plan

A frequent question through the years has been what is the most difficult aspect of writing? Often, it involves simply getting started on a writing project because people often struggle with the initial steps. Individuals will offer an assortment of excuses for not writing for publication such as not having the time, my colleagues do not publish, it is not in my research area and my job description does not require writing. Perhaps, the deeper reason involves a personal awareness of deficient writing skills and a fear of rejection. It is important to face these concerns and realize that the self-confidence to be a successful writer will require taking some risks and developing a plan that will enhance the quality of their writing. The competition for publication is intense but the good news is there are specific steps that individuals can take to enhance their odds of getting articles published in journals and books (Henson, 1999).

The first step in the writing process should be to select a topic that will be informative and relevant to capture the attention of today's editors. There is no real formula for identifying a meaningful topic. Yet, the author has found that creative topics will flow from an individual's reading and studying habits. It is wise to have a diverse reading program that includes nonfiction books, journals and major newspapers such as the *New York Times*. Reading a variety of works offers a practical way to identify hot topics in a particular academic discipline and within the popular culture.

The reading of research reports requires critical reflection and systematic analysis to clearly identify the salient elements of the study. Locke, Silverman & Spirduso (1998) recommend reading with realistic discernment "small steps in improved understanding are the reasonable goal of most inquiry, not great leaps based on perfect studies... If every study involves trade-offs and compromises in scope and design, the same is true in preparing reports. No journal article contains the full story. The constraint of space alone makes this inevitable (p. 54)."

The author usually begins with several potential topics and then decides what topic would best fit the journal's theme or type of articles. This is a crucial step because it is wise to

investigate several journals to clearly identify which one offers the best possibility of being published. For instance, it is important to understand certain basic facts about the publication such as the percentage of articles that are written by free lance writers, the average length of time to peer review an article and the acceptance rate for submitted articles. This type of information is an effective way to start exploring what would be the best journal or magazine to pursue publication. Brogan and Brewer's (2003) *Writer's Market* is an example of books that examine potential publications. It offers practical advice and contact information for writers who are investigating places to submit their work. It is important to devote time to studying various publications before making a final decision on a topic and place of submission. Ray (2002) recommends asking the following questions:

- What is its purpose?
- What regular departments or features does it include?
- What seasonal material does it include?
- What range of freelance-written topics does it cover?
- What topics and articles have been recently published?
- What elements and features do the articles include?
- What writing techniques, structure, and organization do authors employ?
- How long are the articles?
- How deep is the information?
- How do articles and accompanying graphics appear?
- How formal or informal are the design, writing, and graphics? (paragraph 4)

The list of questions will help individuals to identify the top three or four potential journals or magazines that offer the best publication opportunities. The next step is to establish a series of short and long-term writing goals. It is essential that individuals create goals that help them continually write and practice their skills. The author writes letters to the editors on a variety of social issue to major newspapers such as *USA Today* and the *New York Times* because they represent competitive writing situations. The *New York Times* will publish one letter every two months and they attract writers who are leaders in their respective fields. *USA Today* newspaper receives approximately 125, 000 letters a year and has 2.2 million readers (Hoover's Online, 2002). Therefore, it is a real honor to be published with either of these newspapers.

Serious writers will share their knowledge and insights in a diversity of articles such as a literature review, reflections on a recently attended conference and book reviews. The articles can be creative and descriptive narratives that can reflect a good working knowledge of the literature. Usually, editors will invite individuals who have specific expertise in an academic area to review a recent book. Fahey (2001) recommends, "a book review should not just summarize the book, but should incorporate personal judgments. You should be polite even if you disagree with the author (and especially if you are just beginning your writing/teaching career) (paragraph 20)."

Authors occasionally experience a time where they lack ideas and they draw a blank. It is wise to realize that others can have this problem and take a healthy perspective on this issue. Skinner & Policoff, 1994 offer strategies to jump-start the writing process.

- Establish a writing routine that creates a specific time and place to write and encourages daily practice.
- Change your established writing schedule to a different time of the day.
- Read books and articles in your research area with renewed sensitivity because it can promote new ideas.
- Write a letter or poem that expresses your thoughts.
- Exercise or listen to music to help energize your creativity (Skinner & Policoff, 1994).

Develop Good Relationships with Editors

The key is to be continually writing and networking with other writers and editors at conferences and online newsgroups. There are numerous professional organizations that offer formal and informal formats to meet others who are involved in research projects and publication related activities. For instance, The International Forum of Educational Technology Society (IFETS) provides an online discussion platform for sharing information and networking with others (Fahey, 2001).

It is essential that writers cultivate good relationships with their editors by learning to be attentive to the publishing process. The author is an editor and it surprising how people will often neglect to provide updates on how they are progressing on an article. Also, individuals will miss promised deadlines and then decide not to write the article but not inform their editor. Unfortunately, some writers can operate in a manner that undermines their relationships with editors and it can diminish the possibility of having future writing opportunities.

“But, while editors may assign an article based on a query and subsequent exchanges, they may choose not to work with you again if you became lazy midway through a project, didn't respect their time, were difficult or time-consuming to communicate with, or didn't follow through on what was promised (Ray, 2002, final paragraph).”

Conclusion

Editors are always looking for creative and relevant articles that will meet the needs of their readers. Writers should strive to develop positive communications patterns with their editors by submitting quality work, meeting promised deadlines and responding promptly to their e-mail or telephone messages. The author has found that a writer's focus should not be on fears about their work being rejected. Rather, individuals need to be dedicated to producing excellent material that editors will want to publish. Writing for publication represents a wonderful opportunity to interact with the others and make a positive contribution to the academic community.

References

- Brogan, K. S. & Brewer, R. (2003). *Writer's market*. Cincinnati, OH: Writers Digest Books.
- Fahey, S. J. (2001). How to write academic articles for publication. Available: <http://www.marquette.edu/aegs/advice/publishing.htm>
- Henson, K. T. (1999). *Writing for professional publication: Keys to academic and business success*. Boston, MA: Allyn & Bacon.
- Hoover's Online (2002). Gannett Co. Available: <http://www.hoovers.com/co/capsule/3/0,2163,10623,00.html>
- Ray, D. S. (2002). Freelance article writing: Tips for establishing and maintaining good relationships with magazine editors. TECHWR-L. Available: <http://www.raycomm.com/techwhirl/employmentarticles/happyeditor.html>
- Skinner, J. & Policoff, S. P. (1994). Writer's block—and what to do about it. *Writer*, 107 (11), 21-24.

About the Author



Brent Muirhead has a BA in social work, master's degrees in religious education, history, and administration, and doctoral degrees in Education (D.Min. and Ph.D.).

Dr. Muirhead is the area chair for the MAED program in curriculum and technology for the University of Phoenix Online (UOP) and teaches a variety of master level courses. He also trains and mentors faculty candidates, conducts peer reviews of veteran faculty members, and teaches a variety of courses in UOP's Doctor of Management program. He is an Associate Editor for Educational Technology & Society. He may be reached via email: bmuirhead@email.uophx.edu

Editor's Note: This study relates self-efficacy to retention for online psychology students. The thought crosses this editor's mind that self-efficacy is significant in completion of any learning task in any discipline, whether learning takes place online or face-to-face.

Self-Efficacy & Motivation Effects on Online Psychology Student Retention

The Effects of self-efficacy and level of motivation on retention for learners in online graduate psychology programs

Robert Irizarry

Abstract

Online classrooms are considered the future wave of education. Increase availability of computer technology and acceptance of adult online professional degrees have fostered this attitude. Online education requires learners to be self-directed, intrinsically motivated, and have practical knowledge of computer technology. Influenced by perception of individual ability, student's motivation, self-beliefs, and teaching practices can account for the difference among students completing an online degree. Bandura (2001) explains the effects of beliefs as reciprocally influencing the person and the environment in a triadic relationship. Can self-efficacy beliefs and levels of motivation account for online psychology student retention? The author will discuss the implications of social cognitive theory concept of self-efficacy, its relationship to motivation, teaching practices, and online graduate psychology student retention.

Introduction

Distant learning can be described as the educational wave of the future. The acceptance of home school as a valid form of education and the success shown by the distant learner home schooled children have influenced the expansion of mode of education to the university and professional degrees. Increase availability of computer-based technology has opened the way to increased college educational availability to adults who otherwise would have not been able to attain a college degree. Exposure to technology also made possible the use of computers to aid classroom instruction. Technological advances have facilitated the development of faster Internet communication, lower technology costs, and more user-friendly computer software. These advances have enabled the tracking and storage of information needed in an on-line instructional web based education. Online education has opened a new world of collaboration and increased availability of information and educational opportunities (Wang & Newlin, 2000). Psychologists are no exception to the influx of Internet driven education in their attainment of advance professional degrees.

Employment and licensure opportunities that require advanced graduate degrees motivated psychologists to continue their education until reaching a professional degree. Even though online graduate education attracts many psychology students, few research studies have dealt with the question that can theoretically explain specific learner's

characteristics that aid the success and completion of an online professional psychology degree (Wang & Newlin, 2000). Empirical investigation results could define and become the base line for strategies that increase the retention of online graduate psychology students.

Sherry (1996) presents distant learners' student characteristics and learning styles as well as teaching techniques that aid this type educational experience. Sherry establishes that self-directed behavior and an internal locus of control are important ingredients for distant students. Online learners' characteristics can present useful information that could bring light to practices that will increase the likelihood of degree completion. The use of a theoretical foundation as the basis for empirical data gathering is an important step to determine and narrow down characteristics that can contribute to online student retention. The determination of a theoretical construct that can account for student retention therefore has to be directly related to academic achievement and resiliency among online graduate psychology students.

Psychologists and psychology students can receive a professional degree from a web-based institution, which results in a costly well-rounded educational experience enhancing the professional's own experience learning with others in the field. The characteristics of these cyber-students is often cited as self-motivated, self-starter, critical thinker, degree of family support, class content and personal/career interest, amount and type of feedback with instructors and other students, accepts responsibility for own learning, organized, and practical knowledge in the use of computers, (Murphy, 1998). These experiences have created momentum and positive perception in the attainment of a well-rounded educational experience. Self-perceptions and confidence in the attainment of one's goal also affect the outcome of such an endeavor.

Campbell (1999) describes adult distant learner characteristics based on the andragogy model. The andragogy model states that adults have come to the psychological stage of life where they are responsible for their well-being and can execute self-directed activities (p. 1). This coincides with Thompson (1998) findings which states that adult distant learners are older, more mature, married, employed, and female (p.2). Research attempts to establish a relationship between online graduate student retention and demographical characteristics has been inconclusive and contradictory (Thompson, 1998). Assuming that distant learner's characteristics are applicable to online learners, Thompson and Campbell's lack of specificity only accounted for overall characteristics. Specificity and determination of a valid theoretical foundation constitute a deficiency in the empirical data of online graduate psychology student characteristics. Wang & Newlin (2000) established that current research determining online student characteristics relies on anecdotal evidence (p. 137).

The individual characteristics of each participant are important factors in the completion of educational goals. These educational goals have to match the individuals' preparedness and willingness to engage in such a program. Web-based distant learning provides learners with the opportunity to maintain their life-style, interact with other students from remote places, the ability to plan a study schedule around other activities, cut down in travel to have more time to search for resources, benefit from an array of resources and

from diverse faculty interest. The combination of experiences and the facilitation of an experienced professor provide the ideal learning experience for an array of students seeking a professional degree in psychology. Each individual's characteristics, motivations, and experiences are accounted for during the course of learning. Different from traditional education, each individual is solely responsible for his or her own learning.

Faculty also presents an important piece of the paradigm of individual student learning by becoming the resource in which the learning takes place. An online distant learning professor's creativity and level of planning influence the specific interactive nature of this type of instruction. McKeachie (2002) explains the difference in the process of teaching a distant course as, "Distant teaching is an extended act of imagination." (p. 258). Professors have to process the course sequence, guide instructional activities, looking ahead to the need of the students. Encouraging, motivating, guiding, are descriptors of the online web-base instructional experience.

For students to be successful, an array of conditions are found to contribute to the retention of graduate psychology students using the web-based education to fulfill their academic goals. Motivational factors contribute to the retention of students. Bandura's social cognitive theory provides a framework that can account for differences in the retention of students. In addition, motivational factors, internal and external influences captivate the individual's ability to complete an online graduate psychology degree using a distant learning program. Bandura's social cognitive theory presents the reciprocal influences of three areas of learning. Behavior, personal (cognitive, affective, biological) events, environmental and behavioral conditions affect student motivation (Schunk & Pajares, 2001). The concept of self-efficacy can account for the differences between graduate psychology students completing their degree or withdrawing from such a program. In addition, self-efficacy provides the root of the motivational process that affects the individual attainment of educational goals.

The formulation of concepts regarding the characteristics of web-based distant learning psychology programs and degree completion will be addressed by taking in consideration the following questions: Is the completion rate directly related to the level of motivation and self-efficacy of those seeking to complete a distant learning program? What differences are there among those students that complete a distant learning web-based psychology program?

The search for such information will determine the possible need to stimulate research in this area. Caution should be given when attempting to encapsulate individual characteristics with degree completion. Many other variables can account and influence such a result. This essay will attempt to explain retention of distant on-line graduate psychology program students using Bandura's social cognitive theory self-efficacy and level of motivation.

Social Cognitive Theory

Social cognitive theory establishes that human behavior is influenced and affected by the individual, behavior, and environment. Each person affects as well as it is affected by this triadic relationship. The theory establishes that each individual possesses the capacity to symbolize, develop self-directed forethought, and learn from his or her and others individual experiences (Schunk & Pajares, 2001). According to social-cognitive theory, each individual possesses a self-regulating system that affects motivation and learner differentiation. This self-regulating system represents a process that is affected by a bi-directional and interdependent relationship between behavior, personal experiences, and environment (Bandura, 2001). This relationship becomes a triadic interrelation that influences motivation and self-beliefs. The self-system is a part self-regulatory system that each individual possess. The self-regulatory system aids in the development of beliefs and behavior that will enable or discount actions. Research has shown that self-regulatory behavior can account for academic achievement (Pajares 1996; 2001a; 2001b; 2002; Pajares & Schunk, 2001). As part of this self-regulatory system, Bandura introduced the concept of self-efficacy. He defines self-efficacy as an essential part of the human functioning reciprocally motivating and perpetuating the individual's behavior (Bandura, 2001). The concept of self-efficacy can be considered as the theoretical foundation to determine the individual differences that account for the retention of online psychology graduate students.

Bandura (2001) explains the process of thought and action as regulated by a self-system that enables individuals to exercise control of their thoughts, feelings, and actions. Pajares (1996) describes the self-system as one that "houses one's cognitive and affective structures and includes the ability to symbolize, learn from others, plan alternative strategies, regulate one's own behavior, and engage in self-reflection" (p. 1). The self-system is a self-regulatory subsystem that mediates the influences of each of the triadic parts of individual's behavior, thoughts, feelings, and motivation. Based on the results of the interactions between environment, personal characteristic, and beliefs, the individual's likelihood of similar actions to occur is increased. Each person affects his or her environment and is influenced by his or her actions. The thoughts resulting from this interrelationship becomes a mediator between knowledge and behavior (p. 3).

Each person's experience forms an important part in the development of self-regulation (Bandura, 2001; Pajares, 1996). The individual is therefore accumulating perception about his or her performances that influence his or her self-belief. Through this bi-directional reciprocal process, the individual is in control of his thoughts, environment, and behavior. The self-system is composed of experiences and beliefs that each person forms of his or her abilities. According to Bandura (2001), self-efficacy is the concept by which each person's experiences, abilities, and thoughts merges into one road. This concept could account for the online learner level of motivation, affecting the retention of online psychology graduate student retention.

Self-Efficacy and Motivation

Bandura defines self-efficacy as “people’s judgment of their capabilities to organize and execute courses of action required to attain designated types of performances” (p. 2). Self-efficacy regulates the way in which an individual perceives his or her competency. This perception influences an individual’s ability to complete a task and a set, attainable goal (Pajares & Schunk, 2001). This perception also affects the level of motivation and resilience the individual develops. Each individual develops a visualization of self, creating what Bandura calls a self-system. This self-system provides cognitive and affective information basic to the control of thoughts, feelings, and actions. An individual perception activates the self-system providing information regarding past experiences, accomplishments, and failures. These experiences are processed, stored, and used by the self-efficacy beliefs system, which in turn affects experiences, thoughts, behavior, and environment. The self-system then forms conceptualizations of the individual’s abilities. These perceptions become the motivational drive that accompanies action.

Self-efficacy directly affects the levels of motivation and actions individuals engage. By determining what activities they are more likely to accomplish, the adult learner engages in actions they are more likely to succeed. According to Pajares (2001a), Pajares (2001b), and Schunk & Pajares (2001), research studies have demonstrated that self-efficacy affects the level of motivation, learning, and achievement. Social cognitive theory proposes a bi-directional interrelation between each part of the individual’s experience, as well as the cognitive summary of the experiences each individual accumulates through the years. Each individual forms a set of self-efficacy beliefs that account for his or her motivation and resilience in completing an activity. Students’ perceptions are based on information obtained from “actual performances, their vicarious experiences, and the persuasions they receive from others and their physiological reactions” (p. 2). High self-efficacy contributes to beliefs in the individual’s capacity to learn, motivating experiences and the efforts placed on learning.

Self-efficacy is not only a judgment of an individual’s ability, but also the beliefs that an individual develops regarding his or her ability to successfully complete a task. The development of self-efficacy is the result of the triadic interrelationship between environment, personal characteristics, and behavior. Self-efficacy influences the will to complete a task, perform an action, or engage in an activity. This perception of self-efficacy interrelates with the individual’s ability to complete a task. According to social cognitive theory, each individual’s motivation is driven by self-efficacy beliefs as well as other self-regulatory characteristics (e.g. self-esteem). Self-efficacy influences motivation by the individual’s perception of their ability. An individual can have a high level of motivation and self-efficacy on a learning task, but his or her actual experience may affect the individual’s belief of his or her ability to complete such a task. The learning process is then mediated by self-efficacy, which motivates and affects the effectiveness of self-directed behavior (Pajares, 1996, p. 7).

Self-efficacy is an essential part of learning that affects the individual’s belief that it is possible to engage and complete a task. If self-efficacy can account as a characteristic that affects the retention of online graduate psychology student, the inclusion of this

concept in the teaching practices of online classroom can enhance and prevent students withdrawing from their psychology graduate programs.

Self-Efficacy and Teaching Practices

The particularities of online learning do not include motivational factors based on modeling and or perceptual similarities. The learning process occurs using the written language found in online discussions and task completion. Each individual experience constitutes the foundation in which interactions include newfound knowledge. During the online learning process, each individual is responsible for task completion. The compilation of knowledge presented in the course, as well as assigned projects during the length of the class, aid in the process of learning. The organization of online courses is an important part in the enhancement of the learning process. The teacher should consider the characteristics of their students in the process of course design (McKeachie, 2002).

Sherry (1996) describes distant learning as learning that should be directed toward the needs of the students and not on inclusion of technology within the learning process. If this is taken into consideration, the development of teaching strategies should focus on student characteristics. Self-efficacy can be considered an important motivational part of student characteristics. Therefore, if self-efficacy can be increased by teacher-student interactions, then teaching practices could enhance each student's belief system, increasing the probability for online graduate degree completion.

Bandura (2001) explains that human behavior is an ever-changing process. Interactions and modes of learning are bi-directional influenced by the self-regulatory system. Lacking the face-to-face interaction, online graduate learners are more vulnerable to the self-regulatory system. Drawing from their self-beliefs and self-efficacy system, the online students depend on validation from the interaction with their professors. If this influence is considered valid, then teaching techniques used can enhance the self-efficacy system of an adult student receiving online graduate education (Debowski, Wood, & Bandura, 2001). Self-efficacy can account for the heightened retention of students otherwise leaving this non-traditional form of education.

Considering that self-efficacy influences the choices people make, the actions they take, the amount of effort placed on an activity, how quickly the individual recovers from a set back, the belief that things are tougher that they really are, and many other factors enhancing motivation; then self-efficacy becomes an important source of motivation for the online graduate learner. Wang & Newlin (2000) reported that online web-based education psychology students, when compared with traditional education students, have a high need for cognition and an internal locus of control. The investigators studied the cognitive-motivational and demographic characteristics of psychology students enrolled in an online graduate web-based psychological statistics course and compared them with students taking a face-to-face, more traditional course to determine success. The implication of Wang & Newlin study opens a categorical question regarding empirical information available to predict the success of students. Self-efficacy may account for the

base line and theoretical construct to investigate the differentiation among online psychology students seeking a professional degree.

Online education requires the development of skills necessary to meet course requirements. One important skill is the ability to utilize the online resources available to the student. Debowski, Wood, & Bandura (2001) studied the self-regulatory process on the mechanics and acquisition of information through electronic search. They found that university students enrolled in an accounting course that were guided through the exploration of the internet “produced higher levels of perceived self-efficacy, satisfaction, strategy quality, and performance and lower levels of wasted effort on electronic search tasks than self-guided, enactive exploration” (p. 13).

Schunk & Pajares (2001) present some useful information regarding the development of self-efficacy and possible instructional strategies. They report that clear goals and expectations enhance the learning process and contribute to individual self-efficacy beliefs. Pajares (2002) presents the importance of the self-system, specifically self-efficacy, as follows: “Unless people believe that their actions will have the desired consequences, they have little incentive to engage in those actions” (p. 6).

Professors engaged in distant education know the importance of identifying their audience and visualizing students’ needs while planning an online course. Distant educators are also aware of the importance of sequence in the process of course delivery. Research has found that online education psychology students have a need for guidance in the process of learning (Debowski, Wood, & Bandura, 2001). Wang & Newlin (2000) found that professors should closely monitor the online interactions of their students, determining progress and providing feedback.

Self-efficacy proponents recommend that teachers pay attention to the manner in which students perceive their skills and confidence in completing a task. Online educators can enhance their students’ learning experience and motivation by providing feedback that enhances each student’s perception of competence, without compromising honesty. The student’s perception of competence can enhance or diminish his or her level of motivation.

The applicability of self-efficacy to teaching practices has to meet the specificity recommended and implied by Bandura’s theory (Pajares, 1996). Interactions between the online learner and the instructor will require specificity in the practices that will enable the investigation of the effects of teaching techniques to specific self-efficacy beliefs. Determining these conceptual practices will allow the modification and improvement in the communication and the enhancement of the online learning experience. The unavailability of empirical information regarding online teaching practices will invite the use of specificity in theoretical construct as well as well defined learning relationships among the variables studied.

Discussion

Rapid growth and availability have left distant education without sufficient empirical validation that can account for the retention of students of online graduate psychology programs. Certain online student characteristics are more conducive to resiliency and higher levels of motivation. Self-efficacy was found to explain the differences in students' academic achievements. The specificity of these student characteristics can provide the basis for empirical formulations. Bandura (2001) and Pajares (1996) caution measurements of global self-efficacy and the failure in the predictive ability of the concept of self-efficacy. Since self-efficacy is a part of a self-regulatory system, the individuality of such characteristics can only be measured in specific academic domains. Recommendations are made for specificity in the constructs of empirical formulations to measure the predictive ability of the concept of self-efficacy. There has been limited empirical investigations regarding the applicability of the concept of self-efficacy to online graduate psychology retention. Nevertheless, the applicability of the concept to aid in the understanding of online learner characteristics cannot be discounted.

Teaching strategies that will enhance and predict online student retention are far from a conceptual framework. The literature demonstrates that certain processes aid in the online learning process, but lack the specific techniques that will enhance and promote retention of online graduate psychology student. Even though self-efficacy cannot directly account for specific teaching strategies, the importance of self-efficacy as a conceptual theorem can validate the need for further empirical investigation. Individual differences can account for levels of retention in online graduate psychology education. Student characteristics provide a basis for investigation and the belief that a student can accomplish a task could determine the difference between retention and not completing an online psychology graduate degree.

According to the information presented, self-efficacy affects the beliefs and motivation level of the individual. If a person believes that he or she can complete a task, the probability that he or she will engage and become resilience to any obstacles increases. Of course the belief is accompanied by many components that have been bi-directionally affected by personal experiences, environment, and actions. Individuals that have experienced academic success may be more prone to engage in similar experiences. Their success in completing an online psychology degree includes variables other than self-efficacy. However, the concept of self-efficacy can partially account for the resiliency of those that complete online graduate degrees.

At this time, literature cannot account for differences in individual characteristics that aid the retention of online students. Information and empirical evidence has brought light to the characteristics of online students, with a lack of specificity concerning student retention.

This presentation is by no means has covered all possible information in the subject of online psychology student retention. Many other possible theoretical constructs that could account for explanation of learner characteristic are not considered. The author acknowledges the fact that many other theoretical constructs can be considered in the

conceptualization and explanation of individual differences, which can account for online psychology student retention. Social cognitive theory present a more empirically sound concept that can account for student achievement and online psychology student retention. Undoubtedly the need for research specifying the difference between online psychology student's characteristics and retention remains.

References

- Bandura, A. (2001). Social Cognitive Theory: And Angetic. *Annual Review of Psychology*, 54(1), 1-26.
- Campbell, K. (1999). *Learner Characteristics and Instructional Design*. Retrieved March 14, 2002, from <http://www.atl.ualberta.ca/articles/idesign/learnchar.cfm>.
- Debowski, S., Wood, R. E., & Bandura, A. (2001). Impact of Guided Exploration and Enactive Exploration on Self-Regulatory Mechanism and Information Acquisition Through Electronic Search. *Journal of Applied Psychology*, 86(6), 1129-1141. Retrieved April 21, 2002, from <http://spider.apa.org/ftdocs/apl/2001/december/apl18661129.html>
- McKeachie, W. J. (2002). *Teaching Tips: Strategies, Research, and Theory for College and University Teachers* (11th Edition). Boston: Houghton Mifflin Company.
- Murphy, K. L. (1998). *Learner Characteristics*. Retrieved March 14, 2002, from <http://disted.tamu.edu:800/classes/learner-char.html>.
- Pajares, F. (1996). *Assessing self-efficacy beliefs and academic outcomes: The case for specificity and correspondence*. Paper presented at a symposium chaired by B.J. Zimmerman, Measuring and mismeasuring self-efficacy: Dimensions, problems, and misconceptions. Annual meeting of the American Educational Research Association, New York. Retrieved February 31, 2002, from <http://www.emory.edu/education/MFP/aera2.html>.
- Pajares, F. (2002). *Overview of Social Cognitive Theory and of Self-Efficacy*. Retrieved March 30, 2002, from <http://www.emory.edu/EDUCATION/mfp/eff.html>.
- Pajares, F. (2001). Self-efficacy beliefs in academic settings. *Review of Educational Research*, 66(4), 543-578. Retrieved March 31, 2002, from <http://valdosta.edu/~whuitt/psy702/files/selfeff.html>.
- Pajares, F. (2001). Current Directions in Self-Efficacy Research. *Advances in motivation and achievement*, 10, 1-49. Retrieved March 31, 2002, from <http://www.emory.edu/EDUCATION/mfp/effchapter.html>
- Pajares, F., & Schunk, D. H. (2001). Self-Beliefs and School Success: Self-Efficacy, Self-Concept, and School Achievement. In R. Riding & S. Rayner (Eds.), *Perception* (pp. 239-266). London: Ablex Publishing.

Schunk, D. H., & Pajares, F. (2001). The Development of Academic Self-Efficacy. In A. Wigfield & J. Eccles (Eds.), *Development of Achievement Motivation*. San Diego: American Press.

Sherry, L. (1996). Issues in distant learning. *International Journal of Educational Telecommunications*, 1(4), 337-365. Retrieved March 14, 2002, from <http://carbon.cudenver.edu/~lsherry/pubs/issues.html>

Thompson, M. (1998). Distant Learners in Higher Education. In C. Campbell Gibson (Ed.), *Distant Learners in Higher Education: Institutional Responses for Quality Outcomes* (pp. 10-18). Madison, WI: Atwood Publishing.

Wang, A. Y., & Newlin, M. H. (2000). Characteristics of Students Who Enroll and Succeed in Psychology Web-Based Classes. *Journal of Educational Psychology*, 92 (1), 137-143. Retrieved May 5, 2002, from <http://spider.apa.org/ftdocs/edu/2000/march/edu921137.html>.

About the Author

Robert Irizarry is currently attending Walden University (Minneapolis, MN), Counseling Psychology Ph.D. program. He holds a B.A. in Psychology and M.A. in Counseling and Guidance from the InterAmerican University of Puerto Rico.

The author is interested in the development of empirical information that will increase the knowledge and effectiveness of retention effort of students registered in online psychology educational programs. His telephone number is (832)-865-6997 and email address is ririzarr@waldenu.edu.