Issues and Trends in Instructional Technology: Lean Times, Shifts in Online Learning, and Increased Attention to Mobile Devices

Abbie Brown and Tim Green

We continue the tradition of reporting the issues and trends of instructional technology that have continued or arisen within the past year. This chapter is comprised of four sections: overall developments; corporate training and development; higher education; and K-12 settings.

Overall Developments

While there were signs that pointed to an improvement of the nation's economy, a full economic recovery was not evident. Higher than expected unemployment and decreases in tax revenues continued to play a significant role in how various sectors approached technology spending. Similar to the previous year, funding for K-12 and higher education was less than robust. Technology spending in the private sector, however, did seem to pick up from the previous review, though it remained conservative and cautious. Despite the issue of funding, all sectors continued to explore innovative uses of instructional technology. Online learning, Web-based collaborative tools, and the use of mobile devices are this year's significant trends to watch.

A. Brown (✉)
Department of Mathematics, Science Instructional Technology Education,
East Carolina University, Flanagan Hall, Greenville, NC 27858, USA
e-mail: brownab@ecu.edu

T. Green
Department of Elementary and Bilingual Education, California State University,
Fullerton, CA, USA
e-mail: timdgreen@gmail.com

M. Orey et al. (eds.), *Educational Media and Technology Yearbook: Volume 36, 2011*,
Educational Media and Technology Yearbook 36, DOI 10.1007/978-1-4614-1305-9_6,

Interest in Mobile Computing Devices

This year's ECAR study examines closely the use of mobile devices on campus (Smith, Salaway, & Borreson Caruso, 2009), noting that nearly every undergraduate now owns a cell phone and engages regularly in text messaging. The Horizon Report mentions Mobiles as a "technology to watch" (Johnson, Levine, & Smith, 2009). As mobile devices become more versatile, incorporating functions like global positioning, Web browsing, and video capture, they show greater promise as learning tools.

The Current State of Online Learning

Online learning continues to expand in higher education and K-12, but not in corporate training and development. The Sloan Consortium's report on online education in the United States indicates that online enrollments in higher education settings have increased 17% from the previous year (Allen & Seaman, 2010). The ASTD state of the industry report, however, indicates a slight decrease in business and industry's use of e-learning.

Corporate Training and Development

As we have done in previous issues and trends chapters of the yearbook (e.g., Brown & Green, 2009, 2010), we continue to track corporate application of instructional technologies primarily by referring to the American Society for Training and Development's (ASTDs), *State of the Industry Report,* (Paradise & Patel, 2009). The current ASTD annual report is based on data collected from the Benchmarking Forum (BMF) organizations, ASTD BEST award winners, and responses from users of ASTD's WLP (Workforce Learning and Performance) Scorecard. The report describes the activities of organizations recognized as exemplary in their approach to workplace learning and performance as represented by the BEST award winners; larger, global organizations typically represented by BMF members; and data collected from users of ASTD's WLP Scorecard benchmarking and decision support tool.

Expenditure for Learning

ASTD reports organizational expenditures for learning remained relatively stable over that past year (Paradise & Patel, 2009). The average annual learning expenditure per employee fell slightly (3.8%) from $1,110 in 2007 to $1,068 in 2008. Paradise and Patel observe the decrease in spending on workplace learning was similar to spending reductions in all aspects of business and industry. Paradise and

Patel also point out the consolidated average learning expenditure as a percentage of payroll *increased* 0.09% (from 2.15 to 2.24) between 2007 and 2008, and direct learning expenditures increased 0.03% (from 5.6 to 5.9), indicating business and industry's continued commitment to workplace learning.

The trend in spending on internal learning operations (as opposed to external training providers and instructional media producers) continues (Paradise & Patel, 2009). Internal learning departments continue to take on greater importance in corporate training and development.

The ASTD report also indicates that learning professionals are increasing their productivity: the average number of employees per learning staff member increased from 227 in 2007 to 253 in 2008, suggesting the average learning department is serving a relatively larger population (Paradise & Patel, 2009).

Instructional Content

ASTD reported no major changes in instructional content emphasis between 2007 and 2008 (Paradise & Patel, 2009). Paradise and Patel suggest this indicates that business and industry did not engage in radical restructuring during this period despite economic uncertainties.

Corporate instructional content remains focused on profession and industry-specific subject matter (Paradise & Patel, 2009). The second largest content area over the past year was information technology knowledge; Paradise and Patel suggest this can be attributed to greater focus on organizational efficiency. Other top content areas such as managerial and supervisory training, mandatory and compliance training, and processes procedures and business practices remained similar to previous years (Paradise & Patel). Though it accounts for a small percentage of instructional content overall, sales-oriented instruction increased significantly (from 5.4 to 6.1%) as did instruction for interpersonal skills, which is peripherally related to sales (from 5.6 to 7.4%) (Paradise & Patel).

Use of Technology: A Surprising Emphasis on Face-to-Face Instruction

The 2009 ASTD report reveals a surprising reduction in the use of e-learning.

After a consistent rise over several years, e-learning approaches diminished between 2007 and 2008. Instructor-led classroom learning accounted for almost two-thirds of the learning hours employed in 2008 (Paradise & Patel, 2009). Self-paced online learning declined in use for the second consecutive year.

Paradise and Patel (2009) suggest the use of e-learning approaches for formal learning will rebound; that its flexibility and efficiency (particularly the ability to reuse technology-based instruction) make it an increasingly important platform, and

we are inclined to agree. Furthermore, Paradise and Patel observe that e-learning used for informal education is increasing rapidly; Web 2.0 technologies, including social networking, are changing the ways people share information and collaborate (Paradise & Patel).

Higher Education

We examine higher education's information technology use and instructional technology application primarily by referring to the *EDUCAUSE Core Data Service Fiscal Year 2008 Summary Report* (Arroway & Sharma, 2009), *The ECAR Study of Undergraduate Students and Information Technology, 2009* (Smith et al., 2009), and *The Horizon Report* (Johnson et al., 2009). Trends in online learning are further examined by referring to The Sloan Consortium's report, *Learning on Demand: Online Education in the United States* (Allen & Seaman, 2010). Each of these is a large, ongoing study with significant resources allocated to measuring the technological climate of higher education. *The EDUCAUSE Core Data Service Fiscal Year 2008 Summary Report* is drawn from information supplied by over 900 participating institutions (Arroway & Sharma); *The ECAR Study of Undergraduate Students and Information Technology, 2009* compiles and summarizes responses provided by over 30,000 undergraduate students (Smith et al.); *The Horizon Report* is a qualitative analysis that examines the use of emerging technologies in learning-focused organizations, produced in collaboration between the EDUCAUSE Learning Initiative and the New Media Consortium (Johnson et al.); and the Sloan Consortium's report on online learning is based on the responses provided by over 2,500 colleges and universities.

According to Allen and Seaman (2010), the economic downturn has increased demand for both traditional "face-to-face" courses and courses presented entirely online. Over half of the institutions surveyed for the Sloan Consortium's report confirmed an increased demand for face-to-face courses (Allen & Seaman). The demand for online courses was even higher: 66% of reporting institutions saw increased demand for new courses and programs, and 73% saw increased demand for existing online offerings.

Information Technology on Campus: Staffing and Compensation

The top three functional areas for information technology (IT) staff on college and university campuses are "administrative/enterprise information systems," "desktop computing, user support services, training, computer store," and "instructional technology, multimedia services and student computing" (Arroway & Sharma, 2009). Campus IT leaders (the administrative head of IT) typically report directly to the institution's highest academic or administrative officer (Arroway & Sharma).

Eight-seven percent of the institutions providing information have a technology advisory committee that provides feedback and direction for strategic IT planning (Arroway & Sharma).

Instructional Technology (IT) employee compensation remains consistent (modest or no increase in salary over the past 2 years) for full-time staff. Student worker compensation in IT has dropped considerably in past years (Arroway & Sharma, 2009). Although the EDUCUASE report makes no mention of this specifically, it is reasonable to assume that a majority of students in instructional technology/educational technology graduate programs who work for IT services while attending school are receiving lower wages than in the past.

Campus Technology Support and Use of Technology for Instruction

Bandwidth continues to increase on most campuses (Arroway & Sharma, 2009). Remote access for students and faculty off campus is largely supported, as is on-campus Wireless (WiFi) access, and most campuses have videoconferencing facilities, though videoconferencing support varies widely by institution type (Arroway & Sharma).

Course management systems (CMS) are currently supported by the vast majority of institutions, virtually all of which are commercial (e.g., Blackboard) or open-source (e.g., Moodle) applications, as opposed to "home-grown" applications developed by and at the institution (Arroway & Sharma). Smith et al. (2009) report an increase in undergraduate CMS use from 79.7% in 2006 to 91% in 2009.

Undergraduate students report making regular use of their college or university library Web site as well as a CMS (Smith et al., 2009). A majority of undergraduates further report making regular use of presentation software (e.g., PowerPoint) and spreadsheet software regularly for course work; about 25% of these students report using Wikis for course work as well (Smith et al.). Just over 25% of undergraduates reporting state they use social networking sites such as Facebook or Ning for course work, and roughly 15% report using blogging, graphics software, Internet messaging, and programming languages (e.g., Java) regularly in their studies (Smith et al.).

Learning Online. According to the Sloan Consortium report, over 4.6 million students took at least one online course in the fall 2008 term; this is a 17% increase over the previous year's reported number (Allen & Seaman, 2010).

Technology Support for Faculty

Arroway and Sharma (2009) report the three most common methods of providing faculty support for integrating technology into teaching are opportunities for successful technology users to share their experiences, seminars on technology-oriented topics, and training on request. Arroway and Sharma also note a downward trend in

college/university support for centralized instructional technology centers, while the use of student technology assistants is on the rise (2009).

Undergraduate students continue to find faculty use of information technology (IT) to be mediocre at best (Smith et al., 2009); 45% reported that most of their instructors use IT effectively in their courses. The past year's ECAR report continues to report a preference among students for only a moderate amount of IT in any of their courses: undergraduates on campus continue to appreciate the face-to-face learning experience (Smith et al.).

Support for Online Instruction. Although undergraduate students on campus tend to prefer face-to-face or relatively "low-tech" instruction, there is a rising demand for online course delivery. According to Allen and Seaman (2010), institutions differ widely in the support they provide for developing skill with online instruction: 19% of reporting institutions provide no training of any sort; over half of those institutions offering online courses provide training courses and informal mentoring; a smaller group (15%) provides training from external sources.

Student Computing

Undergraduates are bringing their own, relatively new laptops with them to campus (Smith et al., 2009). In 2009, 88.3% of students responding to the ECAR study reported owning their own laptops, while 44% reported owning desktop systems (Smith et al.). Arroway and Sharma (2009) point out a difference in student computer ownership depending upon the type of institution: students attending DR (doctoral degree granting) institutions tend to own their own computers far more often than students attending AA (associates degree granting) institutions. Arroway and Sharma also report that all responding BA, MA, and DR (doctoral degree granting) institutions with residence halls provide high-speed network connections (2009).

The vast majority (over 90%) of undergraduate students are using social networking sites and instant messaging and text messaging to communicate (Smith et al., 2009).

Mobile Devices. This year's ECAR report focuses attention on student use of mobile devices. It is generally assumed that cell phone ownership and use among undergraduates is ubiquitous, and over half the study's respondents report owning an Internet-capable mobile device (Smith et al., 2009). Mobile devices are also a "technology to watch" in this year's Horizon Report (Johnson et al., 2009).

K-12 Education

In reporting the trends and issues for the K-12 education section, the following reports were predominantly used: *Technology Counts 2010*, *The 2010 Horizon Report: K-12 Edition*, *Learning in the 21st Century: 2009 Trends Update*, and *Generation M2: Media in the Lives of 8- to 18-Year-Olds*. *Technology Counts 2010*

is the 11th annual report published by *Education Week.* This report focuses on the overall state of educational technology in K-12 schools. *The Horizon Report*, produced by the New Media Consortium and the Consortium for School Networking (CoSN), focuses on emerging technologies or practices that are likely to gain use within K-12 over the next year to 5 years. *Learning in the 21st Century* is part of a series of reports published by Project Tomorrow in conjunction with Blackboard Inc. This report examined data collected from over 335,000 U.S. K-12 students, teachers, administrators, and parents regarding technology use. The *Generation M2* report was sponsored by The Kaiser Family Foundation. This report is the third in a series of studies that focused on the media use of approximately 2,200 3 rd–12th grade students throughout the United States.

When reflecting on the previous reviews, many of the major issues regarding instructional technology use in K-12 have remained relatively consistent. Issues that were key holdovers from previous reviews are online learning, mobile devices, and the use of Web 2.0 tools (Brown & Green, 2009, 2010). A major issue from the last review, STEM education, continues to be pushed in K-12 despite evidence that funding for many of these federally funded projects was never received (Robelen, 2010). Funding for overall K-12 continued to be a major issue that, not surprisingly, had a direct effect on instructional technology use.

The Overall State of K-12 Technology

Previous *Technology Counts* reports provided an overall view of technology use in schools broken down state by state and the District of Columbia. Data for last year's report was collected on 10 indicators covering state technology policy and practice – specifically, technology use and technology capacity. Technology use was based on the following policy indicators: student technology standards, student testing on technology, virtual schools, and computer-based student assessment. Technology capacity focused on technology standards for teachers and administrators, course work or a test for initial professional licensure, and technology training or a technology test for professional recertification. Last year's report provided letter grades in technology use and technology capacity for the USA as a whole. The nation earned a B in technology use and a C+in technology capacity for use. Nine states received A grades for technology use while 11 received D+grades and the District of Columbia received an F. Three states earned A grades in technology capacity for use while seven earned D grades and five earned F grades (Hightower, 2009).

Due to a lack of sufficient state-level data, the recent *Technology Counts* shifted its focus to how public school districts are using technology to enhance and improve teaching and learning (data from this report will be discussed in various sections that follow). Thus, letter grades were not provided in the report for states or the nation. Based on the trends from previous reviews and based on the level of available funds for K-12 during this review, we believe that the overall grade for technology use and technology capacity for the nation as a whole would have most likely remained the same.

Funding

The overall funding for K-12 dropped – significantly in many states – as state budget deficits rose. Market analysts predict large deficits for states to continue for another 2–3 years (Devaney, 2010). As with previous reviews, specific numbers on how much money states spent on K-12 technology remains difficult to obtain. Despite the specifics, there is evidence that spending was down. According to a report published by the American Association of School Administrators, administrators (435 from 45 states; 92% superintendents) who responded to a survey school funding indicated that technology purchases are increasingly being delayed due to lack of available funds. "While 13% made delays in 2008–2009, 29% and 57% report delays in 2009–2010 and 2010–2011, respectively" (Elerson, 2010).

Despite the lower reported funds available for technology, federal funds for educational technology seemed to be available (e.g., $650 million from the Enhancing Education Through Technology initiative; other monies are available; albeit, buried in various federal education programs such as Title 1 and IDEA). The president requested an increase of $4 billion for education in the federal budget plan for the fiscal year 2011. The administration, however, proposed moving to a greater percentage of federal dollars from "formula-based grants to competitive grants—a move that school leaders fear will further squeeze their limited resources" ("Survey: School budget cuts," 2010).

Teacher Technology Availability and Use

The "Tracking Trends" section of *Technology Counts 2010* provided a snapshot of the technology resources public school districts made available to their teachers and students (Education Week, 2010). The data was gathered from a federal study conducted by the U.S. Department of Education (Gray, Lewis, & Tice, 2009). The data points to teachers having relatively good access to various technology tools. Access to electronic tools was 95% for all secondary teachers and 87% for all elementary teachers. Eighty-two percent of secondary teachers and 83% of elementary teachers had server space for posting a Web page and class materials. Online student assessment tools access was 72% (secondary teachers) and 73% (elementary teachers). Online curricula access were 66% for both elementary and secondary teachers. Opportunity for distance learning was 65% (secondary) and 64% (elementary). Access to course-management and course-delivery software was 57% for all teachers. Finally, 44% (secondary) and 46% (elementary) have remote access to school or district software.

According to the seventh annual PBS national survey of teachers' (1,212 K-12 public schools; 206 pre-K in public and private schools) use of media and technology, *Digitally Inclined,* teachers' attitudes toward and use of digital media and

social networking tools have increased (PBS, 2010). Some key findings from the survey regarding K-12 teachers were:

- 76% use digital media in their classroom (33% pre-K)
- 44% reported being frequent users (everyday to two times a week)
- 93% indicated that their schools have computers with Internet access
- 81% have computers with Internet access in their classroom
- 61% have DVD players or computer DVD drives in their classroom
- 72% stream or download digital content from the Internet
- 58% indicated use digital media for games and activities for students
- 51% access digital images

The survey indicated that the trend of teachers' use of games is on the rise as is teachers valuing student-produced multimedia, student-created Web sites, and Web sites for student work submission (the use of games in K-12 is also supported by *The Horizon Report: 2010 K-12 Edition*).

The *Digitally Inclined* report also indicates, "Teachers report that their students prefer digital media over other types of instruction and that digital media increases student motivation and stimulates discussions. Teachers also believe digital media supports their own creativity and student creativity" (PBS, 2010, p. 5). More teachers are using video than in previous years. The use of video is different, however; 42% of teachers indicated that they were more likely to use partial segments (5–10 min) of videos rather than an entire video (PBS). Finally, the survey indicated that 29% of teachers report using social networking sites or social media community for instructional purposes. Twenty-six percent reported belonging to an online community specifically for teachers. These percentages are up from the previous year's survey (PBS). The data points to a key trend for teachers' use of instructional technology, which is the use of digital content. We believe that teachers' use of digital content – especially from the Internet – will continue to rise.

Teacher Technology Training, Certification, and Professional Development

During the previous three reviews (Brown & Green, 2008, 2009, 2010), we were optimistic that the number of states with technology standards for teachers would increase (46 states had teacher technology standards, as of the last review). We were also hopeful that additional states would implement technology requirements for teacher licensure. We predicted that the number of states requiring technology course work or the passing of a test to demonstrate competency would slightly increase (Brown & Green, 2010). As of the last review (Brown & Green, 2010), only 21 states required either technology course work or the passing of a test to demonstrate competency. Ten states required course work or a test for initial licensure for administrators (Hightower, 2009).

Table 1 Data from Education Week (2010)

Teacher professional development topics	% of Districts *offered*	% of Districts *required*
Integrating technology into instruction	95	39
Using Internet resources and communication tools for instruction	91	15
Internet safety	89	55
Using content-specific software tools for instruction	86	16
Using multimedia digital content for instruction	86	14
Developing curriculum plans that include using technology to address content standards	85	37
Using technology to access or manipulate data to guide instruction	83	32
Applying technology in assessing student achievement with respect to state curriculum standards	82	40
Using technology to support collaboration	80	16
Intellectual property and copyright rules	77	45
Using student-assessment and student-evaluation strategies that involve technology	74	27
Using technology to promote dialogue on student-performance indicators and related data	72	20
Creating or using digital portfolios	51	5
Teaching via distance learning	47	4

Although data are not readily available to support our predictions from our previous review, what we can report is the percentage of public school districts that *offer* teacher professional development and the percent that *require* teacher professional development in various technology topics. This provides a glimpse into what teachers are being asked to know and to do regarding instructional technology use. *Technology Counts 2010* reported data on 14 technology topics (Education Week, 2010). The data they provided is presented in Table 1.

Student Use and Ownership of Technology

Our last review reported that 8- to 18-year-olds' use of media in and out of school averaged 6½ h a day according to a 2005 Kaiser Foundation Study (Rideout, Roberts, & Foehr, 2005). Of these 6½ h, this group was actually exposed to the equivalent of 8½ h of media. The media ranged from watching television to reading print-based materials. The largest percentage of time was spent using digital media (e.g., watching live or recorded television 4 h a day). A new Kaiser Foundation Study (Rideout, Roberts, & Foehr, 2010) on media use of 8- to 18-year-olds found that since the last study the amount of time this group spends with media has increased an hour and 17 min to a total of 7 h, 38 min a day. This translates into the equivalent of 10 h, 45 min of media content. All media use increased except for movies (which remained

at 25 min a day) and print-based (which dropped 5 min a day to 38 min). Music and audio had the greatest increase at 47 min a day for a total of 2 h and 31 min a day (Rideout et al., 2010).

Related to media use there are some interesting findings that we believe are important to highlight. The 8- to 18-year-olds who spent more time with media (indicated being "heavy users") reported lower grades and lower levels of personal contentment than those who considered themselves to be "moderate" or "light users" of media (Rideout et al., 2010, p. 4).

Mobile Devices. In our previous review (Brown & Green, 2010) we provided data from the *Speak Up 2008* survey indicating that approximately half of the students surveyed had access to a cell phone, while approximately 65% had access to an MP3 player, and half had access to a laptop (Project Tomorrow, 2009). According to the *Generation M2: Media in the Lives of 8- to 18-Year-Olds*, the percentages of ownership are 66% for cell phones, 76% for iPod/MP3 players, and 29% for laptops (Rideout et al., 2010). *Technology Counts 2010* reported 71% of teens owned a cell phone (Manzo 2010a, b). The key point here is that student ownership to mobile devices – especially cell phones – continues to rise. Rideout et al. (2010) indicated the use of cell phones "morphed from a way to hold a conversation with someone into a way to consume more media" (p. 3). The 8- to 18-year-olds surveyed reported using their phones the following ways on average per day:

- 30 min talking
- 17 min listening to music
- 17 min playing games
- 15 min watching TV

Those in 7th through 12th grades reported spending an average of 1½ h text-messaging.

We predict that more K-12 students will have access to mobile devices and the use of these devices will continue to increase. As a result, students will continue to put pressure on schools to allow use of these devices as learning tools in and out of the classroom.

Online Learning. Our last review (Brown & Green, 2010) reported that according to the Sloan Consortium the growth of K-12 students using online courses significantly rose (more than one million public school students) from 2008 to 2009. The total number of students using online courses increased 47% from 2005. We predicted that the number of students taking online courses would increase during this review period. Although there is no new data available to indicate whether this number has increased over the review period, we believe that the numbers have indeed increased and will continue to increase. There is speculation (Christensen & Horn, 2008) based on current data regarding student growth that by 2019 about 50% of high school courses will be delivered online. We predict that school districts that do not provide online learning opportunities for their students will find their students seeking these opportunities outside of their school (e.g., for-profit institutions).

Innovative and Emerging Technologies and Practices Used in K-12

The use of mobile devices and online learning were two innovative and emerging technologies and practices used in K-12 that persisted during this review period. We predict, based on past data trends, mobile devices and online learning will most continue to gain popularity. Schools, however, will need to overcome challenges (e.g., network infrastructure, teacher professional development, safety and security) in order to realize the full potential for mobile devices and online learning.

In addition to these trends, there is evidence of other innovative and emerging technologies being used in K-12. *The 2010 Horizon Report: K-12 Edition* reported on "emerging technologies for their potential impact on and use in teaching, learning, and creative expression within the environment of pre-college education" (Johnson, Smith, & Levine, 2010, p. 3). This report focused on technologies or practices that are likely to gain use within K-12 over the next year to 5 years. The six they identified as ones to watch are cloud computing, collaborative environments, game-based learning, mobiles, augmented reality, and flexible displays. Of these, we predict that cloud computing, collaborative environments, game-based learning, and, as we previously mentioned, mobile devices, will have the greatest near-term effects on K-12.

In previous reviews (Brown & Green, 2009, 2010), we predicted that as Web 2.0 tools continued to become more sophisticated their use in K-12 would increase. *The Horizon Report: 2010 K-12 Edition* lends support to our predictions by pointing to two emerging technologies – cloud computing and collaborative environments – that the report states have 1 year or less time to adoption. These two technologies both support Web 2.0 tools. Schools have begun to adopt cloud-based tools mostly for productivity and administrative purposes (Johnson et al., 2010, p. 9). We predict that as schools become more familiar and comfortable with using these types of tools other cloud-based tools (e.g., Google docs) will increase in use for teaching and learning. We also predict the use of collaborative environments (e.g., Ning, VoiceThread, Wikis) will continue to increase for teaching and learning, if schools are able to manage security and safety issues while providing adequate access to these tools for teachers and students (Robinson, Brown, & Green, 2010).

Our final prediction regarding innovative and emerging technologies is that we believe digital textbooks will gain more attention as schools continue to try and lower costs while at the same time provide teachers and students with access to the most current and useful content (e.g., Rich, 2010). Digital textbooks could find a great deal of traction if publishers provided content in ways that could be accessed on the various mobile devices students use.

Conclusion

We predict that spending on instructional technology will remain at the same level with the possibility of a decrease in the K-12 sector until a full economic recovery has been realized. As reported in our previous review, state budgets tend to take

18–24 months to recover after an economic downturn (Griffiths, 2008). With this in mind, increased spending on instructional technology in K-12 (and possibly public higher education) could be as far off as 2012.

Based on the trends observed online learning will no doubt continue to increase in higher education and K-12. Although corporate use of e-learning was slightly down, we predict its continued use, and its increase as the economy improves and as mobile devices become more popular and versatile to the point where instruction delivered through them becomes practically *de rigueur*.

Overall, we continue to anticipate financially lean times for all sectors. However, this will not stop innovative uses of instructional technology and opportunities being available for instructional technology specialists in corporate, higher education, and K-12 environments.

References

Allen, I. A., & Seaman, J. (2010). *Learning on demand: Online education in the United States*. Babson Park, MA: Babson Survey Research Group.

Arroway, P., & Sharma, B. (2009). *EDUCAUSE core data service fiscal year 2008 summary report.* Retrieved from http://net.educause.edu/ir/library/pdf/PUB8006.pdf.

Brown, A., & Green, T. (2009). Issues and trends in instructional technology: Web 2.0, second life, and STEM share the spotlight. In M. Orey, V. J. McClendon, & R. M. Branch (Eds.), *Educational media and technology yearbook* (Vol. 34, pp. 7–23). Springer.

Brown, A., & Green, T. (2010). Issues and trends in instructional technology: Growth and maturation of web-based tools in a challenging climate; social networks gain educators' attention. In M. Orey, S. A. Jones, & R. M. Branch, (Eds.), *Educational media and technology yearbook* (Vol. 35, pp. 29–44). Springer.

Brown, A., & Green, T. (2008). Issues and trends in instructional technology: Making the most of mobility and ubiquity. In M. Orey, V. J. McClendon, & R. Branch (Eds.), *Educational media and technology yearbook* (Vol. 33). Westport, CT: Greenwood Publishing Group Libraries Unlimited.

Christensen, C. M., & Horn, M. B. (2008). How do we transform our schools. *Educationnet, 8*(3), 13–19. Retrieved from http://educationnext.org/how-do-we-transform-our-schools/.

Devaney, L. (2010, February). Economy continues to batter schools. *eSchool News*, *13*(2), 1, 38.

Education Week. (2010). Ed-tech states. *Technology Counts 2010, 29*(26), 36–37.

Elerson, N. (2010). Cliff hanger: How America's public schools continue to feel the impact of the economic downturn. American Association for School Administrators. Retrieved from http://www.aasa.org/uploadedFiles/Policy_and_Advocacy/files/CliffHangerFINAL(1).pdf.

Gray, L., Lewis, L., & Tice, P. (2009). *Educational technology in public schools: Fall 2008.* National Center for Education Statistics: U.S. Department of Education. Retrieved from http://nces.ed.gov/pubs2010/2010003.pdf.

Griffith, M. (2008). Education policy fellowship program leadership forum. Retrieved from http://ww.ads2008.org/ads/index.php.

Hightower, A. M. (2009). Tracking U.S. trends: States earn B average for policies supporting educational technology use. *Technology Counts, 28*(26), 20–33.

Johnson, L., Levine, A., & Smith, R. (2009). *The 2009 Horizon Report*. Austin, TX: The New Media Consortium.

Johnson, L., Smith, R., Levine, A., & Haywood, K. (2010). *The 2010 Horizon Report: K-12 Edition*. Austin, TX: The New Media Consortium.

Manzo, K. K. (2010a). Tracking trends: Ed-tech stats. *Technology Counts 2010, 29*(26), 36–37.

Manzo, K. K. (2010b). Tracking trends: Mobilizing the research. *Technology Counts 2010, 29*(26), 34–36.

Paradise, A., & Patel, L. (2009). *2009 state of the industry report: ASTD's annual review of trends in workplace learning and performance*. Alexandria, VA: American Society for Training & Development.

PBS. (2010). *Digitally inclined.* Retrieved from http://www.pbs.org/teachers/_files/pdf/annual-pbs-survey-report.pdf.

Project Tomorrow. (2009). *Speak up 2008.* Retrieved from http://www.tomorrow.org/SpeakUp/.

Rich, M. (February, 2010). Textbooks that professors can rewrite digitally. *The New York Times*. Retrieved from http://www.nytimes.com/2010/02/22/business/media/22textbook.html.

Rideout, V. J., Foehr, U. G., & Roberts, D. F. (2005). *Generation M: Media in the lives of 8- to 18-year-olds*. Menlo Park, CA: Henry J. Kaiser Family Foundation.

Rideout, V. J., Foehr, U. G., & Roberts, D. F. (2010). *Generation M2: Media in the lives of 8- to 18-year-olds*. Menlo Park, CA: Henry J. Kaiser Family Foundation.

Robelen, E. K. (2010). Talk bigger than federal funding for STEM projects. *Education Week, 29*(22), 8.

Robinson, L. K., Brown, A. H., & Green, T. D. (2010). *Security vs. access: Balancing safety and productivity in the digital school*. International Society for Technology in Education (ISTE): Eugene, OR.

Smith, S. D., Salaway, G., & Borreson Caruso, J. (2009). *The ECAR study of undergraduate students and information technology, 2009*. Boulder, CO: EDUCAUSE.

Staff Reporters. (2010, April 9). Survey: School budget cuts even worse next year. *eSchool News*. Retrieved from http://www.eschoolnews.com/2010/04/09/survey-school-budget-cuts-even-worse-next-year/.