



ELSEVIER

Internet and Higher Education 7 (2004) 95–105

**THE INTERNET
AND HIGHER
EDUCATION**

Blended learning: Uncovering its transformative potential in higher education

D. Randy Garrison*, Heather Kanuka

*Learning Commons, Room 525, Biological Sciences Building, University of Calgary, 2500 University Drive NW,
Calgary, Alberta, Canada T2N 1N4*

Received 19 December 2003; accepted 13 February 2004

Abstract

The purpose of this paper is to provide a discussion of the transformative potential of blended learning in the context of the challenges facing higher education. Based upon a description of blended learning, its potential to support deep and meaningful learning is discussed. From here, a shift to the need to rethink and restructure the learning experience occurs and its transformative potential is analyzed. Finally, administrative and leadership issues are addressed and the outline of an action plan to implement blended learning approaches is presented. The conclusion is that blended learning is consistent with the values of traditional higher education institutions and has the proven potential to enhance both the effectiveness and efficiency of meaningful learning experiences.

© 2004 Elsevier Inc. All rights reserved.

Keywords: Blended learning; Leadership; Higher education; Higher-order learning; Communities of inquiry; Transformation; Action plans

1. Introduction

Online learning is pervading higher education, compelling educators to confront existing assumptions of teaching and learning in higher education. Indeed, leaders of higher education are challenged to position their institutions to meet the connectivity demands of prospective students and meet growing expectations and demands for higher quality learning experiences and outcomes. Given the increasing evidence that Internet information and communication technologies are transforming much of society, there is little reason to believe that it will not be the defining transformative innovation for higher

* Corresponding author. Tel.: +1-403-220-6764; fax: +1-403-282-0730.

E-mail address: garrison@ucalgary.ca (D.R. Garrison).

education in the 21st century. Transformation of learning environments in higher education settings for an increasingly electronic world is critical to ensure that the benefits are fully realized (Williams, 2002). In agreement with Hicks, Reid, and George (2001), there are demands for universities to “provide for a larger and more diverse cross-section of the population, to cater for emerging patterns on educational involvement which facilitate lifelong learning and to include technology-based practices in the curriculum” (p. 143).

A source of this transformation stems from the ability of online learners to be both together and apart—and to be connected to a community of learners anytime and anywhere, without being time, place, or situation bound. Moreover, the increasingly prevalent practice of the convergence of text-based asynchronous Internet-based learning with face-to-face approaches is having a volatile impact on traditional campus-based institutions of higher education. To this point, the President of Penn State University cites the convergence of classroom and online education as “the single greatest unrecognized trend in higher education today” (Young, 2002, p. A33).

The purpose of this position paper is to discuss the emerging trend in higher education to blend text-based asynchronous Internet technology with face-to-face learning—often referred to as simply *blended learning*. We posit that blended learning is an effective and low-risk strategy which positions universities for the onslaught of technological developments that will be forthcoming in the next few years. As society and technology fundamentally alter the manner in which we communicate and learn, this inevitably alters how we think. This is being driven further by the expectation placed on higher education to meet the need for intellectual talent. Forms of communication and our ability to manage information challenge our cognitive abilities and the traditional classroom paradigm. Institutions of higher education need to discover their transformative potential. Internet information and communication tools provide flexibility of time and place and the reality of unbounded educational discourse. This does not represent the demise of the campus-based institution, but will cause us to recognize how best to utilize both face-to-face and online learning for purposes of higher education.

To begin, this paper will describe blended learning along with its capability to support meaningful learning outcomes. The core of the discussion, however, is on uncovering the transformative potential of blended learning approaches in higher education settings and providing an examination of developmental and leadership issues.

2. Blended learning described

Blended learning is both simple and complex. At its simplest, blended learning is the thoughtful integration of classroom face-to-face learning experiences with online learning experiences. There is considerable intuitive appeal to the concept of integrating the strengths of synchronous (face-to-face) and asynchronous (text-based Internet) learning activities. At the same time, there is considerable complexity in its implementation with the challenge of virtually limitless design possibilities and applicability to so many contexts.

To begin, it is important to distinguish blended learning from other forms of learning that incorporate online opportunities. First, blended learning is distinguished from that of enhanced classroom or fully online learning experiences (see Fig. 1). However, it is not clear as to how much, or how little, online learning is inherent to blended learning. In fact, this is only a rough, indirect measure that may be

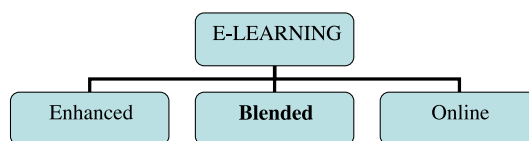


Fig. 1. A continuum of e-learning.

misleading. The real test of blended learning is the effective integration of the two main components (face-to-face and Internet technology) such that we are not just adding on to the existing dominant approach or method. This holds true whether it be a face-to-face or a fully Internet-based learning experience. A blended learning design represents a significant departure from either of these approaches. It represents a fundamental reconceptualization and reorganization of the teaching and learning dynamic, starting with various specific contextual needs and contingencies (e.g., discipline, developmental level, and resources). In this respect, no two blended learning designs are identical. This introduces the great complexity of blended learning.

The core issue and argument is such that, when we have solid understandings of the properties of the Internet, as well as knowledge of how to effectively integrate Internet technology with the most desirable and valued characteristics of face-to-face learning experiences, a quantum shift occurs in terms of the nature and quality of the educational experience. At the heart of this argument is the quality and quantity of the interaction and the sense of engagement in a community of inquiry and learning, achieved through the effective integration of Internet communication technology. Focusing for a moment on the properties of the Internet, we know that much of the satisfaction and success of blended learning experiences can be attributed to the interactive capabilities of Internet communication technology (Garrison & Cleveland-Innes, 2003; Swan, 2001). A closer examination reveals the ability of asynchronous Internet communication technology to facilitate a simultaneous independent and collaborative learning experience. That is, learners can be independent of space and time—yet together. A concomitant property of learning with Internet communication technology is that it has a significant educational implication resulting from the emphasis on written communication. Under certain circumstances, writing can be a highly effective form of communication that encourages reflection and precision of expression. When thoughtfully integrated with the rich dynamic of fast-paced, spontaneous verbal communication in a face-to-face learning environment, the educational possibilities are multiplied.

What makes blended learning particularly effective is its ability to facilitate a community of inquiry. Community provides the stabilizing, cohesive influence that balances the open communication and limitless access to information on the Internet. Communities also provide the condition for free and open dialogue, critical debate, negotiation and agreement—the hallmark of higher education. Blended learning has the capabilities to facilitate these conditions and adds an important reflective element with multiple forms of communication to meet specific learning requirements. For example, at the beginning of a course, it may be advantageous to have a face-to-face class to meet and build community. In contrast, discussing a complex issue that requires reflection may be better accomplished through an asynchronous Internet discussion forum.

Whether face-to-face or online, communities of inquiry consist of three elements: cognitive, social, and teaching presence (see Fig. 2; Garrison & Anderson, 2003).

The sense of community and belonging must be on a cognitive and social level if the goal of achieving higher levels of learning is to be sustained. This requires the consideration of the different

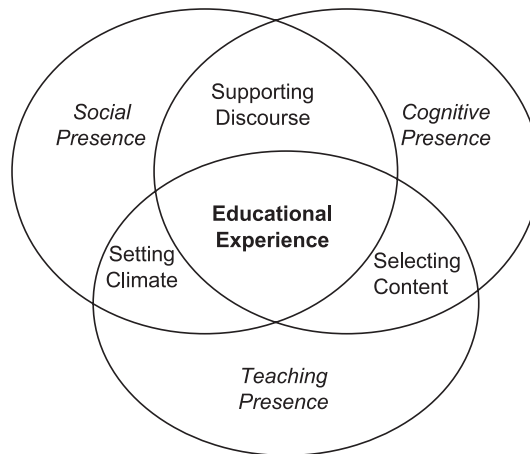


Fig. 2. Community of inquiry.

cognitive and social characteristics of each medium of communication. In this regard, blended learning presents a special challenge and, thus, highlights the importance of the third key element—teaching presence. Teaching presence manages the environment and focuses and facilitates learning experiences. With the combination of synchronous verbal and asynchronous written communication in the context of a cohesive community of inquiry, blended learning offers a distinct advantage in supporting higher levels of learning through critical discourse and reflective thinking.

The range and quality of interactive dialogue that can be facilitated through blended learning is congruent with the widely accepted means of facilitating critical thinking and higher-order learning. Hudson (2002) argues, for example, “that the very basis of thinking is rooted in dialogue, drawing on a socially constructed context to endow ideas with meaning” (p. 53). The emphasis must shift from assimilating information to constructing meaning and confirming understanding in a community of inquiry. This process is about discourse that challenges accepted beliefs, which is rarely accomplished by students in isolation. At the same time, to be a critical thinker is to take control of one’s thought processes and gain a metacognitive understanding of these processes (i.e., learn to learn). A blended learning context can provide the independence and increased control essential to developing critical thinking. Along with the increased control that a blended learning context encourages is a scaffolded acceptance of responsibility for constructing meaning and understanding.

3. Meaningful educational experiences

The literature on the potential of Internet information and communication technology to support meaningful educational experiences has been well documented. For example, it has been widely argued in the literature that asynchronous computer-mediated conferencing supports flexibility, reflection, interpersonal and teamwork skill development, motivation, and collaborative learning environments—resulting in deep and meaningful understandings and communities of inquiry (e.g., Garrison & Anderson, 2003; Hiltz, 1997; Marjanovic, 1999; Rimmershaw, 1999; Williams, 2002).

Perhaps most significantly, though, is that discourse facilitated through asynchronous Internet communication tools provides a platform where participants can confront questionable ideas and faulty thinking in more objective and reflective ways than might be possible in a face-to-face context. The rationale supporting this view is that there is a greater focus on the substantive issues and less distraction or noise in an asynchronous text-based Internet environment. Furthermore, Internet discussion forums can provide a permanent record and expand time; as such, discussions are often more thoughtful, reasoned, and supported by evidential sources (Meyer, 2003). While some competency in terms of writing skills is required, it also provides opportunity for students to learn to express themselves in written form. Alternatively, face-to-face discussions have energy and enthusiasm that are spontaneous and contagious—but also viewed as “off the hip/lip” (Meyer). Students have to remember what has been said and be verbally quick and assertive or opportunities to contribute are lost. Clearly, both are complementary in a quality learning environment, and when creatively and effectively designed, can be achieved through blended learning.

Connection with others is essential to realize a community of inquiry characterized by reflective written or spontaneous verbal dialogue. A sense of community is also necessary to sustain the educational experience over time so essential to move students to higher levels of thinking. This is important as “students with stronger sense of community tend to possess greater perceived levels of cognitive learning” (Rovai, 2002, p. 330). Critical thinking moves through discernable phases of a triggering event, exploration, integration, and application (Garrison & Anderson, 2003; Garrison & Archer, 2000). A community is essential to engender commitment and ensure students progressively move through the phases of critical inquiry. Communities of inquiry blend online learning and knowledge management into a dynamic and meaningful educational experience where the focus is constructing knowledge.

4. Not more of the same

One thing is certain, blended learning does not represent more of the same. It is not just finding the right mix of technologies or increasing access to learning, although a secondary outcome may be increased efficiency and convenience for students and professor. Blended learning inherently is about rethinking and redesigning the teaching and learning relationship. To paraphrase Marshall McLuhan, it is not enough to deliver old content in a new medium. We must seriously reflect on how to design and deliver higher education. With the limited results of higher education in facilitating critical thinking (King & Kitchener, 1994), and the need for these abilities in our information age, it is becoming clear that it is essential we do better at facilitating critical, creative, and complex thinking skills. Blended learning offers possibilities to create transformative environments that can effectively facilitate these skills. It also represents a new challenge for higher education instructors to provide the necessary teaching presence in a blended environment.

5. The transformative potential

As has been discussed, blended learning is an integration of face-to-face and online learning experiences—not a layering of one on top of the other. From this perspective, the Internet has been

considered to be a disruptive technology that requires a careful consideration of the educational goals, structures, and processes (Archer, Garrison, & Anderson, 1999). There is evidence that blended learning has the potential to be more effective and efficient when compared to a traditional classroom model (Heterick & Twigg, 2003; Twigg, 2003). The evidence is that students achieve as well, or better, on exams and are satisfied with the approach.

Results to date show improved student learning in 19 of the 30 projects, with the remaining 11 showing no significant difference. Other outcomes achieved by the redesigns include increased course completion rates, improved retention, better student attitudes toward the subject matter, and increased student satisfaction with the mode of instruction compared to traditional formats. *We believe that redesign is the watchword of technology's promise for higher education [emphasis added].* (Heterick & Twigg, 2003, p. 28)

There are a variety of possible explanations for these outcomes. In essence, though, we assert that it begins by questioning the dominance of the lecture in favor of more active and meaningful learning activities and tasks. In the studies reviewed by Heterick and Twigg (2003), typically, a large enrolment course replaces one or two lectures each week with any combination of online discussion groups, simulations, discovery labs, multimedia lessons, tutorials, assignments, research projects, quizzes, and digital content. These may be effectively facilitated by teaching assistants under the supervision of a professor. The professor then has more time to give to individual students and enhance the quality of the course through sustained course development and innovation as well as teaching development. Twigg (2003) argues that perhaps “the most significant aspect of this process has been the need...to teach the design methodology...since neither faculty nor administrators traditionally employ this approach to restructuring courses using IT” (p. 8). Blended learning has enormous versatility and potential but concomitantly creates daunting challenges on the front end of the design process.

6. The front end: administration and development

Issues pertaining to the front end of blended learning (administration and development) fall into the following categories: policy, planning, resources, scheduling, and support.

6.1. Policy

Most traditional universities offer some form or forms of technology-mediated education to selected populations of students—often based on individual faculty interest. These programs or courses are typically managed by the individual faculties, or teaching faculty, and require little administrative policy—because the number of students is usually quite small. However, a defining characteristic of blended learning is the ability of the Internet to provide an interactive learning experience to large numbers of students (e.g., high enrollment and/or high demand courses) in ways that are accessible and cost effective (see for example, the Pew Foundation at <http://www.center.rpi.edu/>). As a result, there is a need for a more formal approach to the development of policies and operations required to support blended learning approaches.

6.2. Planning

Related to policy is planning. There are two essential levels of planning required to develop and sustain blended learning: strategic and operational planning. Strategic planning involves the identification of needs, goals, and objectives; potential costs; and available resources. Of the strategic planning aspects, cost identification is the most complicated and important. Costs that need to be determined will include technology, delivery model and schedules, human resources (e.g., administrative support, course developers, instructors, and technical assistance), and infrastructure (e.g., hardware/software, Internet access, and office space).

Operational plans are necessary to operationalize the goals and objectives in an action plan. With respect to blended learning, operational planning involves attending to the noninstructional components including the following: promotional and advertising strategies; creating relationships for shared resources (e.g., registration, fees); managing technology; and creating an effective assessment process.

6.3. Resources

The need to carefully assess the resources required to implement and sustain effective blended learning environments cannot be overemphasized. The resources required fall into three broad categories: financial, human, and technical.

Financial resources are necessary to initiate and support blended learning initiatives. New initiatives, such as blended learning, need ‘seed money,’ but in the longer term may prove to be both more effective and efficient (Heterick & Twigg, 2003). Sustained incentives for computers and release time as well as support for instructional design and development are required. However, this cost is remarkably affordable and can be found in existing budgets with a reassessment of priorities. As such, it is essential that there be the commitment from senior administration.

Human resources are essential to the development and delivery of blended learning courses. Individuals with instructional design, curriculum development, and technology skills are necessary to support teaching faculty new to blended learning. In addition to these skills, individuals who can provide personal attention and motivational strategies for teaching faculty who are not convinced of the value of blended learning approaches are required.

Finally, technical resources that are dependable and transparent are required to ensure that the technology can enhance the learning process—rather than obstruct it. This requires having course management tools in place that have the capability of meeting the learning needs, is up-to-date, and the technical tools are reliable and easy to use.

6.4. Scheduling

Blended learning approaches require considerable thought to the scheduling of courses. Specifically, both teaching faculty and administration will need to rethink how courses are being offered. Will blended learning courses be scheduled in the traditional format? (e.g., 3 days a week for 1 h). Or can a more flexible format be developed whereby flexible scheduling can be implemented in ways that provide learners and instructors with the ability to ‘time-shift?’ (In traditional higher education institutions, any kind of course scheduling changes required by the registrar’s office change can be an enormous challenge).

6.5. Support

Providing support for both students and teaching faculty is a critical component of blended learning. At a minimum, providing effective support for blended learning requires an understanding of the course management environment that students and teaching faculty will be using, in addition to situational, dispositional, informational, and institutional barriers. More specifically, there needs to be a dedicated student service support center to help students with technology access, which includes not only access to a computer with the necessary software and Internet connections, but also support with the skills necessary to succeed in a blended learning environment. Most traditional universities currently have adequate support services for their students' technology needs.

Teaching faculty also require support services, but, unlike their students, these supports are often not in place. Teaching faculty require assistance with course development needs, time management of their learning curve, and technical assistance. The most effective support systems for teaching faculty are those that provide a course development team for the development of blended learning courses. This team is typically comprised of the instructor as content expert, an instructional designer who assists with course design, and a media specialist who assists with the technical creation of course materials.

7. Organizational and leadership issues

We hardly need to be reminded that higher education institutions, especially universities, are notorious resisters to change. However, some are carefully rethinking their undergraduate experience, drafting policy to guide technological innovation, and cautiously developing prototypes that will preserve the traditional values of higher education. It should be noted that the interest and early success of blended learning is due to the fact that it is an approach that can preserve and enhance the traditional values of higher education. When thoughtfully designed, blended learning offers an opportunity to enhance the campus experience and extend thinking and learning through the innovative use of Internet and communications technology.

The current challenge for administrators, policymakers, and faculty of higher education institutions is to acknowledge and accept that there have been significant and irreversible changes in societal demands, funding shortfalls, competition, technological innovations, and student demographics. As a result, there is a critical need to move creatively and assertively to confront and adapt to these changes. Successfully responding to these demands involves a change in mind-set and a commitment to reposition higher education institutions in terms of teaching and learning. Addressing this challenge requires creative and innovative action; it also requires a shift in thinking in the way we conduct the educational enterprise.

Successful adoption of a blended learning approach to enhance the effectiveness and efficiency of teaching and learning will require the following:

- creation of clear institutional direction and policy
- frame the potential, increase awareness, and commit
- establishment of a single point of support, quality assurance and project management
- creation of an innovation fund to provide the financial support and incentives to faculty and departments to initiate blended learning course transformations
- investment in establishing a reliable and accessible, technology infrastructure

- strategic selection of prototype projects that prove to be exceptionally successful exemplars of effective learning
- development of formal instructional design support available through a blended format
- systematic evaluation of satisfaction and success of the teaching, learning, technology and administration of new course
- create a task group to address issues, challenges and opportunities as well as communicate and recommend new directions to the University community.

This represents a considerable challenge to the leaders and academic faculty of higher education institutions. It is clear that learning technologies must play a strategic role in the academic plans of higher education. The question is, what are we doing to position our institutions for the transformational changes that are very difficult to predict but are certain to disrupt the traditional structure and operational dynamic of higher education? The question is whether current academic leaders have the vision, courage, and decisiveness to position their institutions to be academic leaders in the 21st century. This is not inconsistent with traditional values and practices or of high risk, politically or financially. To ignore this is to neglect the core purpose of higher education, which is scholarly inquiry by students and faculty.

Leaders must apply the core values of higher education, skepticism, and inquiry, to how they conduct their core business. This is happening on the research side of the house with the adoption of various forms of technology. But it is rarely in evidence on the teaching side of the house. Where is the true spirit of exploration and experimentation when it comes to teaching and learning? Where is the investment and risk taking to move higher education from the 19th century to the 21st century? Little attention and effort is being focused on the challenges of the classroom, increasing expectations, and conceptualizing the properties and potential of blended learning approaches. Is higher education really committed to the values we espouse; that of involving students in a learning community—a community of inquiry? While we cannot say what the future will look like, neither can we say we have been up to the task of understanding current realities, existing deficiencies, and engaging faculty and students in exploring new and emerging possibilities.

Nor can senior academic officers continue to manage at a distance. They must take positions and commit resources to developments, such as blended learning, where the financial investment is modest and the academic return can be enormous. What remains is the will to act and focus on meaningful change—not simply trying to win the public relations battle. Considering its potential congruence with the traditional values and goals of higher education, it should be clear that blended learning is not a technological fad. It is an approach and strategy that can be built upon in a progressive, systematic, and thoughtful manner, and over time, will transform the institution in a manner congruent with our highest ideals. This is the “good to greatness” strategy. With regard to technology, how we react to technological change is a good indicator of its inner drive for greatness versus mediocrity. Great institutions respond with “thoughtfulness and creativity, driven by a compulsion to turn unrealized potential into results; mediocre companies react and lurch about, motivated by fear of being left behind” (Collins, 2001, p. 162).

Higher education institutions must react to technological change with understanding and vision but also with the courage and decisiveness that will free resources to produce desired results and realize potential. To date, most institutions of higher education can be described as lurching about.

It has been speculated that the survival of many higher education institutions are at stake. The rationale underpinning this position is that competition for the best students and faculty has already

become intense. Tuitions continue to rise and students want value for their investment. Not only are students increasingly demanding a quality learning experience, they also want service and convenience. There is growing evidence and a sentiment that sitting in a large lecture hall three times a week is not intellectually stimulating or perhaps worth the commute to campus.

8. Conclusions

It is inevitable that campus-based higher education institutions will adopt blended learning approaches in a significant way. As has been demonstrated by several institutions, once there is clear policy and strong leadership, the evolution will be quick (e.g., University of Central Florida). In a matter of a few short years, higher education institutions can be transformed in a manner consistent with their values and mitigating the fiscal and pedagogical challenges and deficiencies currently challenging the quality of the classroom experience. The academic benefit, evidence, and competitive advantages are clear; only the will and commitment remains. Blended learning can begin the necessary process of redefining higher education institutions as being learning centered and facilitating a higher learning experience.

In closing, as we explore the use of blended learning, it is important that we assess and evaluate its effectiveness. Tracking transformations resulting from the use of blended learning approaches, with respect to learning outcomes, student satisfaction, retention and achievement, are important to use as baseline measures of change that result from blended learning courses. In addition to assessing the learning outcomes, the learning process should also be assessed. Assessing and evaluating the effects of blended learning on the learning process in terms of higher levels of learning (e.g., critical and reflective thinking) is a priority. It is essential that researchers begin to explore the impact of blended learning in achieving more meaningful learning experiences.

References

- Archer, W., Garrison, D. R., & Anderson, T. (1999). Adopting disruptive technologies in traditional universities: Continuing education as an incubator for innovation. *Canadian Journal of University Continuing Education*, 25(1), 13–30.
- Collins, J. (2001). *Good to great: Why some companies make the leap... and others don't*. New York: Harper Business.
- Garrison, D. R., & Anderson, T. (2003). *E-learning in the 21st century: A framework for research and practice*. London: Routledge/Falmer.
- Garrison, D. R., & Archer, W. (2000). *A transactional perspective on teaching–learning: A framework for adult and higher education*. Oxford, UK: Pergamon.
- Garrison, D. R., & Cleveland-Innes, M. (2003, September). *Critical factors in student satisfaction and success: Facilitating student role adjustment in online communities of inquiry*. Invited paper presented to the Sloan Consortium Asynchronous Learning Network Invitational Workshop, Boston, MA.
- Heterick, B., & Twigg, C. (2003, February). *The Learning MarketSpace*. Online, retrieved on December 5, 2003 from <http://www.center.rpi.edu/LForum/LM/Feb03.html>.
- Hicks, M., Reid, I., & George, R. (2001). Enhancing on-line teaching: Designing responsive learning environments. *The International Journal for Academic Development*, 6(2), 143–151.
- Hiltz, S. R. (1997). Impacts of college level courses via synchronous learning networks: Some preliminary results. *Journal of Asynchronous Learning Networks*, 1 (2) (Online, retrieved on December 5, 2003 from: <http://www.aln.org/alnweb/journal/jaln-vol1issue2.htm>).
- Hudson, B. (2002). Critical dialogue online: Personas, covenants, and candlepower. In K. E. Rudestam, & J. Schoenholtz-Read (Eds.), *Handbook of online learning: Innovations in higher education and corporate training* (pp. 53–90). London: Sage.

- King, P. M., & Kitchener, K. S. (1994). *Developing reflective judgement*. San Francisco: Jossey-Bass.
- Marjanovic, O. (1999). Learning and teaching in a synchronous collaborative environment. *Journal of Computer Assisted Learning*, 15, 129–138.
- Meyer, K. A. (2003). Face-to-face versus threaded discussions: The role of time and higher-order thinking. *Journal of Asynchronous Learning Networks*, 7(3), 55–65.
- Rimmershaw, R. (1999). Using conferencing to support a culture of collaborative study. *Journal of Computer Assisted Learning*, 15(3), 189–200.
- Rovai, A. P. (2002). Sense of community, perceived cognitive learning, and persistence in asynchronous learning networks. *The Internet and Higher Education*, 5(4), 319–332.
- Swan, K. (2001). Virtual interaction: Design factors affecting student satisfaction and perceived learning in asynchronous online courses. *Distance Education*, 22(2), 306–331.
- Twigg, C. A. (2003). *Improving learning and reducing costs: Lessons learned from round I of the PEW grant program in course redesign*. Troy, New York: Centre for Academic Transformation, Rensselaer Polytechnic Institute.
- Williams, C. (2002). Learning on-line: A review of recent literature in a rapidly expanding field. *Journal of Further and Higher Education*, 26(3), 263–272.
- Young, J. R. (2002, March 22). 'Hybrid' teaching seeks to end the divide between traditional and online instruction. *The Chronicle of Higher Education*, A33.