

# EDUCATIONAL TRANSFORMATION THROUGH ONLINE LEARNING: TO BE OR NOT TO BE

*Anthony G. Picciano, Ph.D.*

Professor, Graduate Center and Hunter College, City University of New York (CUNY)  
Executive Officer of the Ph.D. Program in Urban Education  
Graduate Center (CUNY)

*Jeff Seaman, Ph.D.*

Survey Director  
The Sloan Consortium  
Co-Director, Babson Survey Research Group  
Babson College

*I. Elaine Allen, Ph.D.*

Research Director, Arthur M. Blank Center for Entrepreneurship  
Associate Professor of Statistics & Entrepreneurship  
Co-Director, Babson Survey Research Group  
Babson College

## ABSTRACT

The purpose of this article is to examine online learning at the macro level in terms of its impact on American K-12 and higher education. The authors draw on six years of data that they have collected through national studies of online learning in American education as well as related research to do a critical and balanced analysis of the evolution of online learning in the United States and to speculate where it is going. Their collection of data represents some of the most extensive research examining online learning in the totality of K-20 education. Issues related to the growth of online learning, institutional mission, student access, faculty acceptance, instructional quality, and student satisfaction are explored. Of particular importance is an attempt to determine if online learning is in fact transforming American education in its essence and to speculate on the future.

## KEYWORDS

online learning, blended learning, distance learning, asynchronous learning, transformation, computer-mediated learning, computer-mediated communications, learning styles, instructional design, instructional technology

## I. INTRODUCTION

For the past two decades, online learning has made significant inroads in American education. Whether or not online learning is actually transforming or appearing to transform education is a key question in need of clarification. According to Webster's 3<sup>rd</sup> New International Dictionary as well as the Free Online Dictionary, the word "transform" has two basic meanings: (one) to change completely or essentially in

composition or structure, and (two) to change the outward form or appearance. In the United States, as well as in many other countries, there have been clarion calls for education to transform in light of new technology especially as afforded by online learning. Some observers claim that this is already occurring and within the next several years education will be completely “disrupted” experiencing a transformation in its nature and structure [1].

In 1988, the U.S. Congress’s Office of Technology Assessment (OTA) conducted a national study on the uses of computer technology for instruction in primary and secondary schools. Extensively researched and documented, the study provided one of the first glimpses of the investment that schools in all parts of the country were making in instructional technology. Millions of microcomputers costing billions of dollars had been purchased in the 1980s, and almost every school in the country had acquired some form of computer technology. This study was frequently cited in professional journals as evidence of the “revolution” under way in the schools. The study showed that a major new thrust in instructional computing was indeed occurring [20].

In 1983, the student-per-microcomputer ratio in all K-12 public schools was approximately 125:1; by 2004 it was 4:1, where it has stayed for the past half-dozen years. American K-12 public schools spent approximately \$2 billion per year on computer technology in the 1980s. Presently, schools are spending closer to almost \$10 billion per year on technology [26]. Based on the number of machines purchased and the dollars invested, one might assume that computer technology has become an integral part of instruction in our nation’s schools and has indeed revolutionized K-12 education. This is debatable. Larry Cuban (2000, 2001), professor of education at Stanford University, posited that computers were “oversold and underused” and that many teachers at all levels remained occasional users or nonusers. Furthermore, those who were regular users seldom integrated the machines into core curricular or instructional tasks [2, 3]. In a national survey conducted for *Education Week* in 2004, many teachers considered themselves beginners in the use of technology in their classes and only 63% of the 4th grade students surveyed reported using a computer at least once a week in school [4]. To add to this issue is the basic question whether or not technology improves learning. In 2007, the National Center for Education Statistics issued a report based on a series of experimental and quasi-experimental studies on the use of a number of different reading and mathematics educational software products across thirty-three districts, 132 schools, and involving 439 teachers. The major findings indicated that test scores in treatment classrooms that were randomly assigned to use the software products did not differ from test scores in control classrooms that used traditional instructional methods [24]. This study was followed up in 2009 and resulted in the same findings [25]. The conclusion is that although schools continue to invest significant resources in technology, educators are cautious and concerned about its impact and much instruction continues to rely heavily on traditional face-to-face modes.

In 2008, Clayton Christensen, a professor at the Harvard Business School and the best-selling author of *The Innovator’s Dilemma*, published a book with Michael Horn, and Curtis Johnson entitled *Disrupting Class: How Innovation Will Change the Way the World Learns* [1]. Christensen, Horn, and Johnson present a compelling rationale for changing education in a way that makes far greater use of online technology to provide more student-centered and individualized instruction. The book’s call for change is being cited by many educators as an important consideration for policymakers when looking at the future of American education. Among the most provocative aspects of this book are the predictions that about one-quarter of all high school courses will be online by the year 2016 and that about one-half of all high school courses will be online by the year 2019. In Chapter 4, Christensen et al provide the bases for their predictions and among other citations refer twice to one of these authors’ studies published in 2007. Christensen et al are among the clarions that foresee transformation in education occurring driven by online learning technology. It has been projected that over the next five or six years, the K-12 enrollment in online courses will approach 5-6 million students which represents about ten percent of the total K-12 student population [5, 6].

In American higher education, the picture is somewhat different. Online learning in colleges and universities started earlier than in K-12 environments and is more established with approximately 4.6

million or twenty-five percent of college and university students enrolled in at least one fully online courses in 2008. These enrollment figures are celebrated by some as indicative of a revolution or “transformation” that is occurring in higher education because of online learning technology. [7,8,9] This too is debatable. Practically all American colleges and universities have acquired some form of course management (CMS) or learning management systems (LMS) raising several legitimate questions: Why aren’t more students--the other eighty percent--enrolled in fully online courses. Can we consider a twenty percent penetration a “transformation,” especially when many of these students are also enrolled in traditional face-to-face courses at the same time? Also, are the students enrolled in online learning really experiencing new pedagogical approaches afforded by the new technology or have the traditional face to face pedagogies simply been transferred?

Another factor that needs to be considered is the use of online technology in less than fully online courses. Blended, hybrid, mixed-mode and web-enhanced courses are surely evolving and increasing in popularity in education at all levels. Unfortunately there are very little reliable data across institutions on blended or hybrid online learning models. Problems of definition make collecting such data especially difficult. One institution’s “blended” course is another’s “web-enhanced” course, and the amount of actual online activity that would represent or reflect significant change is almost impossible to determine. While there have been a number of studies and articles on blended and hybrid models, these have tended to report what has happened in a single course, program, or institution. This is especially true in American higher education where course content and pedagogy is normally determined by individual academic departments and even individual instructors within departments. If it were assumed that blended and web-enhanced models represent a significant percentage of instructional delivery, these models may or may not be considered as “transforming” education. Perhaps they are changing it incrementally or perhaps just on the surface but not in its essence. These are questions that need further exploration.

The purpose of this article is to examine online learning at the macro level in terms of its impact on American K-12 and higher education. Issues related to the growth of online learning, student access, faculty acceptance, instructional quality, and student satisfaction are explored. Of particular importance, is an attempt to determine if online learning is in fact transforming American education in its essence and to speculate on the future.

## **II. BRIEF REVIEW OF THE RESEARCH**

The authors are drawing extensively on six years of data that they have collected from national studies of online learning in American education to do a critical and balanced analysis of how online learning has evolved in the United States and to speculate on where it is going. This collection of data represents some of the most extensive research examining online learning in K-20 education that currently exists. A review of the findings is appropriate. Copies of all reports are available as free downloads at: <http://www.sloanc.org/publications/survey/index.asp>

### **A. K-12 Online Learning**

In a 2007 national study of school district administrators, the number of students enrolled in online or blended courses in American K-12 schools was estimated at 700,000 [5]. In a 2009 follow-up study, the estimate was 1,030,000, a 47 percent increase in two years [6]. This substantial increase is not derived from a few highly-successful large virtual schools but the result of students taking either online or blended courses in three quarters of all school districts (74.8 %). Approximately another 15 percent of the districts are planning to introduce them over the next three years. Respondents in this study anticipated that the number of students taking online courses will grow by 22.8 percent and that those taking blended courses will grow even more over the next two years. It also appears that the number of school districts offering online courses is accelerating. One of the questions asked in the follow-up study of respondents who were offering online or blended learning courses, was: In what year did any student

in your district *first* take a fully online or blended/hybrid course? Figures 1 and 2 provide line diagrams illustrating the responses to this question. They show that online and blended learning have been on an upward trend for the past eight years with more and more districts adopting these approaches in recent years. The data in these charts support the upward growth estimates discussed above. In 2007, the authors' original study predicted that over the subsequent five or six years, the K-12 enrollment in online courses would easily approach several million students. The data collected in the later study support that prediction and it is conceivable that by 2016 online enrollments could reach between 5 and 6 million K-12 (mostly high school) students.

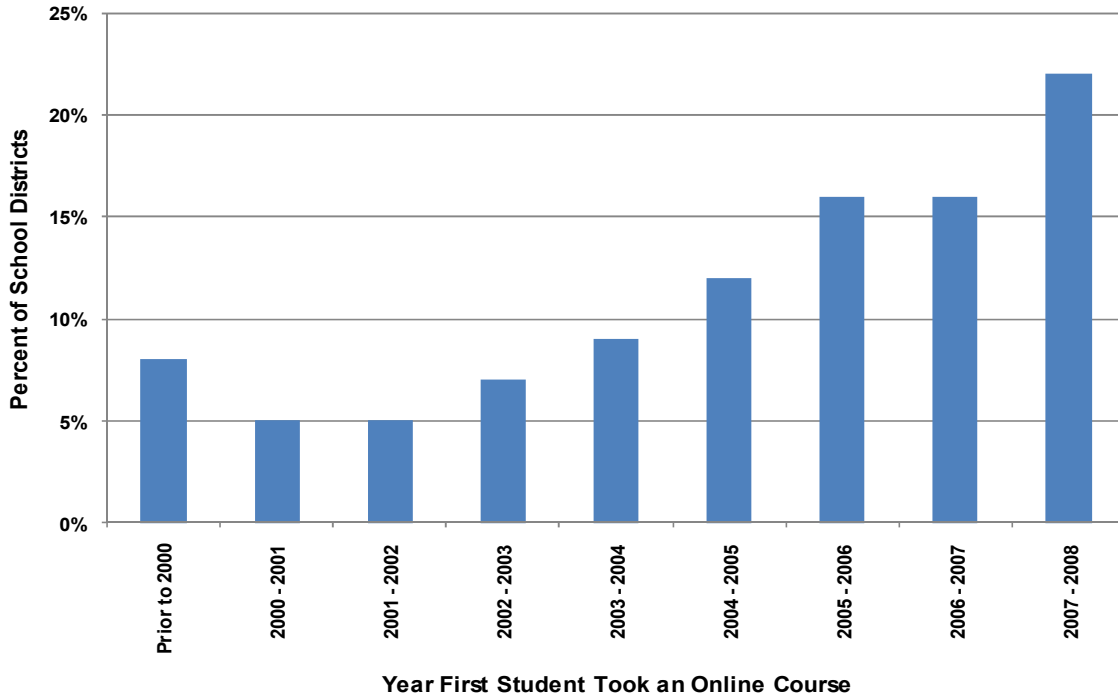
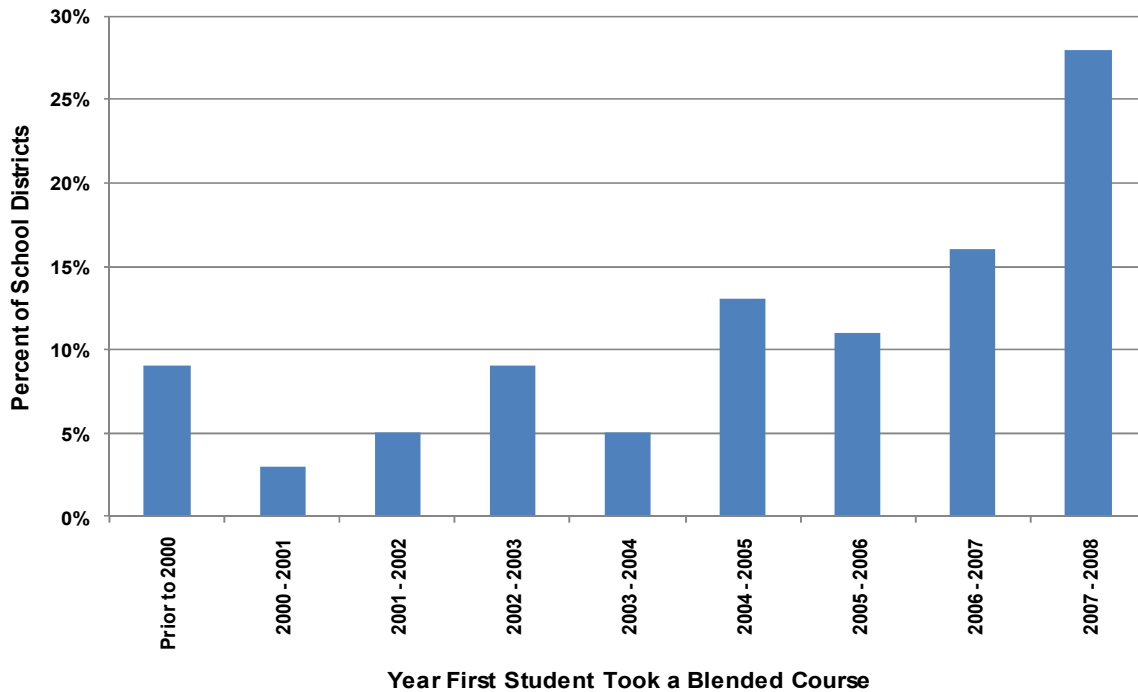


Figure 1. School Districts Reporting Year in which the First Student took a Fully Online Course

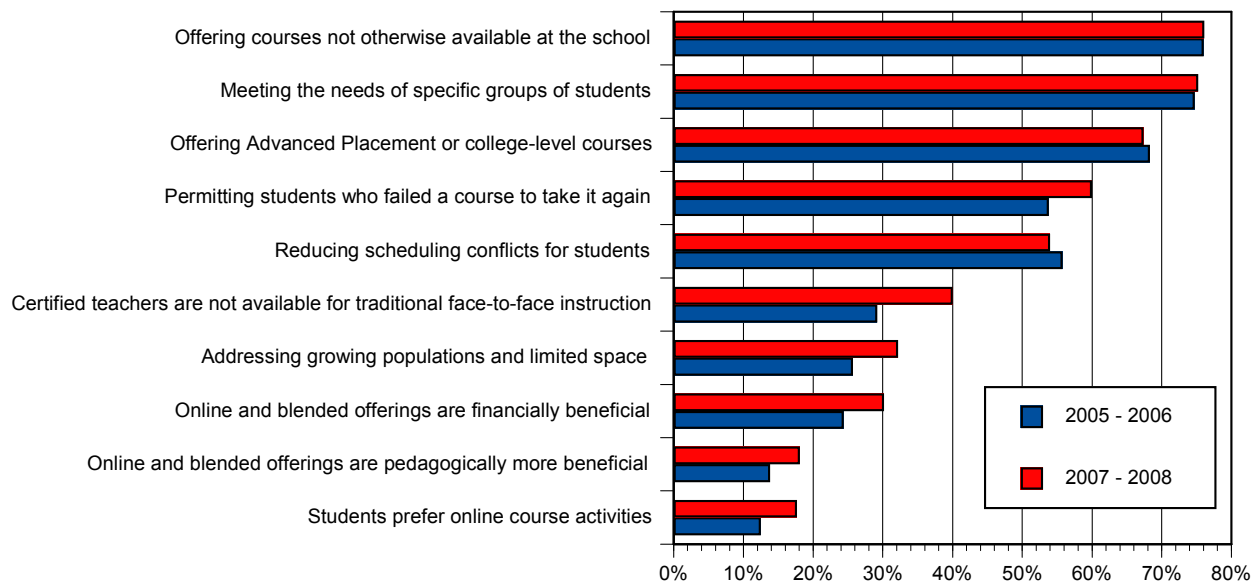


**Figure 2. School Districts Reporting Year in which the First Student took a Blended Course**

Figure 3 illustrates that school district administrators see a real value in online and blended learning in their schools. The basic reason K-12 schools are offering online and blended learning is to meet the special needs of a variety of students. Large percentages of respondents, in excess of 60 to 70 percent, perceive the importance of online learning as related to:

- Meeting the needs of specific groups of students
- Offering courses not otherwise available at the school
- Offering Advanced Placement or college-level courses
- Permitting students who failed a course to take it again
- Reducing scheduling conflicts for students

It should also be mentioned that rural school districts in particular expressed a serious need for online learning to offer courses that otherwise would not be available in their schools. This will be discussed further later on in this article.



**Figure 3. Summary of Responses to: How important do you believe the following reasons are for a school district to offer fully online or blended learning?**

The data discussed above leave little doubt that online and blended learning environments are on the ascent and have important roles to play in American K-12 education. However, while these numbers are important, perhaps even impressive, it would be unwise to present a picture of unbridled enthusiasm for online learning in the K-12 schools. One million students in a total population in excess of 50 million students cannot be considered a transformation. Furthermore, there are important issues reported in the findings of both 2007 and 2009 studies that could slow its growth (see Figure 4). Concerns continue to be expressed by approximately 40-50 percent of respondents about the quality of online courses, development costs, and the lack of funding policies.

While resolvable, these issues need to be addressed and are not simply the responsibility of the schools and districts. Large city school systems, state education departments, and the federal government have roles to play. States such as Michigan (Merit Curriculum) and Alabama (Alabama Connecting Classrooms, Educators and Students Statewide) have initiated major new policies regarding online learning in secondary education. The Florida Virtual School is perhaps the most successful example of state policy supporting an online program that is meeting the needs of tens of thousands of students. Consortial arrangements such as the Virtual High School Global Consortium and blendedlearning.net provide quality services at reasonable costs. Lastly, colleges and universities, the primary providers of online learning for K-12 students, have developed a good deal of expertise in designing and developing online programs and increasingly are becoming willing partners in assisting K-12 schools to develop online learning opportunities. However, more can and needs to be done before online learning evolves into a readily acceptable alternative in primary and secondary school education and before we can agree that a transformation is occurring in K-12 schools.

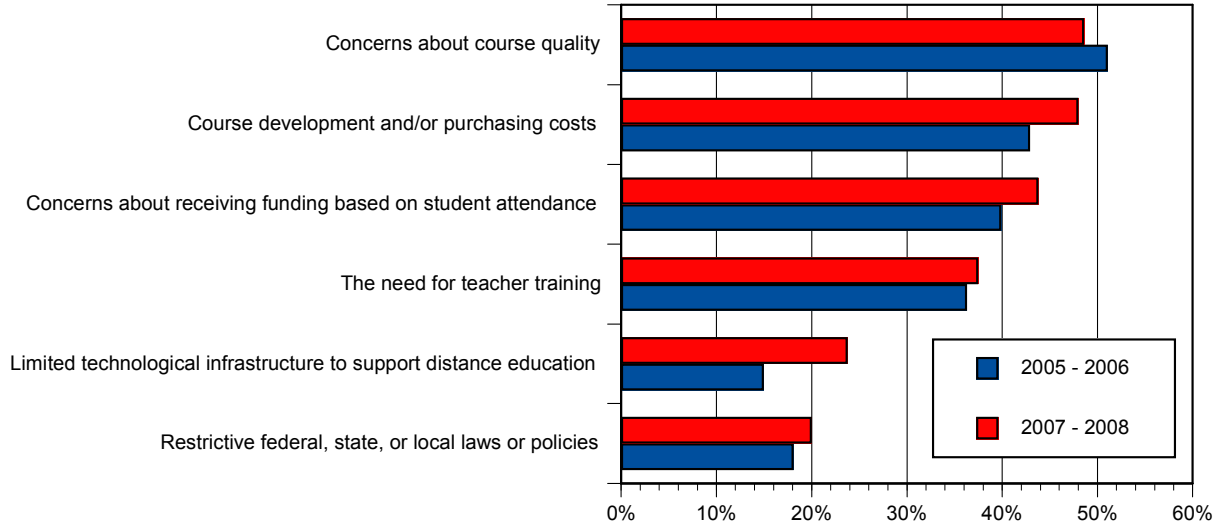


Figure 4. Summary of Responses to: How much of a barrier the following areas would be (or are) in offering fully online or blended learning courses?

### B. Online Learning in Higher Education

The extent and nature of online learning in American higher education has progressed more extensively than in K-12 schools. Figure 5 shows approximately 4.6 million out of a total population of 18 million students are enrolled in at least one online learning course in American colleges and universities [10]. As indicated earlier, online learning has had much more of an impact on American higher education than on its K-12 counterparts. Six years of data indicate that there has been a steady rise in the number of students enrolling in online courses.

	Total Enrollment	Annual Growth Rate Total Enrollment	Students Taking at Least One Online Course	Annual Growth Rate Online Enrollment	Online Enrollment as a Percent of Total Enrollment
Fall 2002	16,611,710	NA	1,602,970	NA	9.6%
Fall 2003	16,911,481	1.8%	1,971,397	23.0%	11.7%
Fall 2004	17,272,043	2.1%	2,329,783	18.2%	13.5%
Fall 2005	17,487,481	1.2%	3,180,050	36.5%	18.2%
Fall 2006	17,758,872	1.6%	3,488,381	9.7%	19.6%
Fall 2007	17,975,830	1.2%	3,938,111	12.9%	21.9%
Fall 2008	18,199,920	1.2%	4,606,353	16.9%	25.3%

Figure 5. Total and Online Enrollment in Degree-granting Postsecondary Institutions, Fall 2002 through Fall 2008

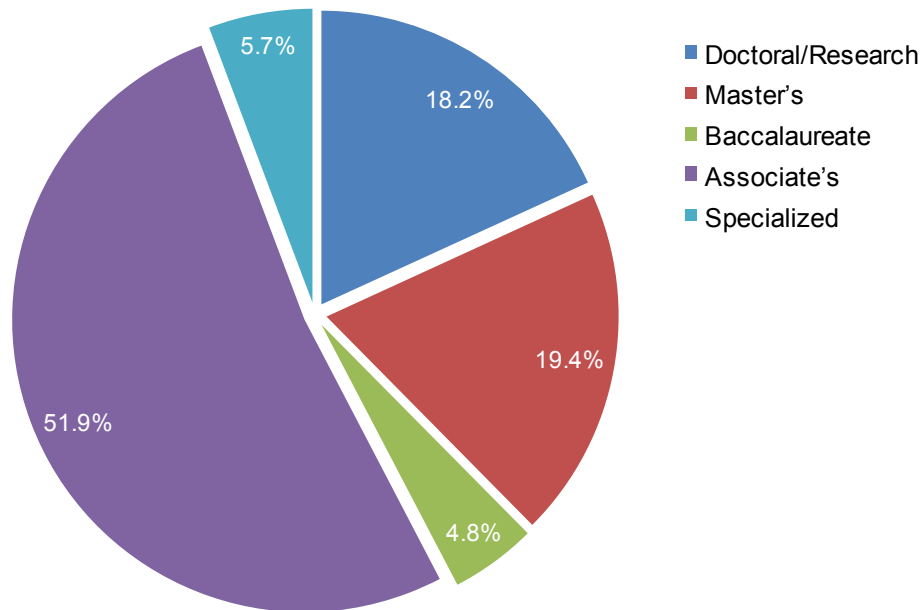
While online learning in higher education has progressed for a number of reasons, the most important by far has been its ability to meet student needs for flexible access [10]. Most college students in the United States attend college while engaged in other activities related to work and family. Gone are the days when “traditional” students in American higher education could be considered full-time, residential students between the ages of 18-22 who depended upon their parents for their financial support. A recently completed study by Public Agenda funded by the Bill and Melinda Gates Foundation found that:

- among students in four-year schools, 45 percent work more than 20 hours a week;

- among those attending community colleges, 60 percent work more than 20 hours a week, and more than a quarter work more than 35 hours a week;
- just 25 percent of students attend traditional residential colleges;
- twenty-three percent of college students have dependent children [11].

Online learning affords a more flexible schedule to these students who combine higher education, employment and family responsibilities into incredibly busy days and nights.

Another important finding from the data on higher education is that online learning is not distributed evenly among all segments of American colleges and universities (see Figure 6). Over 50 percent of all online students are currently enrolled in two-year institutions offering associate's degrees. This pattern has been consistent for the past six years. The tendency has been for public colleges, especially community colleges, whose missions include providing higher education opportunities to wider ranges of students to place greater importance on online learning as part of their strategic planning and overall program offerings [10].



**Figure 6. Online Enrollments by Institutional Type – Fall 2007.**

Colleges and universities that engaged in online learning see it as an important part of their strategic planning. While these institutions cite increasing their regional reach by introducing online courses and programs, the data indicate that the majority of their online students live within 50 miles of the institution's campus.[10] Except for the very smallest of institutions (those with fewer than 1,500 total enrollments); the majority of institutions of all sizes believe that online education is critical to their long-term strategy [10]. However, barriers to development of online learning in higher education continue to be of concern. Figure 7 provides a summary of responses made by chief academic officers asked to rate the importance of possible barriers to the widespread adoption of online learning. Eighty percent of the chief academic officers indicated that students needed more discipline to succeed in online courses. In addition, lack of acceptance by faculty (61%), low retention rates (58%), and cost (58%) represented other major issues that go to the heart of the academic enterprise.



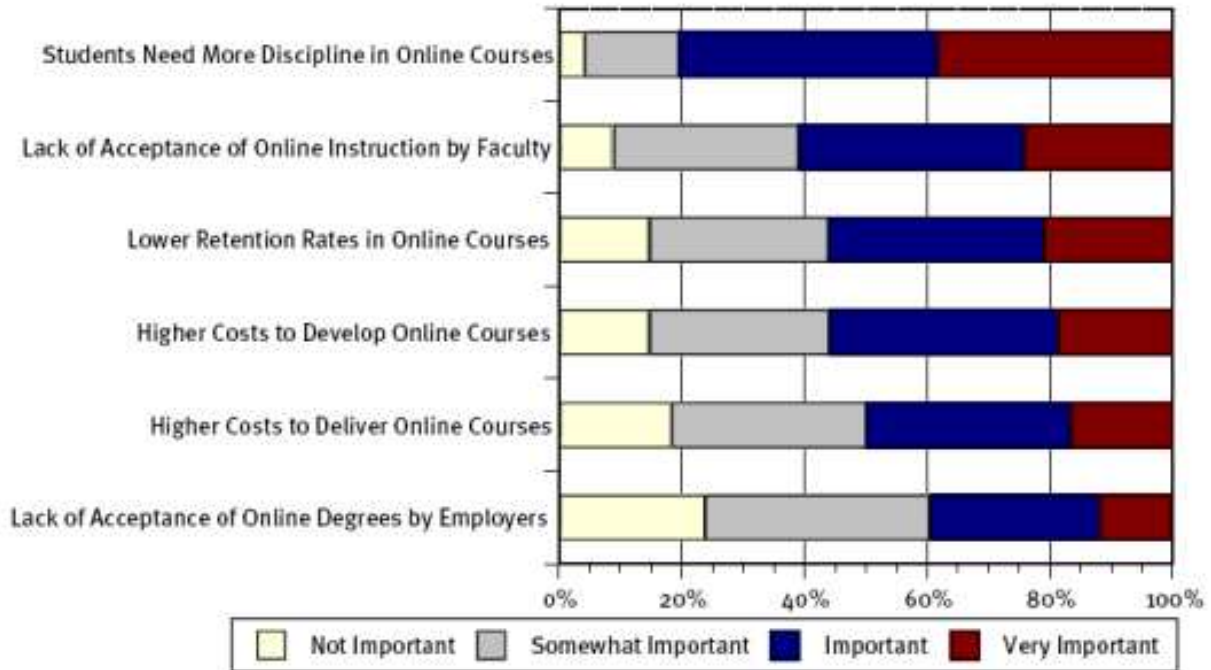


Figure 7. Barriers to Widespread Acceptance of Online Learning – Fall 2006.

### C. Faculty and Issues of Course Quality

The issue of quality in online courses should be a major consideration for those who contend that a transformation has or will be occurring soon in the way education is delivered. If the perception among senior educational leaders is that online courses are not of the same quality as face-to-face instruction, it is unlikely that large-scale change can or will occur in the near future. To examine the quality of online learning further it would be helpful to consider the views of faculty on this issue since they are the ones who ultimately grade and judge the quality of student performance in a course. In a survey of college faculty (N= 10,720) at sixty-nine colleges, Seaman examined a number of issues related to faculty attitudes including their perception of the quality of online learning [13]. Figure 8 is a summary of their responses on this issue.

	HAVE YOU TAUGHT AN ONLINE COURSE?		HAVE YOU DEVELOPED AN ONLINE COURSE?		TOTAL SAMPLE
	Yes	No	Yes	No	Total
Inferior to face-to-face	16.7%	40.8%	16.8%	40.3%	32.3%
Somewhat inferior to face-to-face	31.3%	41.3%	31.1%	41.1%	37.7%
The same as face-to-face	37.2%	15.2%	37.2%	15.6%	23.0%
Somewhat superior to face-to-face	12.4%	2.2%	12.2%	2.5%	5.8%
Superior to face-to-face	2.4%	0.5%	2.6%	0.4%	1.2%

Figure 8. Faculty Opinions of Learning Outcomes of Online Courses

Figure 8 shows that among all faculty respondents, whether they have taught online or not, 70% view online learning as inferior or somewhat inferior to face-to-face learning. While there are surely differences between faculty who have taught online and those who have not, relatively small percentages view online learning as superior. An interesting paradox found in this study is that while faculty express

concern about the quality of online courses, most (56%) of them admit to recommending online courses to their students. This indicates that faculty have mixed feelings and while they might consider online courses inferior, they see value in students taking them. Reasonably interpreted, faculty believe that it is more important to provide students with the opportunity to have access to courses even if they are perceived to be of less quality.

In addition to course quality, this study provided important insights into several other faculty issues with regard to online course development. For example, the popular thesis of digital immigrant v. digital native that posits that older faculty are reluctant to change their teaching approaches, especially with regard to technology and online learning, was not supported. This study found that the most experienced faculty (those with more than 20 years of teaching experience) are teaching online at rates equivalent to those with less teaching experience. This finding indicates that age has had little to do with determining who will develop and teach online. Furthermore, this implies that there will not likely be any surge of online course or program development as younger faculty are hired and replace older faculty.

The time and effort required to teach and develop online courses was also an important issue among faculty in this study. Nearly 64 percent of faculty said it takes “somewhat more” or “a lot more” effort to teach online compared to a face-to-face course. The results for online course development are even more striking: Over 85 percent of the faculty with online course development experience said it takes “somewhat more” or “a lot more” effort [13]. This is an important implication for faculty who work in institutions where scholarship is viewed more importantly for career advancement (e.g., promotion, tenure) than teaching. Faculty in disciplines and academic departments that put a priority on research and grantsmanship would be hesitant about spending additional time on teaching that could better be spent on scholarly activities.

Before concluding this section on course quality, it needs to be mentioned that perceptions and attitudes about student outcomes are not the same as actual student outcomes. There are few cross institutional studies of actual student outcomes in online courses. The U.S. Department of Education (2009) recently conducted a meta-analysis of studies completed since 2004 that compare student outcomes in online, blended and face-to-face studies in both K-12 and higher education institutions. The meta-analysis yielded 51 usable contrasts. The main finding was that blended environments combining face-to-face and online elements had better outcomes than purely face-to-face instruction or purely online instruction. However, variables related to time on task also had a significant effect on student outcomes and the results do not demonstrate that online learning (whether blended or not) is superior as a medium [14].

## **D. Student Satisfaction**

The constituency that may be most important with regard to whether online learning is ushering in a transformation in teaching and learning is the students. There have been a plethora of studies of online learning student satisfaction since the mid-1990s. While most of these studies have been at the course, program, or school level, there have been enough with large sample sizes to conclude that most students who complete an online course or program perceive online learning as beneficial. Readers may refer to the bodies of research that exist on student satisfaction at the Research Initiative for Teaching Effectiveness at the University of Central Florida (<http://www.rite.ucf.edu/>), the Research Center for Educational Technology at Kent State University (<http://www.rcet.org/>), and the Sloan Consortium (<http://www.sloan-c.org>). Typically, student satisfaction studies examine a range of issues. Charles Dzuiban, Director of the Research Initiative for Teaching Effectiveness at the University of Central Florida, in a presentation in 2009, summarized his views on the subject:

...there are 3 reasons students take online courses- convenience, convenience, and convenience! Although this is a major factor in a student’s decision to participate in online courses and thus their satisfaction with it, there are other reasons to consider [also]. These include reduced logistic demands ...increased learning flexibility, technology enhanced learning, and reduced opportunity cost for getting an education. These items all result in higher student satisfaction. Satisfaction curves for students in online courses are always very high once they get comfortable with the

change in format, resulting in a curve that starts very low and increases as the course goes on. There are also dimensions that can negatively influence a student's satisfaction curve. Such influences include reduced face to face time, technology problems, reduced instructor assistance, sense of overwhelming, increased workload, and increased costs for education [19].

The authors agree with Dzuiban that for many students their satisfaction is tied to the flexibility and access to an education that online learning affords. Furthermore, as education, especially higher education, becomes more "market" or "customer" driven, students increasingly are able to influence academic program offerings including mode of delivery. This bodes well for transformation. However, one complication related to student satisfaction is the higher rate of student attrition in online courses.

There have been a number of studies that indicate that college student attrition is higher in online courses and programs [15,16,17,18]. Considering the nature of the students who enroll in online courses, it is not surprising that the attrition is higher. The students who are most attracted to online learning are likely balancing several major activities (education, jobs, and families) in their busy daily lives. Their personal circumstances will influence their decisions to continue in a course or not. If we accept the assumption that these students are more at risk of dropping out and that they are more likely to enroll in online courses, then it is not surprising to see higher attrition in online courses. A recent study sponsored by Public Agenda (cited earlier) was based on a survey of more than 600 individuals aged 22 to 30. The study compared those who started a college education but did not complete it with those who received a degree or certificate from a two- or four-year institution. The top reason the dropouts gave for leaving college was that it was just too hard to support themselves and go to school at the same time. The time, effort, and logistics of working while attending college had overwhelmed them. Since they could not afford to quit or reduce their work, they dropped out of college.

A number of issues raised in this study are pertinent for this article. Of particular interest are the responses to a question:

"How would the following help someone whose circumstances are similar to yours ... in getting a college degree?"

The top three responses were:

- Allow part-time students to qualify for financial aid – 81%
- Offer more courses in the evenings, on weekends or in the summer so people can work while attending school – 78%
- Cut the cost of attending college by 25 percent – 78%

The three lowest responses were:

- Improve teaching so the classes are more interesting and relevant – 67%
- Put more classes online – 57%
- Make the college application process easier – 50% [11]

With regard to the benefits of online learning, these responses can be viewed positively or negatively. While fully half of the students felt that online learning would help them complete a degree, there were a number of other things related to their decision to stay or leave college that were somewhat more important.

### III. TRANSFORMATION OR ENHANCEMENT

Earlier in this article, Webster's 3<sup>rd</sup> New International Dictionary and the Free Online Dictionary were cited in defining the word "transform": (one) to change completely or essentially in composition or structure, and (two) to change the outward form or appearance. There has been very little cross institutional research on whether or the nature of the transformation because of online learning at any level of American education. What does exist are studies at the course, program or individual institution level that attempt to show that online and/or blended learning are changing the way teachers teach and

students learn. Whether large-scale “transformation” is occurring across institutions or whether incremental or modest changes are occurring is not easily determined. It is a given that many instructors and teachers at all levels of education are increasingly using software such as CMS/LMS to enhance and expand what is being done in their courses and classrooms. It is not at all clear that they are radically changing how they teach or just transferring face-to-face techniques to online activities. More simply put, adding technology without changing the pedagogy does not necessarily result in any major change to teaching and learning. As an example, Graham & Robinson examined blended learning by conducting a study at Brigham Young University [7]. Using a mixed quantitative and qualitative research design, they surveyed 1600+ faculty at the university regarding their use of online technology in their courses. The survey was followed up by interviews with selected faculty who appeared to be the most prolific users of online technology. In doing their analysis, a taxonomy of three different types of blended learning environments was established based on the scope, purpose and nature of the blended learning course. These three types of environments were identified as:

- transforming blends
- enhancing blends
- enabling blends.

Transforming blends represented large scope projects that were designed to improve pedagogical practice especially with regard to movement toward active learning environments. Their findings and conclusion were:

We found that there has been wide spread adoption of blended learning [technologies] across the campus. However, we also discovered that much of the blended learning ...has not dramatically changed the pedagogical strategies being used in the class but rather is being implemented as enhancements to the traditional on-campus, lecture oriented pedagogy. It remains to be seen whether there is an evolution from smaller scale enhancing blends to more transformative blends [7, p. 108].

It should be mentioned that Graham & Robinson have written extensively on the topic of online learning environments and have generally been viewed as proponents of the new technologies. Their findings in the above study are honest, important, and surely question whether the new online technologies are transforming instruction or simply enhancing it.

One legitimate question with regard to the Graham & Robinson study is whether their definition of transformation is appropriate. Surely transformation involves change that is occurring on a large scale. The improvement of pedagogy also seems appropriate. However, the emphasis on active learning environments might be questioned because “active learning” comes in different forms. Graham & Robinson referenced the work of Roschelle et al (2000) that established four characteristics of active learning environments as:

1. Active engagement
2. Participation in groups
3. Frequent interaction and feedback
4. Connections to real-world contexts [22].

While it is possible to question these four characteristics, they do represent a basic, legitimate definition of active learning. One possible addition to these characteristics might be student-centered learning in which instructional activities are developed to appeal to a variety of learning styles. Multimodal learning approaches are evolving that include multiple techniques in order to accomplish this [23]. Regardless, the characteristics of active learning as cited by Graham & Robinson were viewed as appropriate for their study and acceptable for the purposes in this article.

How do we incorporate the findings in a study such as Graham & Robinson’s at the macro level? Surely there are many cases in which online technologies are being used in innovative pedagogical ways to

create active learning environments. Are these instances occurring on a large scale and transforming education or are they isolated cases that reflect changes to a modest number of courses and programs. Or, are these instances any more common than the rate of innovative new approaches are being developed for face-to-face courses? This is not easy to determine and perhaps impossible, but we can speculate based on the authors' work referenced earlier that surveyed K-12 school district administrators and higher education chief academic officers. If we accept that a fundamental aspect of transformation is to improve pedagogical practice, most senior-level administrators responding to the authors' surveys did not view this as a goal or objective for online learning. Instead they were attempting to meet the needs of special students (K-12) and to improve access (higher education) [5,6,10]. In addition, while improving pedagogy was not the major reason or rationale for engaging in online learning, these administrators expressed concerns about online instruction related to questions of academic quality, faculty acceptance, student readiness, and retention. This leads us to assume that instructors and instructional designers are still experimenting with and exploring the use of online technology to develop pedagogical practice but that change on a large scale has not happened yet and has not been recognized by senior administrators.

#### **IV. TRANSFORMATION: TO BE OR NOT TO BE**

Having examined some of the current research on online learning, it is now appropriate to speculate on the future.

##### **A. The Future of Online Learning in K-12**

Online learning is still in its nascent stages in K-12 education and a good deal more study is needed before it can be determined if a foundation for a transformation is taking place or will be taking place in the near future (five to seven years). K-12 online learning started in earnest with the new millennium and presently there are more than 1 million students enrolled in online or blended learning courses. This approximation represents two to three percent of the K-12 student population. These enrollment levels cannot be seen as a transformation in the making. While a number of states have established virtual schools, some of which are quite successful, they serve more as models rather than as evidence of a major penetration of online learning into K-12 schools. In the limited research that does exist, several major issues are apparent.

First, the issue of the quality and appropriateness of online learning for K-12 students is real and has to be further studied and addressed. While there has been a modest home-school movement in the United States, the vast majority of K-12 students attend and will continue to attend brick and mortar public schools. The typical public schools do not simply provide instruction but are incredibly important socializing agents that nurture and provide social and emotional support to young people helping them to mature and contribute to society. Instruction in these schools is integrated with the nurturing role and there is skepticism, perhaps justifiable so, as to how well online learning can perform both functions. It is not surprising that the majority of existing K-12 online learning is conducted at the secondary level where students are older and beginning to come into their own socially and emotionally. Online learning surely has a role to play for some of these students, but it is not likely to be in the form of fully online programs but a blended approach that makes available courses and parts of courses to students who otherwise meet in fully face-to-face places we call schools.

Second, the enrollment of K-12 students in online courses, while partially driven by student needs, has also begun to take root in a number of rural school districts [5,6]. In these districts, online learning is not simply an attractive alternative to face-to-face instruction but increasingly is becoming a lifeline to a basic quality education. Shortages of teachers in high-demand secondary school subject areas such as science, mathematics, and foreign languages, as well as modest property tax bases and the lowest per pupil expenditures compared to their urban and suburban counterparts have forced rural school districts to use their financial resources as wisely and effectively as possible. Online learning provides these districts with a cost beneficial method of providing courses that otherwise would require hiring teachers, many of

whom would be uncertified in their subject areas and who would not have enough students to justify their salaries. This is true not only for electives and enrichment subjects but increasingly for advanced required courses as well. These districts will continue to invest in and promote online technology because they are beginning to rely on it to deliver basic components of their academic programs. While these school districts enroll modest numbers of students compare to their urban and suburban counterparts, if a transformation does take root, it will likely start in rural America.

Third, in K-12 education, academic programs and planning including pedagogical practice are closely aligned if not coupled with public policy, much of which exists at the state and local levels. The early research indicates that policy and funding issues in particular need more attention before the foundation for a transformation is established.[5,6] A number of states do not have educational policies in place that provide for the establishment and funding of online learning at the K-12 level. For example, some states fund education based on daily (physical) attendance in classes. However, while it is too early to tell, it appears that the U.S. Education Department, may be preparing to propose major incentives for states that promote and support policies conducive to the development and sustenance of online learning technology in K-12 schools.

## **B. The Future of Online Learning in Higher Education**

While a foundation for a transformation is still evolving at the K-12 level, it is our opinion that the foundation for a transformation in American higher education is in place. However, such a transformation is not inevitable and considerable additional development needs to be done before an actual transformation can be realized. Whether this transformation will occur in a relatively finite amount of time, say five to seven years, or a gradual evolution that takes fifteen to twenty or more years depends upon a number of factors.

First, understanding the nature of institutions supporting online learning is critical to speculating whether the new technology will usher in a transformation of teaching in higher education. Six years of data have consistently indicated that public colleges and universities, especially community colleges, are the major providers of online learning courses and programs [27]. In addition, there are a small number of successful for-profit colleges (e.g., University of Phoenix, DeVry, Kaplan, Cappella) that have developed and successfully marketed online learning.

Two important classes of higher education institutions have resisted or have not become major providers of online learning. Private four-year liberal arts colleges have shown very little interest in online education in any form. Research-based universities do report that online is a critical part of their long term strategy, but often it is relegated to non-core academic areas, such as their continuing education departments. The mission of these institutions is not one of broadening access as much as selecting the brightest, typically higher income, and often legacy (students of alumni) students for enrollment. These two sectors are perceived by students, parents, and faculty as the “elite” institutions and the “best” of American higher education. It follows then that the nature of their educational programs, which continue to be based on face-to-face instructional activities, continue to be perceived of higher quality. In actuality this may not be true. Research universities emphasize the research and scholarship missions of their academic programs more than teaching. Faculty are hired and promoted based on their research, grantsmanship, and scholarship not because they can teach well. At many of these institutions, large portions of teaching responsibilities fall to graduate assistants rather than full-time “scholars”. Most private four-year liberal-arts colleges that consider themselves “elite” have been reluctant to invest significantly in online teaching and learning because it could jeopardize the social aspect of their programs. Parents who spend \$50,000 or more annually for tuition and fees would likely question the worth of their investment if a significant portion of the academic program was delivered online. These colleges appeal to students whose parents are looking to provide their children with the “best college experiences that money can buy”. The perceived quality and reputation of the liberal arts colleges among parents, students, faculty and educators slow the possibility of a higher education transformation since it is not likely that a major investment to online learning will occur at these colleges in the foreseeable

future.

Any educational transformation that may occur will be in the non-research-oriented public university systems, community colleges, and for-profits that seek to provide access and enroll as many students as possible. However, in many of these institutions, especially the public four-year colleges, many faculty are hired and promoted based on their scholarship as much as for their teaching. This too may slow any transformation that is based strictly upon pedagogical practice and teaching. Of particular concern is the fact that in recent years, states and localities have been limiting if not reducing their financial support of public higher education. If this trend continues, publicly-funded colleges will be more aggressive in hiring faculty for their research and grantsmanship skills rather than for their teaching ability.

A second important consideration is that online learning was often ushered into higher education through the alternative (e.g., distance, adult, continuing) education units of colleges and universities rather than by mainstream academic departments. Alternative programs that emerged as highly successful online learning providers such as the University of Maryland University College, the Penn State World Campus, and SUNY's Empire State College were not coupled closely with their institutions' mainstream academic programs. These alternative operations, while providing an enormously important service to students, especially older, part-time students, did not always receive the respect that they deserved from their mainstream colleagues. They were seen in many cases as "cash cows" that were expected to be self-sufficient or preferably to turn a profit for the good of the entire institution. They currently represent a significant portion of higher education online student enrollments. The lessons learned and the approaches pioneered in online learning by the faculty in these alternative operations were initially viewed with suspicion by administrators and faculty in mainstream academic departments. While this has changed considerably in recent years, vestiges of suspicion still remain.

A third critical factor is faculty attitude to online learning. Even among those faculty who have developed, taught, and continue to teach online, the quality of online learning is perceived to be of a lesser caliber than face-to-face instruction. Part of this perception may be related to the experiences and comfort levels that have developed among faculty whose initial teaching experiences were in face-to-face environments. However, part of this perception may be based on objective observation that online learning as a mode of instruction is still evolving and that what constitutes good teaching online is likewise evolving and has not reached the level of face-to-face instruction.

The Seaman study referenced earlier also provided critical evidence that the opinion among faculty is that developing and teaching online takes more time and effort [13]. This too becomes important in trying to determine whether a transformation will take place. Technology has been sold for decades on the promise that it is faster, easier, and more efficient than traditional ways of doing things. This is true for high-transaction processing such as airline reservations, banking, and inventory control applications but it may not be the case for intense human relationship activities related to education. The attitude, and possibly the actuality, that online learning takes more time and effort combined with the perception that online learning is of lesser quality, results in a situation that will delay if not significantly prevent any transformation from occurring. One possible approach that might alleviate the problems associated with quality and effort is combining face-to-face with online instructional activities in a blended or hybrid model. The U.S. Department of Education study gives some credence to the quality of blended approaches but much more research in this area needs to be conducted [14].

Lastly, student access issues may be the most important forces driving a transformation of higher education through online technology. Higher education institutions that see students as customers who drive their academic programs will have to adjust to the demands of the market and increasingly provide courses and programs that meet the needs of incredibly busy individuals who combine work, family, and higher education. These student customers clearly see higher education as important for entering certain fields or advancing careers and seek certification or credentials that allow them to apply for new positions, promotions, and salary rewards. The anytime, anyplace nature of online learning has a certain appeal to these students and is generally accepted by them, not necessarily because of the quality of the program but because of the convenience. Garrett in a study of 2,000 potential students concluded that

“interest in online learning appears to be dominated by notions of convenience, and is seen to imply a quality tradeoff” [28]. In sum, a transformation based on access and convenience has begun to occur in institutions and programs that have traditionally emphasized professional preparation (e.g., business administration, education, health services) and may see its way into other academic programs.

## V. CONCLUSION

The purpose of this article was to examine online learning at the macro level in terms of its impact on American K-12 and higher education. Data were provided from cross-institutional research to establish a baseline of information on the extent and nature of online learning in American K-12 and higher education. An attempt was made to determine if online learning is in fact transforming American education. Our review of the research leads to several major conclusions.

First, online learning in K-12 schools is in its beginning stages and a good deal more public policy development at all governmental levels (federal, state, local) needs to be done in order for online learning to take a strong foothold upon which transformation can take place. Furthermore, blended approaches that combine online with face-to-face instruction whether at the program, course, or module level will likely be more readily accepted than fully online programs.

Second, in American higher education, a foundation has been established upon which a transformation can occur. However, much of this foundation exists in specific segments of the higher education enterprise, namely publically-funded university systems, community colleges, and select for-profit institutions addressing a specific subset of students. A sizable minority of higher education institutions continue to either ignore online education, especially in the four-year private liberal arts schools, or to relegate it to the peripheral of their activities. These institutions show no signs of embracing online learning in the future. For an overall transformation to occur in American higher education online education will need to be embraced by the full range of institutions. This will demand fundamental changes in some very strongly-held beliefs among particular schools; an unlikely prospect.

Lastly, issues regarding the quality of online learning and the level of effect required to develop and teach online courses continue to be of concern at all levels of education leading to the conclusion that more developmental work needs to be done. As Christensen et. Al. and others have stated, there needs to be a cultural shift in pedagogical approaches that takes advantage of the newer online technologies. Only then can a widespread transformation occur.

## VI. ABOUT THE AUTHORS

**Anthony G. Picciano** is a professor and executive officer of the Ph.D. Program in Urban Education at the Graduate Center of the City University of New York (CUNY). He is also a professor in the graduate program in Education Leadership at Hunter College, the doctoral program in Interactive Pedagogy and Technology at the Graduate Center (CUNY), and the interdisciplinary program in Communication and Culture at the CUNY School of Professional Studies. He has forty years of experience in education administration and teaching, and has been involved in a number of major grants from the U.S. Department of Education, the National Science Foundation, IBM, and the Alfred P. Sloan Foundation. In 1998, Dr. Picciano co-founded *CUNY Online*, a multi-million dollar initiative funded by the Alfred P. Sloan Foundation that provides support services to faculty using the Internet for course development. Currently he serves on the Board of Directors of the Sloan Consortium. His major research interests are education policy and leadership, Internet-based teaching and learning, and multimedia instructional models.

Dr. Picciano has authored numerous articles and eight books including *Data-Driven Decision Making for Effective School Leadership* (2006, Pearson), *Educational Leadership and Planning for Technology*, 4<sup>th</sup> Edition (2005, Pearson), *Distance Learning: Making Connections across Virtual Space and Time*



(2001, Pearson), and *Educational Research Primer* (2004, Continuum). His most recent book was co-edited with Chuck Dzuiban and is entitled, *Blended Learning: Research Perspectives* (2007, Sloan Consortium). He also has just completed editing a special edition of the Journal of Asynchronous Learning Networks (JALN) on blended learning. In 2007 and 2008, Dr. Picciano completed national studies with Jeff Seaman on the extent and nature of online learning in American school districts. They are among the first studies to collect data on fully online and blended learning in primary and secondary schools. He is currently collecting data on a study of online learning in American high schools.

**Jeff Seaman** currently serves as the Survey Director for The Sloan Consortium and as Co-Director of the Babson Survey Research Group. Dr. Jeff Seaman has worked in education information technology for his entire career, and holds degrees in Demography/Statistics, Sociology, Electrical Engineering, and Housing, all from Cornell University. He has taught social science, information technology and statistics at several colleges and universities, including Cornell University, the University of Wisconsin, the University of Pennsylvania's Wharton School, and Babson College.

Dr. Seaman created and ran the Computing Resource Center and served as Associate Vice Provost for Computing for the University of Pennsylvania and as Chief Information Officer for Lesley University. His industry experience includes serving as Chief Technology Officer at HighWired.com where he led the development of an online learning system used by thousands of US high schools and as the Vice President of Engineering for Vista Associates where he did functional design work and led the engineering team in building course management systems. He has served on academic technology advisory boards for a number of information technology companies including Apple Computer, IBM, and Microsoft.

Dr. Seaman has been conducting research in the impact of technology on higher education and K-12 for over a decade, beginning with comprehensive national studies of technology use in U.S. Higher Education in 1991. His most recent work includes the annual Sloan Consortium surveys on the state of online learning; *Charting the Course: Online Education in the United States, 2008*, *Making the Grade: Online Education in the United States, 2006*, *Growing by Degrees: Online Education in the United States, 2005*, *Entering the Mainstream: The Quality and Extent of Online Education in the U. S. 2004 and 2004*, and *Sizing the Opportunity: The Quality and Extent of Online Education in the United States, 2002 and 2003*.

**I. Elaine Allen** is the Research Director of the Arthur M. Blank Center for Entrepreneurship and an Associate Professor of Statistics and Entrepreneurship at Babson College where she teaches advanced statistics and analytics courses. She is also Co-Director of the Babson Survey Research Group (BSRG).

Dr. Allen is the statistician on several large survey projects including the Global Entrepreneurship Monitor and the Sloan Survey on online education. She is also Co-Director of the Babson Survey Research Group (BSRG).

Dr. Allen has published widely in statistical, clinical, and managed care journals on statistical issues in meta-analysis, data mining, survey research methods, clinical and biological research methodology and statistical computing. She has been conducting research in the impact of technology on higher education since 2002. Her most recent work includes the annual Sloan Consortium surveys on the state of online learning; *Charting the Course: Online Education in the United States, 2008*, *Making the Grade: Online Education in the United States, 2006*, *Growing by Degrees: Online Education in the United States, 2005*, *Entering the Mainstream: The Quality and Extent of Online Education in the U. S. 2004 and 2004*, and *Sizing the Opportunity: The Quality and Extent of Online Education in the United States, 2002 and 2003*. Prior to joining Babson, she founded and held executive positions in the healthcare and biotechnology industry, including at Centocor, ARIAD and MetaWorks, Inc. She serves on several NIH research panels on best practices in statistics and on evidence- and effectiveness-based research. She is a Fellow of the American Statistical Association.

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