DOCUMENT RESUME

ED 477 103                                                    IR 021 831

AUTHOR            Thurber, Bart; Pope, Jack
TITLE             The Computer, the Discipline and the Classroom: Two
                  Perspectives.
PUB DATE          2002-06-00
NOTE              6p.; In: ED-MEDIA 2002 World Conference on Educational
                  Multimedia, Hypermedia & Telecommunications. Proceedings
                  (14th, Denver, Colorado, June 24-29, 2002); see IR 021 687.
AVAILABLE FROM    Association for the Advancement of Computing in Education
                  (AACE), P.O. Box 3728, Norfolk, VA 23514. Tel: 757-623-7588;
                  e-mail: info@aace.org; Web site: http://www.aace.org/DL/.
PUB TYPE          Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE        EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS       *Case Studies; *Computer Assisted Instruction; Computer Uses
                  in Education; Course Content; Educational Technology; Higher
                  Education; *Instructional Design; *Instructional
                  Effectiveness; *Teaching Methods; Teaching Models

ABSTRACT
        The authors present two case studies in the use of computers
in the classroom, one involving an introductory computer science class, the
other an upper division literature class. After describing each case, the
differences are discussed, showing that pedagogical models developed for one
discipline may not transfer to another, and that the discipline itself,
beyond instructor's preferences or institutional policies, may determine what
works and what does not. (Author)

# The Computer, The Discipline and the Classroom: Two Perspectives

Bart Thurber
Professor of English
University of San Diego, United States
email: thurber@sandiego.edu

Jack Pope
Director of Academic Computing
University of San Diego, United States
Email: pope@sandiego.edu

**Abstract:** The authors present two case studies in the use of computers in the classroom, one involving an introductory computer science class, the other an upper division literature class. After describing each case, the differences are discussed, showing that pedagogical models developed for one discipline may not transfer to another, and that the discipline itself, beyond instructor's preferences or institutional policies, may determine what works and what doesn't.

## Introduction

Our goal in this paper is twofold. First, we'll indicate that the successful use of information technology in the classroom depends more on the synergy between teacher, student and the learning context than on the technology itself. The use of technology –- as the primary vehicle for teaching (distance learning) or as an adjunct to the more traditional classroom –- is effective only insofar as it addresses this synergy. Second, we will maintain that one under-appreciated factor influencing teachers, students and learning contexts is the discipline itself, in a way that goes beyond simply paying appropriate attention to learning (or teaching) styles. We offer two case studies, one drawn from an introductory computer science course, the other from an upper division literature course, in support of these claims.

Enthusiasm for online learning is of course high for students who live in areas not easily served by the traditional classroom, and courses accessible anytime and anyplace can provide valuable learning experiences for mature students who work full time and take courses when schedules permit. But the use of online learning tools *within* traditional campus-based course delivery structures has become popular as well [1]. James Duderstadt, President Emeritus and Professor of Science and Engineering at the University of Michigan, suggests that universities must themselves take a leadership role in remodeling the universities of the 21st century, and that new information and communication technology tools will play a key role in that mission, suggesting that universities will continue to have a physical existence, whatever their virtual roles may become[2]. This is not a completely uncontroversial claim; in a New York Times article, John Chambers, then Chief Executive Officer for Cisco Systems, asserts that "the next big killer application for the Internet is going to be education. Education over the Internet is going to be so big it is going to make e-mail usage look like a rounding error." [3].

As the situation has developed, however, and as other researchers have begun to look at what now seem to be inflated claims, online education has emerged as one aspect of a larger picture. Prosser and Trigwell [4] argue that both teachers and students benefit from an increased awareness of their own personal experiences, approaches and perceptions of the learning process and that this awareness facilitates positive learning outcomes. In particular, they emphasize that "good teaching involves an awareness of students' perceptions of teaching technologies (including information technology) used in teaching" and that these perceptions can significantly impact the learning experience either positively or negatively. Given their results, the successful use of information technology in the classroom is clearly more dependent

on interactions between teachers, students and learning contexts than on the technology; it may even indicate that there are some things technology cannot appropriately do, a point to which we shall return.

On the other hand, learning opportunities newly available through the use of technology can support desired learning outcomes—provided (our second claim) those outcomes, as defined not simply by the instructor or the institution but by the discipline *itself,* are congruent with what the technology can provide.

Astin's comprehensive study of student development characteristics in various higher institutional settings [5] points out that active engagement of students in interdisciplinary courses, course with discussions, debates, and class presentations strongly correlates with critical thinking skills.To the extent that technology can facilitate (or at least create the opportunity to provide) such active learning strategies, the effort will not only increase student involvement in the course, but also increase understanding of course concepts by relating them to independent inquiry and debate.

The question is whether available technology can actually do that.

## Case Studies and Examples

Our first case study involves an introductory computer science class. Pope's goal in implementing web-based tools the course was to increase opportunities for communication and participation. The class was small (approximately 25), but there was a considerable amount of material to cover and the topics that dominate the headlines -- Microsoft Antitrust litigation, Privacy in Cyberspace – provide fertile ground for discussion. He began using WebCT as a tool both for distributing informational materials and for on-line testing. In doing this, he relied on the students to read on their own time; his discussion/lecture now addresses related but different concepts in supplementing the text. Making the quizzes available online provided more opportunity for group and class discussion.

Students were positive; they could find their grades, course syllabus, assignments and topic notes in one central location.

In designing this kind of structure Pope was of course not alone. The University of Central Florida, for example, adopted a similar approach to improve its course in American National Government. There, the goals of the restructuring were practical as well as mission-oriented. The course enrolled over 2000 students in sections of 80-100 students. Classroom space was in critical short supply; increasing the number of sections was not a viable option. But the course also had a retention problem and surveys indicated that partially web-based sections had somewhat higher retention rates. Building on this, the department designed a web-based asynchronous learning environment based on web-based modules to encourage student participation. Class meeting time was reduced by two thirds. Bruce Wilson reports "students are, by necessity, more actively involved in the learning process. And instructional technology can also enhance students' critical thinking skills. … The use of the Internet in teaching Political Science gives instructors more opportunities to design activities that involve students' direct participation and to follow clearly set instructional goals." [6]

Herman D. Lujan [7] alludes to the tendency of many faculty to "narrowly define 'good' teaching and learning as something that occurs in a time -bound, synchronous classroom setting." Pope believes that students in his computer science course benefit not only from in-class – 'synchronous'– discussions and demonstrations but also from the ability afforded by new online tools to communicate and learn using the tools that promote asynchronous learning opportunities.

Unlike Lujan, however, Pope is not convinced online learning fits in every teaching and learning context. It fits in this course because much of the material and the broad topics under review can be organized in a modular fashion and students can easily take part in discussions outside of the class context using WebCT. Fine for an introductory class, not so fine for an upper division, seminar-style class in advanced topics in mathematics.

This class meets twice a week – once in a regular classroom and once in a hands-on computer lab. But based on his experience Pope has come to believe that hands-on access is a more critical component of the instructional paradigm than the web-based asynchronous tools. This is a rather tame observation in 2002 – the case for instructional computing labs in science and computing education was made by the mid 1980s; nevertheless, the classroom context heavily influences teaching methodology. Without the lab, there'd hardly be time, and fewer topics, for discussion! The point is that successful teaching requires the clear evaluation of the goals of the course [derived from the discipline], the context in which the teaching and learning takes place [the classroom itself], and finally the learning strategies that best fit both.

Finally, Pope also viewed the electronic interface as an opportunity to evaluate his own teaching. In any implementation of electronic technology in the classroom, a major evaluation of course objectives and teaching strategy is required, and he found this to be a welcome necessity. Drawbacks were a lengthy development and the availability of trained support staff.

Thurber, teaching an upper division class in English literature, had a different experience. It was not obvious to him that the standard distributed education model was appropriate, given both the mission of the university and his actual task, which was to investigate, in this case, the work of the English poet William Blake. He does not give quizzes as such, although short exercises related to that moment's discussion do take place; there is no "lecture" and therefore no lecture notes. The course itself, in addition, was already as "interactive" as he (and his 24 students) could stand. Instead, the goal was to use the Web to investigate the nature of hypermedia, particularly as the poet in question, Blake, had done an 18<sup>th</sup> century version of the same thing. His goals, therefore, were far more specific to the actual material—more contingent, more dependent on the actual poetry than on any idea about how to teach poetry.

He created, therefore, a course website (www.sandiego.edu/~thurber/CyberBlake) and asked the students to create their *own* hypermedia websites in lieu of the traditional paper—the rationale being, once again, not simply that hypermedia may be worth investigating on its own, which it may be, but that, given this poet's practice, hypermedia are an appropriate, perhaps the most appropriate, response. The student's response was positive, in each case suggesting that the course be given again. Typical remarks included "It's about time English Departments did this," "an English course that is actually practical," and "I feel like I'm a writer too, doing something a little bit like Blake."

The course model that evolved, however, has almost nothing in common with Pope's. There was a course discussion board; very few students used it, feeling that opportunities for interaction were already sufficient; a few found it intimidating, while others viewed it as just another course assignment. (Participation in the discussion board was optional. Thurber wanted to see what would happen if it was not required.) There were electronic office hours; no one ever showed up, as students uniformly felt either that they already had sufficient access to the instructor, or that personal interaction was preferable. The emphasis was on the student's ownership and exploration of an electronic medium, the Web, rather than on using the Web to enhance communication or provide additional course materials.

**Observations and Conclusions**

It is about the differences between these two course structures that we would like now to reflect. Crucial to Pope's model was the use of the Web in the transferal of information from the instructor to the student. Indeed, he viewed, as is common, class sessions as adjuncts or supplements to information provided online.

But this is already not a model that transfers readily to an upper division literature class. Advocates of distributed learning have traditionally emphasized that the use of electronic communications present opportunities for teacher-student interaction that effectively shift the educational focus from "teacher-centered" to "student-centered," away from the traditional lecture format and towards distributed learning. But is the "transmission" of information, by itself, what college courses are for? If so, never mind the traditional lecture; colleges have been masquerading as libraries or, now that the technology is available, web sites. As far as the humanities are concerned the "transmission" of information is only one function college courses serve, and in some respects the least important.

While we acknowledge that modern educational philosophy mandates the critical importance of engaging the student in interactions that will impact his or her mastery of the subject matter, it does not then follow that the hallmark of student-centered learning is the use of computers in the classroom. Particularly if, as at our university, classes are small and instructors, on the whole, couldn't lecture if they wanted to. Is the give and take in small, discussion-centered, quasi-seminar situations comparable to what we can do in online discussion groups, even with real-time audio and video? If it isn't, what are the differences, and what is the educational impact of those differences? In the absence of hard answers to those questions, we wonder what's really at stake. What is being transmitted, pre-eminently in literature classes but in the humanities generally, is not the "information" we possess about, for example, Shakespeare, which is trivial, but the nature and kind of conversations we have and have had about his work. Knowledge in the humanities is both a process (not a result) and always contingent, socially constructed and crucially dependent on the context in which it is acquired. (The French Revolution in the eyes of post-1848 Europe was one thing; to Woodrow Wilson it was another; to ourselves it is yet

something different.) From this perspective the transmission of information via the web is a non-sequitur. It isn't the Web that's the problem; it's the word "transmission."

Using computers according to the first model, therefore, at least interferes with and may even negate the goals and methods of the humanities—not because humanities instructors are Luddites (some are), but because the pedagogical model such approaches embody originated in one discipline, or set of disciplines, and don't readily transfer to another. Using computers according to Pope's model would deny Thurber and his students the chance to do what they want to do, which is both to learn what a writer actually did and to forge a response, together, to what she actually did. Here is where the under-appreciated difference between disciplines— world views, at some point— comes into play. There is no, and there had better not be, any such thing as socially constructed knowledge in the sciences. (Actually this is a matter of current debate. What physicists thought about the significance of Maxwell's equations in 1890 was a different than what Einstein thought fifteen years later.) In the humanities, on the other hand, and particularly in literature, there is no knowledge *except* what has been socially constructed -- beginning with the fact that literature is made of language, the most social of all constructions, and including the fact that no writer, no matter how august, is a writer unless someone, somewhere, chooses to read her. The artist has an intent, to be sure, but that intent is only one of many variables connected to our mutual investigation of what a work actually is. Reader-response theory, as a matter of fact, would have us believe, in general, that readers are actually as responsible for what a work does as the author is -- maybe more so, in some constructions. Whether that is true or not, none of us reads or could read Shakespeare as Shakespeare did; but we still read Shakespeare! What's that, then? Shakespeare is Shakespeare but he's also us reading Shakespeare, in ways that he could not have foreseen but which are, still, what Shakespeare "is." For now. Meanings change; there are no "laws" in the sense that there are for the hard sciences.

Thus when Pope says, for example, that it's a good thing that online discussions can happen any time, that it frees people from the constraints of time and space so that they can say anything from anywhere, Thurber's response is -- why is that good? It would depend on the crucial insight that online discussion is the same as or better than the kinds of discussions his students and he have in real time, with their real bodies and their real minds in a real place, zoned into a writer they want to try to understand. Is virtual discussion discussion? (We know, for example, that people write and talk differently, and that they behave differently on- or off-camera. What are the differences, are they significant, and are virtual discussions better than, the same as, or worse than virtual discussions? And for what ends? There has been surprisingly little research in these areas, particularly as different disciplines are involved.)

Even, Thurber notices, Britain's Open University, one of the oldest and most successful implementations of computer-based instruction (http://www.open.ac.uk), supplements online material with local study centers (and tutors) at learning centers around the world. On this model, the discussion, always specific, always local, and always the joint product of the persons present on that occasion, is preserved, together with ancillary electronic material and the opportunity, which he welcomes for his classes, for students to write back at the sea of electronic media they are surrounded by, owning the web by helping, in a small way, to create it.

Thurber makes one further point, however. Crucial to his thinking about the use of computers in the classroom is what he has taken to be the centrality of hypertext (and hypermedia) in the classroom. As things have developed, however, he is beginning to wonder whether hypertext —at least as it was once envisaged—has failed. If it has, the use of computers—any computers at all— in his classroom becomes problematic.

In one sense, of course, it is absurd to say that hypertext has failed—the Web itself is evidence that it has not-- not to mention media-rich computer programs, whether or not they live on the web. Hypertext, and more generally hypermedia, are the cornerstone upon which contemporary electronic communications stand, the cornerstone as well of the new IT economy, with its multiple and still evolving political, social, and psychological impacts. Hypermedia used creatively, moreover, as a medium of expression with its own aesthetics, continues to be produced, if in small quantities. It was this last area—the possibility that interactive technologies could be the means by which student author-readers could create new kinds of texts— that most interested and excited Thurber.

But in this context the early promise of hypermedia has not been realized. We do not go to see interactive movies, though attempts have been made, nor, on any meaningful scale, do we find ourselves reading interactive novels. Hypermedia on the web and elsewhere have developed as economic, more than literary or artistic, engines. Interactive games are arguably interactive fiction-- but games more than fiction, image more than text; but text—language-- is at the heart of Thurber's commitment to his own discipline.

It is true that interactive textuality continues to be investigated in the academy —notably at Brown University, MIT, the University of Texas at Austin—but these attempts too have failed to generate impact beyond those who are already persuaded. Hypertext has not swept away text; hypertext fictions bear approximately the same relationship to fiction that performance art bears to drama—marginal, contingent, rather that the revolution many of us thought was coming.

But whether or not this is true, our conclusion is that each of us is still *en route* to a full understanding of the implications of electronic technologies for higher education. We would emphasize, however, that our different disciplines seem to require different choices, different ways of using those technologies or reasons for not using them. One size does not fit all!

## References

[1] "Wiring the Ivory Tower;" Kathleen Morris; *Business Week*, August 9, 1999; also at http://www.businessweek.com/1999/99_32/b3641119.htm

[2] "A Choice of Transformations for the 21$^{st}$ Century University;" James J. Duderstadt; *Chronicle of Higher Education*; February 4, 2000.

[3]Thomas Friedman, Next: "It's Education;" November 17, 1999; *New York Times*.

[4] *Understanding Learning and Teaching*; Prosser, Michael And Trigwell, Keith; Bury St. Edmonds, Suffolk: St Edmundsbury Press Ltd., 1999.

[5]*What Matters in College, Four Critical Years Revisited*, Astin, A. W., San Francisco: Jossey-Bass, 1993.

[6] "Best of Both Worlds? Web-Enhanced or Traditional Instruction in American National Government." Bruce Wilson, Phillip Pollock, Kerstin Harmann, *Political Chronicle*, v. 12, no. 2, Fall 2000.

[7] "Commonsense Ideas from an Online Survivor", *Educause Review*, March-April, 2002, pp. 29-330.