

# Educational Technology as a Means for Connecting Improved Learning Outcomes and Scholarly Communications

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The practice of scholars publishing their thinking and research as peer reviewed work in print has become in recent years the primary measure for demonstrating competence in higher education. Unfortunately, this increased emphasis has at times been to the detriment of good teaching. Interestingly, several current trends suggest that the “publish or perish” phenomenon as practiced in recent years could very well have reached its zenith and is about to undergo significant changes. Moreover, these changes are occurring in parallel with the bursting of what some say is an “educational bubble” that could dwarf other recent financial crises. These trends include the changing academic landscape as new technologies facilitate online learning, and information distribution moves away from print to online delivery. At the same time, these same new technologies are facilitating the explosion of new information and knowledge in some fields while scholars in other fields are finding it increasingly difficult to report new research that is interesting and useful. This article places these changes in the historical context of higher education in the United States and suggests that educational technology has the potential to not only improve the learner experience, but also to provide opportunities for research and publishing as additional means of assessing professorial competence.

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## Introduction: Questioning Teaching and Research

The practice of questioning the relative importance of teaching and research in higher education is not new. Indeed, questions regarding institutional priorities in these two areas have raged ever since the system that is prevalent today first took root at Harvard in the mid-1930s. More precisely, James Bryant Conant, the very first world-renowned scholar to lead that great university, became president in 1933 and quickly instituted up-or-out meritocracy for professors at the storied institution. This system set Harvard apart from other universities (Christensen & Eyring, 2011) and became the model for academic advancement for most universities in North America. Two writers comment on the effects of Conant’s efforts:

But the new procedure also spurred what would come to be a common feature of the late-twentieth-century university scene: complaints that scholar-professors short-changed undergraduates with scant and indifferent teaching, and that “good teachers” were not kept on. (Keller & Keller, 2001, p. 70)

What had created the apparent fertile ground on which Conant’s ideas fell? What has been the impact of the subsequent changes? Let’s look first at the historical roots of these developments.

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## The Historical Perspective

A brief historical review provides some understanding as to how the system arrived to the point where it finds itself today. In the 9th century Charlemagne established the foundations of the modern educational system, turning to the church for help in strengthening his empire through education. The influence of the church was felt throughout the Middle Ages, with the core purpose of education derived from the desire to lead people to God through a moral life. From that time forward and especially during the early dawn of the American system of higher education, the goal of universities was deemed above all to be to “educate and morally uplift the coming generation” (Boyer, 1990, p. 4).

A second phase in the development of the nation’s approach to higher education added an additional demand on the system, the goal of service to the community in the largest sense of the word. Responding to the general need for building and expanding the nation as well as the need to feed a growing population, the country developed the concept of land-grant institutions, one for each state, established to seek, “without excluding other scientific and classical studies and including military tactics,” to further the national purpose by teaching:

Such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the States may respectively prescribe, in order to promote

the liberal and practical education of the industrial classes in the several pursuits and professions in life. (The Agricultural College Act of 1890)

The third and current phase for evaluating the merits of the professoriate in the United States actually began to emerge in the early 19th century as the result of changes in attitudes towards research inspired by admiration for the German system. The ensuing up-or-out meritocracy that Conant instituted at Harvard in the 1930s took hold in earnest following World War II and expanded rather quickly to the faculties on most campuses in the country. The war effort had placed extraordinary demands on universities to contribute to the nation's success in that endeavor, resulting in research coming to the fore in support of national goals and educational purposes. The movement has become over time what is today the "publish or perish" phenomenon on campuses across the nation.

What has driven this movement, which according to many has taken the focus away from teaching and moved it towards research? No doubt, many supporters of the trend have perceived significant value for universities in achieving their objectives as institutions of learning. That being said, it would be foolish to think that money, which began to become available in great quantities during World War II, has not played a major role in the decision to increase the research profile of institutions across the nation.

### **The Impact on Teaching of the New Institutional Directions**

For almost as long as schools have existed, reformers have sought improvements in how education should be conducted. In the 17th century, John Amos Comenius in his *Great Didactic* called for "a method of instruction by which teachers may teach less, but learners may learn more" (Comenius, 1632, p. 156).<sup>1</sup> This entreaty regarding the purpose of education to help learners to "learn more" is no less a topic of interest today than it was a matter of importance for Comenius 380 years ago, given the abundant evidence of its presence in today's discussions.

Just as one example, Barr and Tagg (1995) have posited a shift in the views of American higher education away from the notion that "A college is an institution that exists to provide instruction" to the view that "A college is an institution that exists to produce learning" (1995, p. 13). Tagg (2003) elaborated on this idea a few years later, stating that what is necessary is to "take hold of the horse and lead it to its proper position in front of the cart, to put purposes before processes" thus placing "the ends before the means" (p. 31).

Where that call for change addresses the importance of learning as alluded to by Comenius, focusing on the "teach less" part of his entreaty might seem somewhat cynical to some. Reading his work, however, suggests that his admonition was more in line with the "guide on the side" approach to teaching advocated by educators today (King, 1993) rather than the prevalent push to conduct

research that too often displaces teaching. Indeed, rather than beginning with Comenius, today's professorial involvement in research and the concomitant avoidance of teaching took root in the United States in the early part of 19th century. It was then that universities first began to follow Germany's lead, making that country's much admired research model for higher education a major part of the accepted mission for universities in this country (Boyer, 1990). Commentaries on the topic abound, and I cite here only a very few examples (Bok, 2006; Boyer, 1990; Christensen & Eyring, 2011; Keller & Keller, 2001).

Derek Bok, the former president of Harvard University, opened his 2006 book, *Our Underachieving Colleges*, by citing *A Nation at Risk: The Imperative for Educational Reform* (1983), the report from President Ronald Reagan's National Commission on Excellence in Education. In the very first paragraph of his book, Bok states that the commission's report "referred to 'a rising tide of mediocrity' and warned of 'unilateral educational disarmament'" (Bok, 2006, p. 1). From there he proceeds through an in-depth analysis of virtually all aspects of higher education. He then concludes with a rather optimistic outlook on how professors are growing increasingly receptive to finding "ways to examine their own teaching methods and try out new techniques for stimulating learning" (p. 342). He includes the following statement in his conclusion:

Faculty members are becoming acquainted with research on teaching and learning and are beginning to think about its application to their own courses. Quietly but steadily, the ground is being prepared for an eventual shift in American colleges away from a teacher-oriented system featuring lectures delivered to passive audiences to a more learner-centered process in which students become more actively involved in their own education and professors adapt their teaching in accordance with more complex understandings of human learning. (Bok, 2006, p. 342)

### **Following the Money**

To understand how to advance the changes that Bok asserts are taking place, it is necessary to return for a bit to the cynical theme suggested earlier on the topic of "teaching less." As with most all human endeavors, considerations inevitably turn to the allocation of limited resources of time and money. For example, taking the "guns versus butter" metaphor of macroeconomics into consideration suggests that it is impossible to focus on both research and teaching in higher education. Indeed, various sources support that observation, documenting that as institutions have competed for funds in order to increase their focus on research, the importance of teaching has diminished (Boyer, 1990; Christensen & Eyring, 2011).

In addition, higher education has found itself in a situation where costs have risen faster than inflation, while at the same time students have taken on an increasing mountain of debt, undoubtedly fueled by federal loan guarantees. The result, some observers assert, is a bubble that will eventual-

ly burst (Cronin & Horton, 2009; Davies & Harrigan, 2012).

Thus, with money playing such an essential role in the process, both now and in the future, the question to be asked is: how is it possible to increase teaching and learning within today's environment of budget cutbacks for universities everywhere? One obvious answer is to effect changes that would bring about increased productivity. Another possible answer is to change how the system operates, i.e., how teaching and learning are carried out.

### **New Paradigms for Productivity**

Unfortunately, education has lagged behind other areas in making changes based on the implementation of new technologies. Stated simply, teachers teach and learners learn pretty much as they have done for several hundred years. Thus, the probability of either increasing productivity or changing how the system operates is slim. The next section contains a brief discussion on how productivity levels in education can be increased. From there we will move to a discussion of how these efforts can easily be connected to the changing processes of scholarly communications.

### **Productivity in Learning**

Increasing class size has been one approach to addressing the problem of productivity in education, but limits are quickly reached due to the prejudice against increased class size and the fact that its negative effect has been demonstrated (Gibbs, Lucas, & Simonite, 1996). Another suggestion has been to implement technology in learning, which some visionaries have predicted for almost 50 years would change how teaching and learning take place (Bush & Mott, 2009).

Unfortunately, educational technology's benefit remains an unfulfilled promise, a situation not unlike the one some say business faced in the 1980s with the advent of the microcomputer in the workplace. Economist Lester Thurow, former Dean of the Sloan School of Management at MIT, observed that computers had added operating costs but failed to provide commensurate increases in productivity (Thurow, 1987). Speaking generally of slow, even dropping, productivity growth in the United States from 1945 through the late 1980s, Thurow wrote:

This situation is even more puzzling if one remembers that the United States is supposed to be in the midst of an office revolution and that investments in office automation have accounted for a large fraction of total business investment in recent years. New technology, new hardware, new software, and new skills were all going into the American office, but negative productivity was coming out. Why? (Thurow, 1987, p. 33)

Despite Thurow's naysaying regarding the impact of microcomputers, their absence in business today would easily cause output to immediately fall to zero! Because output is a direct component of productivity, it is clear that the old approach for measuring productivity failed to

properly assess the impact that computers have had in the workplace. This prompts the rather obvious conclusion that new methods are necessary for assessing not only how work is accomplished but also how output is measured.

The inevitability of similar developments for educational technology has been obvious to a few visionaries for almost 50 years, but change has been slow in coming. Nevertheless, new observers assert that education is on the verge of a significant increase in the implementation of technology, stating that "given the current trajectory of substitution, about 80 percent of courses taken in 2024 will have been taught online in a student-centric way" (Christensen, Horn, & Johnson, 2008, p. 102).<sup>ii</sup> Christensen (2012) asserts that this will be possible because computers now provide a "technological core that is extendable up-market" (Christensen, 2012).

To elaborate, Christensen's Theory of Disruptive Innovation, on which the above prediction is based, states that at the outset of their appearance in the marketplace, disruptive technologies are more convenient, simpler to use, and/or more affordable than existing products. Because they do not perform to the level of the existing solution, however, the technology is only adopted initially by "non-consumers," i.e., those individuals whose needs are not met by the prevalent alternative. Today, recent advances in educational technology have made it capable to the point that online learning has brought to K-12 education and higher education the means to change how the system operates. That which ten years ago was "quite marginal in its quality has just gotten better and better and better, and now you can do really quite remarkable things over the Internet" (Christensen, 2012).

According to other writers, these coming changes will be accompanied by an increase in "learner-centricity" in education (Bush & Mott, 2009, p. 4). This new paradigm will no longer perpetuate teacher-centric, didactic models of education that prevent fundamental changes in how teaching and learning take place. Barr and Tagg (1995) summarize the anticipated change:

A college is an institution that exists to provide instruction. Subtly but profoundly we are shifting to a new paradigm: A college is an institution that exists to produce learning. This shift changes everything. It is both needed and wanted. (p. 13)

To effect the changes to realize this vision, Bush and Mott (2009) "conclude that teachers and academic leaders must embrace these principles—namely openness, modularity, interoperability, the network effect, and learner-centricity—for the full potential of learning technology to become widely available, usable, and affordable" (p. 4).

The resulting benefits will be two-fold. First, students will have access to a wide variety of materials, and just as cream rises to the top, the highest quality learning materials in any given subject area will become more widely available than has been possible to date, due to



the near zero distribution costs of online learning. Second, the specialization and economies of scale to be had in the new environment will result in an increase in productivity for the system as a whole.

### **Productivity in Scholarly Communications**

These developments, combined with the significant potential of educational technology for improving learning, place education at a fascinating juncture; however, some observers suggest that the reporting of scholarly activity is at a less interesting place. For example, Christensen and Eyring (2011) point out how some areas of scholarly activity no longer provide as many opportunities for creating new knowledge as do others. One way to describe the situation with humor, if not with some degree of cynicism, is to consider the difference between science and philosophy:

Science seeks to know more and more about less and less until it knows everything about nothing. Philosophy seeks to know less and less about more and more until it knows nothing about everything. (Berger, 2011, p. 6)

While we can be amused by this statement, which prompts reflection on the possible implications for scholarly publications in the areas of science and philosophy, less amusing is the situation in other fields of academic endeavor. In some cases the challenge of finding new ways of looking at old issues is like harvesting fruit in orchards where the fruit has already been picked. In addition, the “cutting of budgets and outright closing of university presses makes it harder for scholars to publish books even through less prestigious channels. This matters especially to tenure-track faculty in the humanities, for whom publishing books is the ultimate test of scholarship” Christensen & Eyring, 2011, p. 364).

### **Scholarly Communications Meet the New Learning Paradigm**

The paragraphs above regarding promised improvements in learning and scholarly communications constitute in essence a statement of the problem, the need to find a tractable solution that addresses all of the issues outlined. In anticipation of finding such an outcome, the key issues in play can be summarized in four statements:

1. The emphasis on scholarly publication experienced in higher education today is a relatively new phenomenon that has been driven by the quest for increased prestige and research funding.
2. Educational technology has enormous potential to facilitate a move to learner-centric models of learning.
3. Education likely stands on the threshold of financial challenges heretofore unseen.
4. The pressure for scholars to publish faces interesting challenges with respect to topics and venues, especially for certain areas of academic endeavor.

The key to addressing these four issues in a unified

manner lies in the intelligent use of educational technology for students and scholars alike. While technology might not constitute a solution by itself, it is difficult to imagine a solution that does not involve the use of technology.

Suggesting one potential direction, Christensen and Eyring (2011) assert that it is possible to change the focus that universities place on teaching by revising how teaching and research can interact. By integrating teaching and research on teaching and then reporting on the process as an important aspect of scholarly activity, scholars also benefit from the potential that educational technology has for learning. Such a change, however, will require significant changes on the part of individual professors as well as by the institutions where they teach.

Indeed, what is becoming possible is a change in the way that teachers and professors go about their activities. Instead of seeing themselves solely as responsible for small groups of learners at a time, they will come to realize that technology can provide them with the means to leverage their teaching abilities and broaden their impact far beyond the individual classrooms where they normally teach.

As the beneficial effects of educational technology accrue to the learning process, professors in all disciplines, especially those in non-scientific areas, will reap significant benefits as well. Instead of being limited to striving to conduct research to create new knowledge, they can seek to tap into the infinite potential for learning about learning as well as how learning can best be enabled. They will be able to accomplish this in three ways, specifically by sharing:

- (1) learning objects either for online instruction or even for classroom use, which will play an important role in the creation of a learning economy (Hodgins, 2002);
- (2) instructional design strategies used in the development of the learning objects to be produced (Laurillard, 2012); and
- (3) research on the development of learning objects and the effects of their implementation.

Sharing in those ways does not preclude publishing in the conventional channels of the past. Rather than limiting the process to writing and reporting about how technology is used in education, however, academics will be able to more easily share the work they do in improving their teaching. They will be able to move beyond describing the use of educational technology to their colleagues in the articles they write and actually share materials as well as the instructional design strategies used in their creation.

The sorts of changes that are implied here for professors will not take place in a vacuum. Rather, they will be facilitated by institutions as they adjust to the realities of an uncertain future. As they compete for students in the challenging financial environment that is predicted by a rising number of commentators, they will need to find ways to maximize the return on investment by keeping star professors as part of their faculty. They will need to leverage the skills of those professors using technology to

broaden the impact of their stars, all the while limiting expenses by purchasing access to the teaching of professors from other institutions.

Former president of Harvard Derek Bok concludes his book, *Our Underachieving Colleges* (2006), acknowledging that:

Neither presidents nor deans may have the authority to order the faculty to change its method of teaching or revise the curriculum. They do have the power to point the way, to document existing weaknesses, and to offer the recognition, rewards, and resources that will encourage interested professors and attract more of their colleagues to a campuswide process of renewal and improvement. Above all they have the opportunity to persuade members of their faculties that research and experimentation to improve student learning can be as challenging and absorbing as many traditional forms of scholarship and scientific investigation. (p. 343)

Bok's advice will provide benefits for the students at any institution that pursues such a process, but to do so while taking advantage of the benefits of educational technologies and online learning will leverage the best teaching that institutions have to offer and move its effects beyond the limits of their campuses. Not only will their students and others elsewhere benefit from these developments, but of equal importance is the reality that the scholarly reputations of professors will prosper as they engage in the necessary development and associated research.

As for the institutions themselves, given what students will be able to learn online, the institutional challenge will be for organizations to concentrate on those aspects of the educational process that are best carried out by professors interacting with students in the classroom setting. As institutions make that adjustment, their reputations will in turn be significantly enhanced. □

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## Notes

<sup>i</sup> Comenius had been invited but declined to become the first president of Harvard College (Bardeen, 1896), and Piaget spoke of him “as a forerunner of so many modern institutions and trends of thought” (Piaget, 1993, p. 2).

<sup>ii</sup> In their book, *Disrupting Class*, Christensen and his co-authors predict changes in education that are imminent and far-reaching. They reach their conclusions by analyzing education “through the lenses of the theories of disruptive innovation” (Christensen et al., 2008, p. 10). The theories were derived from 20 years of research by Christensen and a colleague at the Harvard Business School and are summarized by the term they coined, “disruptive technologies” (Bower & Christensen, 1995). The purpose of their work was to explain how a revolutionary technology can radically change the status quo in a particular market sector.