

# STORM CLOUDS ON THE DIGITAL EDUCATION HORIZON

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## Abstract

*Although digital education is growing across all sectors of tertiary education, there are still many unresolved challenges. This paper focuses on five of them: 1) faculty workload in online teaching, 2) the continued dominance of traditional pedagogy in digital education, 3) the weak state of assessment of learning outcomes, 4) flaws in the accreditation process, and 5) the disappointing state of research in the area. The paper concludes with recommendations for a strong development research model to address these and associated challenges.*

## Keywords

*Online teaching, pedagogy, assessment, accreditation, development research*

## Introduction

*Red sky by morning,  
sailor take warning.  
Red sky at night,  
sailor's delight.*

The proverb above is an old maritime “rule of thumb” that holds a kernel of truth in that storms generally move from west to east in the most heavily navigated parts of the world. A red sky in the morning can occur when the eastern horizon is clear, and the western horizon, from which storms are most likely to come, is red. The “red” is caused by sunlight reflecting off storm clouds. A sailor seeing a crimson sky in the morning should worry that a storm is on its way. The same sailor seeing the red sky at night can relax, confident that the storm has already passed (Note 1).

Responding to the nautical theme adopted for ASCILITE 2002 in Auckland, New Zealand, this paper presents a review of several problematic issues for digital education in the tertiary sector that can be interpreted as signs that educational developers and researchers (e.g., the ASCILITE community) should take warning. In the sense of the proverb, I will argue that our community has some serious storms that it must weather.

That said, I have not joined the ranks of the professional naysayers such as Clifford Stoll (1999) or confirmed luddites such as Stephanie Mills (1997). Instead, I find myself alternating between pessimism and optimism. At times, I am awash in doubts of the kind expressed by informed, although sometimes strident, critics such as David Noble (2001) and Neil Postman (2003). At other times, I find myself sailing on a sea of hope with e-learning proponents such as Arthur Levine (2003) and Greg Kearsley (2000). Saving my optimistic side for another time, I’ll focus on five worrisome issues related to online learning in this paper, including:

- increasing faculty workload,
- the dominance of traditional pedagogy,
- weak assessment of learning outcomes,
- questionable standards for accreditation of online education, and

- the continuing lack of substantive research in our field.

## The 24-Hour Professor

The cover story of the May 31, 2002 issue of *The Chronicle of Higher Education* was titled “The 24-Hour Professor” (Young, 2002). The article describes the long workdays experienced by Lee M. Grenci, a meteorology instructor at Penn State University in the USA, since he began to teach online:

His early-morning session is just the beginning of a long day of virtual teaching. He will check in again every few hours, from home or from his university office. Long after he goes to sleep, students will continue to post messages to the course's discussion board and send him e-mail -- turning in their assignments, asking about their grades, or just saying hello. Mr. Grenci has taught here for nearly 20 years, but this is his first semester teaching online. He quickly discovered what has become conventional wisdom at many campuses: It takes more time to teach in a virtual classroom than in a regular one.

Whether it takes more time to teach (and learn) online is a contentious issue among administrators, faculty, and students. Settling this debate is complicated by the fact that teaching loads vary widely according to many factors, including country (e.g., Australia versus the United States), the nature of the institution (e.g., research focus versus teaching focus), and size (e.g., large public university versus small private college). From a U.S. perspective, Middaugh (2001) reports that the average faculty member works 53 hours per week (ranging from 47 hours in community colleges to 57 in research universities), but that only 11 hours are devoted to teaching (ranging from 16 hours in community colleges to 7 in research universities).

Given that most people in the public and the legislators who control academic budgets view teaching as the core mission of tertiary institutions, the “small” number of hours that academics appear to teach is being scrutinized more closely than ever before (Huber, 1992). In the wake of abundant criticism, Fairweather (1999) reports that several U.S. state legislatures have moved to mandate an increase in the time faculty spend teaching. In addition, an analysis conducted by the American Federation of Teachers (2000) indicates that post-tenure review is now required in most U.S. states, with special emphasis placed on increasing both the time spent teaching and enhancing its quality.

So does it take more time to teach online than it does in traditional face-to-face courses? DiBiase (2000) claims that it does not, but concludes that many academics report that it does because they are responding to course demands more frequently. In short, DiBiase claims that academic staff are confusing frequency of course contact with the increased time demands. By contrast, Palloff and Pratt (1999) conclude that: “Instructors in the online arena will find that the time needed to deliver this type of class is two to three times greater than to deliver a face-to-face class” (p. 49). According to their analysis, the primary increase in time derives from the two hours that online course instructors often devote to reading and responding to student posts to online discussion forums and answering email on a daily basis, in contrast to the two to three hours per week that faculty typically meet their classes face-to-face.

Gomory (2000) states that: “Interaction [in an online course] with the students is also different. Usually there is more interaction, and incautious professors who do not set rules for when they will answer e-mail find they have given themselves 24 hour/day jobs.” Noble (2001) complains that digital education:

entails an inevitable extension of working time and an intensification of work as faculty struggle at all hours of the day and night to stay on top of the technology and respond, via chat rooms, virtual office hours, and e-mail, to both students and administrators to whom they have now become instantly and continuously accessible. (p. 32)

In support of Noble's contention, Lee (2002) describes a survey of administrators and faculty involved in a large scale distance education cooperative that found that faculty did not perceive current rewards and incentives for distance teaching to be sufficient compensation for the heavier workloads such teaching required. However, few researchers have investigated the actual time demands of online teaching. A rare exception is Collis, Winnips, and Moonen (2000) who compared two different Web-based versions of the same graduate education course. Based upon earlier face-to-face versions of the course, the researchers

expected students to average around 80 hours of active engagement in the course. Instead, they found that students in the version that was more structured averaged 46 hours in the course, whereas students in the more casual version averaged only 31 hours. By contrast, the three instructors who led the course each averaged 86 hours of work on the course.

Online teaching guidebooks (e.g., Lynch, 2002; Palloff & Pratt, 1999, 2001) provide some advice on handling the demands of online distance education, but the foundations for this guidance are largely anecdotal rather than research-based. An equally important question concerns the time demands of online learning for students. The findings of the Collis et al. (2000) study suggest that online models may lighten student workloads, but others contend the online education increases student workload. For example, in an executive briefing delivered in Toronto, Canada, Sir John Daniel (2000) stated: “Another key area where you must achieve balance is student workload. Incorporating new technology almost always leads to an increase in student workload. Unless you get this under control students will simply walk away from your wonderful course.”

Obviously, there is an urgent need for more and better research to provide a clearer picture of the workload demands of online teaching on tertiary staff and students. Increased (or decreased) workloads for academics and students may stem from the problem that most online courses to date have only involved the transfer of traditional pedagogy (such as lectures, readings, and discussions) from classroom to the Internet. Good online learning should require more than a mere shift from one medium to another. Instructional methods must be enhanced to take advantage of the affordances of technology.

## **The Poverty of Pedagogical Innovation**

Most of the people who attend educational technology conferences such as ASCILITE are academics already engaged in pedagogical innovation as well as technological invention. In short, they are the converted. The majority of academic staff are unable or unmotivated to attend technology conferences, and thus they remain unfamiliar with the evolution in cognitive learning theory that drives the best of the innovative learning environments demonstrated at these meetings. Nor do they read books that deal with creative applications of information technology in higher education such as those authored by Oliver and Herrington (2001), Pittinsky (2003) or Schank (2002).

Unfortunately, even if academic staff did attend technology conferences or read educational technology books, the likelihood that their adoption of new technologies would foster innovative pedagogy is slim (Twigg, 2003). Britto (2002) investigated academic staff intentions and university student perceptions of the pedagogical dimensions of web-based instruction (WBI) as supported by WebCT, a popular commercial course management system (CMS). His findings indicated that for academic staff, the primary benefits of teaching a course with a web-based component were the convenience and efficiency of course administration and management. Students, in turn, expressed frustration that WebCT tools were not employed to support their learning more directly.

Similarly, Cuban (2001), after analysing the application of technology in higher education at Stanford University, his own elite institution in the USA, concluded:

Dominant teaching practices remained largely constant in the years of greatest penetration of new technologies. Lecturing still absorbs more than half to two thirds of various departments' teaching practices, especially for undergraduates. Seminars, an innovation that was introduced at the turn of the last century, have become integral to graduate instruction and have penetrated the last two years of undergraduate coursework. These traditional forms of teaching seem to have been relatively untouched by the enormous investment in technologies that the university has made since the 1960s. That individual professors of various departments and schools turned to the case-study method, project-based teaching, problem-based learning, and other innovative approaches, using computer simulations and applications, goes without saying. That such faculty constituted a tiny minority of the entire faculty is just as clear. (p. 129)

Fortunately, alternative models of using technology to support learning in higher education are evolving. For example, Ron Oliver, Jan Herrington, and I are investigating approaches that involve replacing (or supplementing) academic lectures and seminars with web-based interactive learning environments built

around large-scale authentic activities or tasks. Based upon earlier work by Herrington (1997), we have defined ten design principles for developing and evaluating these types of authentic activity-based learning environments:

1. Authentic activities must have real-world relevance.
2. Authentic activities must be ill-defined, requiring students to define the tasks and sub-tasks needed to complete the activity.
3. Authentic activities must comprise complex tasks to be investigated by students over a sustained period of time.
4. Authentic activities must provide the opportunity for students to examine the task from different perspectives, using a variety of resources.
5. Authentic activities must provide the opportunity to collaborate.
6. Authentic activities must provide the opportunity to reflect and involve students' beliefs and values.
7. Authentic activities must be integrated and applied across different subject areas and extend beyond domain-specific outcomes.
8. Authentic activities must be seamlessly integrated with assessment.
9. Authentic activities must yield polished products valuable in their own right rather than as preparation for something else.
10. Authentic activities must allow competing solutions and diversity of outcomes.

We are currently using these design principles to investigate the effective dimensions of authentic activity-based learning environments. Analysis of the data from two units (courses) that approximate these 10 characteristics support the design of web-based learning environments around an over-arching authentic activity or task (Reeves, Herrington, & Oliver, 2002). Although we have yet to clarify the extent and nature of the roles that instructors should play in these types of courses, preliminary analyses indicate that their active participation is crucial, especially with respect to assessment activities that we predict will defy automation in the foreseeable future. Indeed, the challenges inherent in authentic assessment may be just as problematic for academic staff wishing to enhance tertiary teaching and learning through technology as the poverty of pedagogical innovation.

## **The Assessment Dilemma**

Levine (2003) makes two predictions about the future of higher education that increase the need for more reliable and valid assessment by an order of magnitude. First, he claims the academic tradition of basing the award of degrees on the number of hours that students spend in a program (the credit-for-contact model) will give way to a focus on measurable outcomes. Second, Levine predicts that traditional degrees and credentials will lose their importance as both students and employers become more interested in the specific competencies they can demonstrate. Focusing on the U.S. context alone, Levine maintains that: "As traditional degrees lose importance, the nation will need to establish a central bureau that records each person's educational achievements – however and wherever they were gained – and that provides documentation" (p. 23).

The concept of a national or international database of educational achievements raises many alarming issues, some ethical, some pedagogical, and others technological. Setting the ethical issues aside, the pedagogical and technological challenges are formidable. Assessment, defined as the activity of measuring learning, is still a weak component in both traditional and digital education. Within the world of academic e-learning, instructional designers and subject matter experts alike appear to struggle with conceiving of assessment as anything more than a multiple-choice test. Despite the sophisticated multimedia features of many online learning programs, a closer look at the assessment strategies in these programs suggests that developers, perhaps limited by today's still primitive course management systems to highly predictable algorithms, often fall back upon overly simplistic multiple-choice test items that primarily measure low-level retention of isolated facts.

This is not adequate. The higher education graduates of the 21<sup>st</sup> Century will rarely be confronted with clearly delineated choices from which they must select. Instead, the future teachers, scientists, social workers, managers, attorneys, and business people we educate must generate original solutions to unique problems. Traditional multiple-choice tests cannot tap into the critical ability to frame and resolve ill-

defined problems. Nor can they provide adequate assessments of the robust mental models that our students should develop within fields as diverse as chemistry and literary criticism. Laurillard (2002) argues that innovative learning and teaching must be matched by innovations in assessment.

Although new approaches to assessment are sorely needed, the automation of assessment functions in tertiary education advocated by some authorities is a disturbing development for those who cherish academic freedom. For example, Paris (2001) describes how the assessment function has been separated from the design and delivery of instruction at institutions such as Western Governors University. Although individual lecturers still have considerable individual autonomy for the design, development, delivery, and assessment of their courses or units in most institutions today, Paulson (2002) describes an alternative model whereby these functions are “unbundled” to realize greater efficiencies in tertiary teaching. This is already happening in for-profit “virtual universities” such as the University of Phoenix Online, where a primary focus is on keeping costs low to maximize profits. At Phoenix, only the design of courses is relegated to traditional academic staff members, while the majority of the functions are assumed by a mix of adjunct teaching specialists, interactive technologies, and external providers. Phoenix is enjoying unparalleled financial success, with most recent fiscal year revenues exceeding one billion dollars (Farrell, 2002). Whether this monetary success is matched by academic excellence is an open question, one that is poorly addressed by existing approaches to accreditation.

## **Problems with Accreditation**

In the U.S., academic accreditation started out as a sound idea. In the late 19<sup>th</sup> Century, there were numerous bogus academic institutions offering college degrees across the nation. In an effort to differentiate themselves from these fly-by-night academic hustlers, more reputable higher education institutions, both public and private, fostered the establishment of independent agencies that would accredit colleges and universities. Today, there are six large regional accreditation agencies in the U.S., including the Southern Association of Colleges and Schools (SACS) that accredits my own university. Accreditation was a voluntary process until the 1950s when the U.S. Congress passed legislation that prohibited students from spending federal aid funds at institutions that were not accredited. Since then, accreditation has become a *de facto* requirement.

There has been a proliferation of new academic universities and colleges in the late 20<sup>th</sup> and early 21<sup>st</sup> Centuries, many under the banner of online education (Eaton, 2001). Some of these, such as the University of Phoenix and Jones International University, have obtained accreditation from traditional agencies such as the Higher Learning Commission of the North Central Association. Others, unwilling or unable to obtain approval from traditional accreditation agencies, have formed their own agencies such as the Accrediting Commission of the Distance Education and Training Council (<http://www.detc.org/>). Still others ignore the accreditation process altogether.

A recent report (Leef & Burris, 2002) from The American Council of Trustees and Alumni (ACTA) presents a compelling case that accreditation agencies have lost their way. Accreditation has always been limited to ensuring that colleges and universities have certain inputs (e.g., adequate libraries and academic staff with advanced degrees) and processes (e.g., procedures for admissions and the awarding of degrees). The assumption is that if an institution has adequate facilities and staff and a range of appropriate academic procedures, then that institution deserves to be accredited. Accreditation agencies have never dealt substantively with issues of quality, but Leef and Burris, among others, claim that this is no longer viable. They note that the costs of the accreditation process are high, and that most academics in the U.S. view serving on the committees that prepare accreditation reports as an onerous task with little payoff. The Quality Assurance Agency for Higher Education in the United Kingdom has been undergoing similar criticism in recent years (Cohen, 2001).

Most controversially, the Leef and Burris (2002) report recommends that the connection between government student aid and accreditation be cut. Their report includes several other recommendations, including that accreditation agencies evaluate results, not inputs, and that state governments make the accreditation process more competitive by requiring that colleges and universities solicit bids for accrediting services.

Not surprisingly, the accreditation agencies have gone on the defensive, debunking the Leef and Burris report “as doing nothing but picking around the edges at a standard that's proven and isn't questioned by others” (Morgan, 2002). But Leef and Burris are not the first to criticize academic accreditation processes. Lucas (1996) described accreditation as overly expensive, too lengthy and complex, poorly-linked to quality, and often incestuous.

If the accreditation of traditional brick and mortar universities is being assailed, what about the fledgling agencies charged with policing online institutions? In the process of online research for this paper, I stumbled upon Ashworth College, a degree-granting institution headquartered about 70 kilometers from my home that I did not know existed. Founded in 2000 and accredited in the same year by the aforementioned Accrediting Commission of the Distance Education and Training Council (DETC), Ashworth is an online college that offers Associate of Science degree programs in a number of fields, including business, early childhood education, criminal justice, and health care management. Its web page (<http://www.ashworthcollege.com/>) lists as the first of ten reasons you should enrol as: “Ashworth College is one of a few, nationally accredited institutions that lets you earn your associate's degree while studying at home.” The fact that a new online college or university could be started and accredited in the same year suggests that the standards used by DETC may not be sufficiently rigorous.

Is the current accreditation system worth fixing? Commercial evaluations such as those promulgated by *U.S. News and World Report* are unlikely to fill the gap because of the lack of rigor and consistency in their ratings. This is an area where research is sorely needed, especially if new accreditation systems will be targeted at outcomes rather than inputs and processes. More and better research is especially urgent given the increasingly rapid growth of digital education (Farrell, 2002).

## **The Failure of Educational Research**

Educational research has always been a poor cousin to more traditionally scientific fields on campuses around the globe (Lagemann, 2000). Few academics in the more traditional scientific disciplines were probably surprised by “The Failure of Educational Research” headline that appeared in *The Chronicle of Higher Education* several years ago (Miller, 1999). *The Chronicle* cover story included many provocative statements such as “Vast resources going into education research are wasted,” and “They [educational researchers] employ weak research methods, write turgid prose, and issue contradictory findings.”

Is the body of research focused on the application of new technologies in tertiary education over the past twenty-five years any better? Although I have not done a comprehensive analysis of the research papers presented at conferences such as ASCILITE, ED-MEDIA, and EDUCAUSE, my impressions are that the quality of the research presented at these conferences and reported in related journals is still very much in doubt, although with notable exceptions. The studies reported in these papers suffer from many of the flaws I have described in other publications (Reeves, 1993, 2000).

One of the problems with our research is that many researchers remain enthralled with media comparison studies of the kind that Clark (1983) and others have debunked for decades. A recent case in point is a study that compared the effectiveness of online and face-to-face instruction in a business school (Neuhauser, 2002). Typical of the findings of hundreds of studies that have come before it, the study concluded: “The results revealed no significant differences in test scores, assignments, participation grades, and final grades, although the online group's averages were slightly higher. There were no significant differences between the learning preferences and styles and grades in either group” (p. 99).

Meta-analyses in the area of telecommunications and online learning yield results that are similarly disappointing. For example, Fabos and Young (1999) conducted an extensive meta-analysis of the research on telecommunications in the classroom and concluded:

Telecommunications exchanges are lauded by educational researchers and industry experts for enhancing writing and collaboration skills, increasing multicultural awareness, and expanding future economic possibilities. As we have seen, however, many of these expected benefits are inconclusive, overly optimistic, and even contradictory. Like much scholarship on educational technology, many researchers are quick to enter discussions about skill, social, and economic benefits without considering the scholarly, historical, or industrial context of their claims. With

regard to skills, we need to extend the discussion of telecommunication exchange projects from overgeneralised and often nebulous claims about skill benefits, and focus on the content of particular projects, why they hold promise, and how they can be used to meet specific educational goals..... While distant learning activities may appear to be magical education experiences, all educators must first step back, critically evaluate the inevitably enthusiastic rhetoric, and attempt to understand the complex contextual framework behind the push for telecommunication exchange. (p. 254)

What are academic staff pushed to develop web-pages for university courses to do with the disappointing conclusions reached by Fabos and Young (1999), Neuhauser (2002), and so many others? Some authorities seems to have concluded that the “no significant differences” phenomenon is an acceptable result, and that we can confidently move our units and courses onto the web without fundamentally changing the instructional design to take advantages of the affordances of technology (Russell, 1999). But I would argue that we can do better by pursuing a different type of research agenda, one that will provide a set of design principles that specialists and practitioners alike can apply to the development of effective digital learning environments.

## **Recommendations for Navigating Digital Education Squalls**

To return to the nautical metaphor with which I began this paper, I want to suggest a safe course for those of us who desire to enhance teaching and learning in tertiary education through innovations that are both pedagogically and technologically powerful. Our salvation rests in a commitment to a “scholarship of teaching” intended to optimise the roles of human teachers and digital technologies in tertiary education. We simply do not know enough about the demands of online teaching on academic staff, nor do we understand the most effective alignments of educational objectives, content, subject matter expertise, instructional methods, technological affordances, and assessment strategies for distance and flexible learning. The current state of knowledge in this area is woefully inadequate, and research findings to date are often contradictory.

All five challenges identified above can be addressed through the scholarship of teaching using the methods of development research. The development research approach is similar to what Stokes (1997) called “use-inspired basic research,” which is distinct from both pure basic and typical applied research. “Use-inspired basic research” for educational researchers has been labelled in several ways, including “development research” (van den Akker, 1999), “design experiments” (Brown, 1992; Collins, 1992), and “formative research” (Newman, 1990). Brown (1992) and Collins (1992) defined the critical characteristics of design experiments as:

- addressing complex problems in real contexts in collaboration with practitioners,
- integrating known and hypothetical design principles with technological affordances to render plausible solutions to these complex problems, and
- conducting rigorous and reflective inquiry to test and refine innovative learning environments as well as to define new design principles.

Van den Akker (1999) clarifies the meaning of development research:

More than most other research approaches, development research aims at making both practical and scientific contributions. In the search for innovative ‘solutions’ for educational problems, interaction with practitioners... is essential. The ultimate aim is not to test whether theory, when applied to practice, is a good predictor of events. The interrelation between theory and practice is more complex and dynamic: is it possible to create a practical and effective intervention for an existing problem or intended change in the real world? The innovative challenge is usually quite substantial, otherwise the research would not be initiated at all. Interaction with practitioners is needed to gradually clarify both the problem at stake and the characteristics of its potential solution. An iterative process of ‘successive approximation’ or ‘evolutionary prototyping’ of the ‘ideal’ intervention is desirable. Direct application of theory is not sufficient to solve those complicated problems. (pp. 8-9)

Confronting these challenges is not solely the responsibility of educationists. Lee Shulman, President of the Carnegie Foundation for the Advancement of Teaching, advocates the scholarship of teaching for all academic staff, regardless of their disciplines. Shulman (2001) directed special attention to the need to focus the “scholarship of teaching” on new learning technologies:

Technology is the 300-pound gorilla that no one can ignore, and this new element in all of our lives has had a healthily disruptive impact on our old habits. For example, many faculty members are now asking serious questions about teaching and learning: How do we know these new technologies are effective in fostering student learning? What does student learning look like, and how do we know it when we see it? What's the difference between the kind of learning that occurs in traditional venues and the kind that occurs in technologically mediated settings? Most universities have already committed significant resources to the uses of technology. And, since technology is not something you simply plug in, such research questions spawn a much larger set of inquiries about the curriculum, the design of instruction, and assessment, thereby encouraging a more general spirit of inquiry about teaching and learning.

Of course, the move toward development research in postsecondary digital education will not be easy because it requires fundamental change in the basic epistemology held by most tertiary staff as well as refinement of their mental models of scientific research processes. Academic research models are still dominated by positivist epistemology that regards theory above and apart from practice. The overall goal of research within the prevailing positivist tradition is to develop long-lasting theories and empirical principles that can be handed off to practitioners for implementation. While this experimental approach may work in fields such as chemistry and biology, it has not been very successful in the social sciences, including education.

In contrast to traditional empirical research models, development research requires a pragmatic epistemology that regards theory as being collaboratively shaped by researchers and practitioners. The overall goal of development research is to solve real problems while at the same time constructing design principles that can inform future decisions. Motivating academic staff to engage in the scholarship of teaching won't be easy on most campuses, especially those where the pressure to “publish or perish” in traditional disciplines is great or where teaching loads are so heavy that insufficient time is available for any forms of scholarship, but this is a challenge that we as tertiary staff will ignore at our peril. Nothing less than what it means to have a “higher education” in the 21<sup>st</sup> Century is at stake.

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## Notes

1. According to meteorologists, this proverb has very limited validity. For example, red skies can be caused by non-storm clouds, and storms can develop in the afternoon or evening after a clear morning.

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