Educational Media and Technology Yearbook 42

Robert Maribe Branch
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Sheng Shiang Tseng *Editors*

Educational Media and Technology Yearbook

Volume 42 (2019)

Special Section Guest Editors
V. J. McClendon
David R. Squires

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Educational Media and Technology Yearbook

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Preface

Welcome to Volume 42 of the *Educational Media and Technology Yearbook*. The audience for the *yearbook* typically consists of media and technology professionals in K–12 schools, higher education, and business contexts. We, the editors, have dedicated ourselves to providing a record of contemporary trends related to educational communications and technology. We also strive to highlight special movements that have clearly influenced the educational technology field. Thus, this edition contains a special section.

Volume 42 is the first volume of the *yearbook* in its 43-year history that includes a special section. This special section focuses on virtual reality (VR) and augmented reality (AR) research and was proposed and coordinated by the special section editors: V. J. McClendon and David R. Squires. The content focuses on AR, VR, and mixed reality, defined as an immersive multi-platform experience reality (XR). McClendon and Squires have arranged chapters that represent a sample of the broad applicability of new XR technologies for educational uses.

This volume also continues the tradition of offering topics of interest to professionals practicing in other areas of educational media and technology, as the Table of Contents demonstrates. All papers submitted to the *yearbook* are subject to rigorous editorial review, and each set of authors is provided with multiple rounds of feedback on the quality of their work and manuscripts. As in prior volumes, the assumptions underlying the chapters are:

1. Technology represents tools that act as extensions of the educator.
2. Media serve as delivery systems for educational communications.
3. Technology can be interpreted as machines and hardware, but technology also includes techniques and procedures derived from scientific research into ways to promote change in human performance.
4. Educational media and technology should be used to:

    (a) Achieve authentic learning outcomes
    (b) Situate learning tasks
    (c) Negotiate the complexities of guided learning
    (d) Facilitate the construction of knowledge

(e) Aid in the assessment of learning
(f) Support skill acquisition
(g) Facilitate diversity

The *Educational Media and Technology Yearbook* has become a standard reference in many libraries and professional collections. Examined in relation to its companion volumes of the past, it provides a valuable historical record of current ideas and developments in the field of information and communication technology. Feel free to share your perspectives about *Educational Media and Technology Yearbook* at rbranch@uga.edu.

Athens, GA, USA Robert Maribe Branch

Acknowledgments

This book presents trends and issues in instructional technology and has been supported and encouraged in different ways by many to whom we owe a debt of gratitude. We would like to acknowledge their support and contributions to this book. First, we are grateful to the special section editors, V. J. McClendon and David R. Squires, for immersive multi-platform experience reality (XR) special issues. They conducted rigorous reviews of each manuscript and provided each set of authors with multiple rounds of feedback on the quality of their work and manuscripts. We greatly appreciate the work of the book editors for their outstanding contributions. We are also thankful for the authors who submitted their manuscripts to *Educational Media and Technology Yearbook* (Vol. 42): Jennifer A. Bennett, Robert Bodily, Abbie Brown, Joshua P. Case, Robert G. Doyle, Timothy Green, Brad Hokanson, Yu-Tien Huang, Lucas J. Jensen, Hyewon Lee, V. J. McClendon, Kay Meseberg, Amie Norden, Domhnall OShaughnessy, Regina Kaplan-Rakowski, James Riggall, Colin P. Saunders, Carrie Shaw, Shu-Min Shih, David R. Squires, Sheng Shiang Tseng, Keri D. Valentine, Erin Washington, Rick West, and Scott Wilson. This book would not have been possible without their generosity in sharing their research.

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Part I
Trends and Issues in Learning, Design, and Technology

Chapter 1
Issues and Trends in Instructional Technology: Access to Mobile Technologies, Digital Content, and Online Learning Opportunities Continues as Spending on IT Remains Steady

Abbie Brown and Tim Green

We continue the tradition of reporting the past year's issues and trends that shape attitudes and approaches to instructional technology. This chapter is comprises of four sections: Overall Developments, Corporate Training and Development, Higher Education, and K-12 Settings. The trends and issues described are based on major annual reports sponsored and/or conducted by organizations including the Association for Talent Development (ATD), EDUCAUSE, Gartner Incorporated, The New Media Consortium, The Online Learning Consortium (formerly the Sloan Consortium), and Project Tomorrow. These reports require time in terms of data collection, interpretation, and publication, the shortest of which take a year to complete, and therefore reflect the issues and trends of large groups over long periods of time. For a more immediate review of trending topics in instructional technology, please refer to the authors' biweekly podcast, *Trends & Issues in Instructional Design, Educational Technology, & Learning Sciences* (Brown & Green, 2017).

Overall Developments

The reports reviewed indicate that the integration of instructional technology remains a priority in all three sectors. This is a similar theme of the past two reviews (Brown & Green, 2015, 2016). The spending on instructional technology in the

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three sectors had a slight increase over the previous year's level despite continued uncertainty of available funding in some sectors for technology purchases and training. The estimated spending for the year was $12 billion in K-12 and $11 billion in higher education (Edtech Navigator, 2017). Over the year under review, the use of instructional technology continued to provide opportunities for innovative instructional approaches to teaching and learning through the increased access to mobile devices, digital content, and unique online educational settings.

Corporate Training and Development

As with previous issues and trends chapters of this yearbook (e.g., Brown & Green, 2015; Brown & Green, 2016), we continue to track corporate application of instructional technologies primarily by referring to the *State of the Industry* (Ho, 2016) report published by the Association for Talent Development (ATD). The report is based on data collected from organizations regularly submitting annual data, BEST award winners (organizations recognized by ATD for their exceptional efforts in support of learning within the enterprise) and a consolidated group of organizations that submitted their data via an online survey. This represents data collected in 2015 from 310 business organizations; the average number of employees is 15,946 with an average payroll of $1,273,000,000 (Ho, 2016). Additional sources used in this section are the eLearning Guild's report, *2017 eLearning Salary & Compensation Report* (Vipond & Smolen, 2017), and Gartner Incorporated's annual predictions for information technology organizations and users (Panetta, 2017).

Learning Expenditures

Among businesses responding to ATD's *State of the Industry Report* survey, the average learning expenditure per employee in 2015 was $1252 (Ho, 2016). This represents a 1.9 percent increase over the previous year and continues the upward trend from the previous year's 1.7 percent increase. Organizations with less than 500 workers spent on average over $2000 per employee; those with between 500 and 9999 workers spent approximately $800; and organizations with at least 10,000 workers spent an average of $700. Overall, approximately 60 percent of direct learning expenditures went to in-house development, delivery, and administration, while 28 percent went to outsourced or external activities, with 11 percent spent on tuition reimbursement (Ho, 2016).

Instructional Content

As with the previous year, approximately one-third of corporate instructional content focuses on management and supervision, mandatory and compliance training, and professional or industry-specific training (Ho, 2016). Regulated industries

(e.g., manufacturing) provide more mandatory and compliance content, while management consulting firms and software publishers provided a greater amount of sales content (Ho, 2016; Brown & Green, 2016).

The top emerging technology trends reported by Gartner (Panetta, 2017) are artificial intelligence (AI), also referred to as machine learning; "transparently immersive experiences" that include virtual and augmented reality; and "digital platforms" that include blockchain and internet of things (IoT) networking. Each of these represents a significant shift in workforce knowledge and behavior. The authors suspect at least some portion of instruction will be devoted to each of these areas to prepare organizations and their constituents for their integration into general business practice.

Methods of Instructional Delivery

Although instructor-led, face-to-face classroom instruction continues once again to be the delivery method for 51 percent of the instruction documented in ATD's *State of the Industry* report, 41 percent of learning hours were delivered using distance and/or asynchronous technologies, a significant increase in recent years (Ho, 2016). These technologies include mobile devices, live remote classrooms, and computer-based instruction.

Instructional Designers' Professional Prospects

The 2017 edition of CNN's *Best Jobs in America* (CNN Money, 2017) has at least four instructional design-related jobs in its top 100 list: E-Learning Specialist ranks 29th; IT Training Specialist ranks 35th; Education Program Manager ranks 68th; and Training & Development Specialist ranks 71st. The *2017 US eLearning Salary & Compensation Report* (Vipond & Smolen, 2017) notes the average US-based salary for eLearning practitioners is $83,139, up 3.46 percent from the previous year. Salaries for eLearning professionals are highest in the US West Coast metropolitan areas, and in general, people with advanced degrees earn a significantly higher average salary than those with only bachelors or associate degrees (Vipond & Smolen, 2017). Following the trend of recent years, instructional design/technology positions continue to be an attractive and lucrative career choice.

Higher Education

We review higher education's instructional technology application by referring primarily to the *NMC Horizon Report: 2017 Higher Education Edition* (Adams Becker, Cummins, Davis, Freeman, Hall Geisinger, & Ananthanarayanan, 2017);

The EDUCAUSE Almanac for Faculty and Technology Survey, 2017 (EDUCAUSE, 2017a); *The EDUCAUSE Almanac for Undergraduate Student and Technology Survey, 2017* (EDUCAUSE, 2017b); *Digital Learning Compass: Distance Education Enrollment Report 2017* (Allen & Seaman, 2017a); and *Opening the Textbook: Educational Resources in U.S. Higher Education, 2015–16* (Allen & Seaman, 2017b). The EDUCAUSE data and reports presented by Allen and Seaman are based on large-scale surveys and data sets. *The Horizon Report*, sponsored by the New Media Consortium, is a synthesis of responses from an international panel of experts.

Campus Technology Support and Use of Technology for Instruction

Large-scale survey results (EDUCAUSE, 2017a) indicate the majority of faculty rate their campus's technology resources for working and learning as good or excellent (EDUCUASE). Faculty generally express confidence in their institution's ability to safeguard student information and research data, and over 75 percent of faculty make use of a learning management system (LMS) to post their course syllabi, provide content information (e.g., handouts), and administer grades (EDUCAUSE). Faculty report owning smartphones (97%), laptops (69%), tablets (65%), and desktop (48%) computing devices (EDUCAUSE). Roughly half of faculty respondents feel they receive adequate information technology (IT) support for research and scholarship.

Students continue to bring more Internet-capable device with them to campus; 98 percent of undergraduate survey respondents reported owning at least two or three Internet-capable devices (EDUCAUSE, 2017b). Ninety-five percent of students surveyed own a laptop, and 97 percent own a smartphone (EDUCAUSE). About half of the students surveyed rate their school's network performance as good or excellent, giving mixed reviews for reliability of access to Wi-Fi in instructional spaces, student housing, and outdoor spaces.

Learning Online Allen and Seaman (2017) report continued growth in online learning. The growth rate in 2015 was 3.9 percent, higher than reported the previous two years; over six million students took at least one distance course. Almost 30 percent of all students in higher education take at least one distance course; the vast majority of these are undergraduates (Allen & Seaman). Public colleges and universities continue to provide the greatest amount of distance education. Private non-profit institutions are providing an increased amount, while private for-profit institutions are seeing declines in enrollment (Allen & Seaman, 2017).

While a significant majority of faculty feel online learning will make higher education available to a larger population, roughly half do not support online degree programs, and only 22% felt it helped students learn more effectively (EDUCAUSE, 2017a). The *Horizon Report* posits online, mobile, and blended learning as "foregone

conclusions" for which institutions will need integration strategies (Adams Becker et al., 2017) to survive.

Blended Learning The combination of face-to-face instruction with online learning continues to increase in popularity. Seventy-one percent of faculty surveyed prefer to teach using a blended learning approach (EDUCAUSE, 2017a), and 79 percent of undergraduate students surveyed prefer this approach (EDUCAUSE, 2017b).

Faculty Use of Technology for Instruction

Faculty continue to embrace digital technologies and modern classroom tools such as LMSs and look for ways to teach using technology innovative and creative ways (EDUCAUSE, 2017a). Most faculty respondents indicate they encourage the use of tablets and laptops in the classroom, though it must be noted that 52 percent of the respondents report they ban or discourage student use of smartphones in their classrooms (EDUCAUSE, 2017a).

Faculty are beginning to look more closely at open educational resources (OERs), the vast majority of which are available through computer networks. Allen and Seaman (2016) report that OER interest has increased but that it still remains low; only around a quarter of faculty respondents indicated awareness of OERs. Barriers to use of OERs are for the most part a lack of resources in the subject area and the lack of a comprehensive list of possible resources (Allen & Seaman, 2016). EDUCAUSE (2017a), however, reports that 64 percent of faculty respondents support OERs as an instructional approach.

Open educational resources have been in the news over the past year (Brown & Green, 2017) with the US Department of Education advocating greater OER use through its #GoOpen campaign (Office of Educational Technology, ND), which addresses K-12 schools but has implications for all levels of public education. In the US, OERs have become particularly interesting to faculty as they grapple with assigning expensive, traditional textbooks. Faculty report dissatisfaction with the high cost of textbooks, yet they are the most commonly used course resources (Allen & Seaman, 2016). The authors continue to view OERs as promising instructional resources developed by both faculty and instructional design/technology support staff.

Student Use of Technology for Learning

As noted earlier in this section, students are bringing to campus a variety of networked computing devices such as laptops and smartphones, and to a lesser extent tablets (EDUCAUSE, 2017b). Seventy-eight percent of students surveyed are

connecting two or three devices to the campus network simultaneously (EDUCAUSE).

Forty-one percent of undergraduate survey respondents report using a smartphone in most or all of their courses, and 47 percent of those students view smartphones as important to academic success (EDUCAUSE, 2017b). The most common course-related uses for smartphones include communicating with other students, communicating with instructors, taking photos of class activities and resources, and checking grades (EDUCUASE).

Sixty-eight percent of students surveyed think their instructors use technology adequately for course instruction. Students report that 35% of their instructors encourage the use of student devices during class for learning purposes, and 62% would like instructors to provide free, web-based course materials (EDUCAUSE, 2017b). Seventy-nine percent of students responding prefer blended learning environments (EDUCAUSE).

Compared to previous years (e.g., Brown & Green, 2016), students are bringing even more computing tools with them to campus and hoping for their greater use for instruction. Undergraduate students, in particular, would like to see more use of web-based resources and blended learning environments.

K-12 Education

We have primarily consulted the annual reports of Education Week, the New Media Consortium, and Project Tomorrow as we did with previous issues and trends chapters (e.g., Brown & Green, 2016; Brown & Green, 2015). The major reports we accessed were *Technology Counts 2017: Classroom Technology: Where Schools Stand* (Education Week, 2017a), *The NMC/CoSN Horizon Report: 2017 K-12 Edition* (Freeman, Adams Becker, Cummins, Davis, & Hall Giesinger, 2017), and *Trends in Digital Learning 2017* (Project Tomorrow & Blackboard, 2017).

Technology Counts 2017 is the 18th edition of the report published by *Education Week*. The annual report focuses the use of educational technology in K-12 schools. Although the report has shifted away from providing an overall state of educational technology and funding of educational technology state-by-state, this year's report did report on the general state of classroom technology. The New Media Consortium and the Consortium for School Networking's (CoSN) *Horizon Report* examines emerging technologies and practices in K-12 that are likely to gain use traction over the next year to five years. The Project Tomorrow and Blackboard report is the most recent published from the annual survey research conducted by Project Tomorrow that focuses on students, parents, teachers, and administrator perceptions about and use of educational technology. The 2017 Project Tomorrow and Blackboard (2017) digital learning trends report was an analysis of data collected from 514,000 educators, students, parents, and community members in the United States. The report focused on "the readiness of teachers to use digital tools to transform teaching and learning" (p. 1). We outline the major findings from this report later in this section.

Funding for Technology

Determining specific levels of funding in K-12 is historically problematic because of various reporting procedures of States and Federal agencies. It was estimated that approximately $12 billion was spent on IT (specifically hardware, software, and support) in K-12 during 2017 (Edtech Navigator, 2017). As of the writing of this review, the proposed Federal budget (US Department of Education, 2017) included requests for funding for twenty-first-century community learning centers ($1 billion continued funding; although speculation is that this will be eliminated in 2018), Computer Science for All ($200 million new funding), and Computer Science for All Development Grants ($100 million new funding). These Federal programs were in addition to the monies spent on instructional technology by the States.

Technology Availability and Use in Classrooms

Instructional technology continues to make its way into classrooms. As we reported in last year's review (Brown & Green, 2016), 44% of districts expected budget increases for spending on hardware and 32% expected increases in software purchases (EdNet Insights, 2016). According to EdNet Insight, the top-cited technology initiative was wireless networks (71% of districts surveyed) followed by student data security and privacy (65%), online assessment readiness (63%), data-driven decision making (58%), Chromebooks (55%), and one-to-one computing (53%). Mobile device purchase plans by grade level were laptops and Chromebooks (50% districts surveyed) in grades 9–12, Chromebooks in grades 6–8 (56%), Chromebooks in 3–5 (46%), and tablets in K-2 (54%). These data are corroborated by Education Week (2017b) who reported that, "The number of laptops, tablets, netbooks, and Chromebooks shipped annually to US K-12 schools grew by 363 percent over the past seven years, from just over 3 million devices in 2010 to almost 14 million this year" (para. 8). This growth is predicted to continue.

With increased access to classroom technology there has also been an increase in use of this technology in classrooms. Education Week (2017a) cited a National Assessment of Educational Progress Report that indicated an increase in the percentage of fourth and eighth grade students who indicated using a computer during math class at least one time every few weeks. The increase was 19% for fourth grade students and 26% for eighth grade students over the past decade. The same report indicated that over this same decade, the use of computers in math by fourth graders for critical thinking activities has decreased, while the use for drill and practice has increased. This use is similar in other content areas.

In addition to increased access to hardware and software, more schools have access to high-speed Internet connections. According to Education Superhighway (2017), 88% of school districts have Internet connectivity of 100kps per student. This is up from 30% of school districts in 2013. The report predicts that by 2020, 100% of districts will have 100kps per student access.

Teacher Use of Technology

Data from the *Trends in Digital Learning* (Project Tomorrow & Blackboard, 2017) indicate that teachers' use of digital content is on the rise. The report states that over the past three years, the use of online videos for instruction has increased by 39% (p. 4). There was a 14% increase in the use of online curriculum (p. 4). Over the past three years, "teachers have embraced classroom cloud based tools such as G Suite for Education and Office 365" (p. 4). In addition to using instructional technology with students, teachers reported using technology for professional activities such as using digital tools to create student investigations (30%), create videos or labs for their students (18%), maintain a class blog or discussion board for their students to share ideas (14%), and use Twitter as a professional learning tool (13%). Despite increased access of instructional technology in classrooms, this has not necessarily resulted in been better use (Education Week, 2017c). Education Week reported data from the National Assessment of Educational Progress that indicated that eighth grade math students "more commonly used classroom computers for 'passive' activities such as practice or review, than for 'active' purposes, such as researching a math topic" (Education Week, 2017c, para. 1).

According to data from *Technology Counts 2017* (Education Week, 2017b) and results from *Trends in Digital Learning* (Project Tomorrow & Blackboard, 2017), the percentage of teachers who indicate receiving formal training on effective use of the technology has remained level over the past year. Increased numbers of teachers reported engaging in their own professional development—especially through online opportunities such as engaging in social media, participating in a MOOC, watching online videos (e.g., TEDTalk), and taken an online/virtual course (Project Tomorrow & Blackboard, 2017).

Emerging Trends to Watch in K-12

In last year's review (Brown & Green, 2016), data from the reports we reviewed highlighted two significant trends—online learning and personalized learning. We reported that over 462,000 students engaged in semester-long courses during the 2014–2015 school year (Gemin, Pape, Vashaw, & Watson, 2015). We also reported that, "Two-thirds of school principals who have implemented blended learning models at their school say the learning process for each student is more personalized because of that implementation" (Project Tomorrow & Blackboard, 2016, p. 3). Reports we examined for this current review indicate that these two trends are likely to continue. In addition to these trends, data from the reports we reviewed point to emerging trends that are having an impact or should have an impact on K-12 teaching and learning in the next five years. The trends to watch are makerspaces, computer science (e.g., programming and coding), robotics, augmented reality, virtual reality, artificial intelligence and deep learning, and the Internet of Things.

Conclusion

Over the review period, there was continued, ubiquitous use of instructional technology in corporate training, higher education, and K-12 settings. Digital content (commercially created or instructor/teacher created) being used across all three settings remained a trend as did the increased use of mobile devices. Online learning opportunity during this review period was evident among corporate training, higher education, and K-12. Spending on instructional technology in all three sectors remained relatively steady despite historical uncertainties brought on by state and federal budgets. Access to instructional technology remained high in all three sectors. Online learning opportunities continued to trend in higher education and in K-12.

All sectors examined, namely, corporate, higher education, and K-12 continue to devote significant resources to instructional technology, and job prospects for instructional designers, training and development specialists, and eLearning practitioners remain positive.

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Chapter 2
Second Thoughts: Understanding the Impact and Appropriate Use and Non-use of Technologies

Brad Hokanson and Amie Norden

Introduction

Trends are often narrowly described in educational technology as those that directly affect our domain, such as the use of hardware or software advances or the shift to mobile computing. In a larger sense, trends also describe changes in how we live, how society changes, and the resulting tides of human life. Trends are inclinations or drifts in a particular direction, the winds of change in society. These large, subtle trends are often illustrated or caused by our relationship with technology on a personal or societal level. They can and will have an impact on education, on educational technology, and on media use, and they must be addressed in our educational efforts. Now the question becomes, what are you turning off? What is the value of consciously "unplugging" from technologies? How is learning different away from digital technology?

The Challenge

Over the last 10 years, technologies have transformed the learning landscape at a pace and scale that make it nearly impossible to remember what learning was like "before the Internet." As Neil Postman wrote, "… new technologies change what we mean by knowing and truth; they alter those deeply embedded habits of thought

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which give to a culture its sense of what the world is like a sense of what is the natural order of things, of what is reasonable, and of what is necessary, of what is inevitable, of what is real" (1992).

During the last decade, online learning has experienced consistent and increasing growth. The latest Babson survey reports that over 30 percent of higher education students are taking at least one distance education course (2017). Online learning and distance education are no longer curiosities but are firmly entrenched with their technological "feet" firmly planted on the inner courtyard of higher education institutions.

Presently, we have built and enthusiastically embraced a range of technologies that shape our work, our communication, and our thinking. They are not merely conveyors of information but change our thinking and habits. The predictions of McLuhan regarding earlier technologies are still applicable and perhaps even more evident: "The medium is the message because it is the medium that shapes and controls the scale and form of human association and action" (McLuhan, 1964, p. 9).

We find ourselves grappling with the unintended consequences of the creations of Facebook, artificial intelligence, human genetic engineering, and the predominance of technology in education. The unforeseen impacts of mobile computing and Internet access are being widely recognized. Technology has even been described, in some instances, as an addiction: a monster of our own making. "The question is: Will we sail through safely or will we, like Victor Frankenstein, witness 'destruction and infallible misery'?" (Biggle, 2017). Questions and doubts about the assumed value of technology are like a rising tide.

For example, the shift to online shopping is being blamed for the decline of brick-and-mortar stores and shopping malls. Is the same type of phenomenon occurring in the case of universities? Clayton Christensen and Eyring (2011) of Harvard's Business School described how universities can reduce their infrastructure burden through online learning, which is less dependent on brick-and-mortar buildings. Very recently, the University of Maine announced plans to demolish some buildings and reduce its brick-and-mortar footprint due to increased online courses. Per Postman (1992): "New technologies compete with old ones--for time, for attention, for money, for prestige, but mostly for dominance of their world view" (p. 16).

The newest trend in educational technology is not seen in the media coverage of the newest and latest gadget or app, nor is it heavily marketed software or hardware. Paradoxically enough, it may or may not have been observed at the most recent Consumer Electronics Show, but it could have been present. It is not augmented reality, big data, mobile learning, gamification, or personalized instruction. In fact, it is not online at all: it is "non-line." It is not the newest turn on, but rather the act of turning off.

Individuals are reacting to the overabundance of technology in their lives by turning things off, killing their social media accounts, or seeking live music. This could be described as a generalized reaction to the over use of technology in our lives. A recognition of this is evident in our own personal experiences: the proof is in our actions.

We all may have second thoughts about digital technologies in our own lives, looking for more in-person conversations, for quiet time to read on airplane flights, and going so far as installing software to block habitual use of browsers, email, and social media. This trend may be a reaction to the over-selling of social media and Internet technology. Social media growth has hesitated, privacy concerns, with people leaving social media, and hacking/manipulation by digital agents in every corner of the globe.

Mobile phones have had a most significant effect. The ubiquity of mobile technology is being recognized as detrimental, bringing new rules, social norms, and interpersonal connections. Phone-free family dinners are highlighted in television ads, and movie theatres make announcements about silencing phones. Even undergraduates have observed the social awkwardness of everyone in a small group pulling out their phones when the conversation lags, a situation known as "phubbing" or the act of snubbing someone in favor of your phone. This is a trend we see and live.

The art of conversation has suffered; as in-person has languished, verbally chatting via mobile phone has flourished. Carrying on a conversation in person is an unusual skill these days. This illustrates the de-skilling that has occurred in ourselves and our students. In-person experiences are less real and more mediated. They are not "real" unless posted on Instagram or Facebook.

People are actively making choices and limiting their interaction with media, limiting use and activity. This will also affect the effectiveness of digital technology in higher education. It can also be seen in the choices faculty and students make with regard to learning.

Recent NMC Horizon Reports on technological trends are generally accurate, but they deal mostly with hardware and not with some of the social issues of the field. McLuhan's contention was that new technologies themselves are not the most important aspect of their adoption; the most important is the change in how we act and think. They change what is possible and how it is done.

Education

Organizations, faculty, and students all weigh educational access choices in different ways. Universities and colleges often make pragmatic choices regarding online education with a focus on geographical access, facility limits, and tuition revenue. For example, the University of Central Florida has cited online courses as a way to alleviate campus parking problems (Zaragoza, 2010).

Choices *for* online education are often made on the basis of cost, convenience, scale, and repeatability, but not on the basis of quality or engagement. The choices organizations make to operate and in the choices of individuals are administrative guiding the future use of digital technology. On the other hand, ensuring the qualitative aspects of student learning is often vested with the faculty or instructional designers. The premise is that online or hybrid courses should be comparable to in-person sessions.

In 1999, Ertmer published an examination of how educational technology had been adopted and used in education. They characterized two forms of impediments to educational technology, termed first- and second-order obstacles. First-order obstacles were objective: costs, hardware limitations, and the like. Second-order obstacles were more subjective; many faculty chose not to teach online or to integrate technology in their courses. An assumption was that as the faculty evolved, there would be greater use of technology in teaching. It continues to be the human choices that most strongly influence the use of educational technology, and not the specific technologies.

The expression of agency continues to be evident in education in how faculty chose to use, promote, and explore educational technology. Notably, in a recent study by EDUCAUSE Center for Analysis and Research (Pomerantz & Brooks, 2017), even skilled and experienced faculty were choosing *not* to fully base their teaching in the online world. They are preferring a balance between the classroom and the virtual space, even while the use of online education continues to grow. They are beginning to be mindful of the use of technology in teaching.

Most current faculty have the capability for online teaching, and many are choosing to not teach online, but are selecting technology that is appropriate. There remains a desire for in-person communication and engagement, a sentiment often shared by our students. There remains a question among faculty: Would you hire a candidate for a faculty position who has earned an online degree? Is that a consistent choice even with equivalent qualifications? If online communication is so effective, why is it that everyone still conducts face-to-face interviews?

Learning, of course, is more than the distribution and retention of information. The learning process involves all sorts of affective components, not the least of which is the social interactions that occur in-person and on campus. The social contract of the classroom is known to be an effective incentive to improving learning.

Effectiveness

Unfortunately, in many cases, students take online classes for less than positive reasons. They are making choices influenced by convenience, in not having to travel to class and in having a more flexible schedule. They may also be selecting online courses to avoid the structure and interaction of an in-person class, or they may choose an online course because it seems an easier and less effortful option. By this choice, certain affordances of face-to-face courses are lost: the engagement and social contract of attending a class with others, the commitment to a given regimen, and the richer information of a personal experience.

While many residential colleges tout the value of an on-campus and in-person education, there are changes in the online world that illustrate some of the same values. Other educational institutions are making the choice to *not* accept the axiom "learning at any time, any place" by convening online classes at a specific time.

Philosophically, this could mean a recognition of the value of a group engagement at a common time, the useful pull of a social contract, and the immediate and rich nature of the full class that is not met (literally or figuratively) through a chat room. Colleges are placing more emphasis on the full college experience and on campus life. They argue for face-to-face classes as having more *presence.* There is recognition of the value of real experiences in making, travel, and faculty-student interaction.

In perhaps the most telling example, the Harvard Business School has begun to hold its online courses in a synchronous manner. They have recognized the value of holding class and discussion at a particular time, and the translation of their well-known Socratic process necessitates a live performance. It is "learning at any time, any place" but a more controlled and structured event called HBSX (Harvard Business School, 2018).

Instructional faculty do recognize that online classes may not be as effective at motivating and keeping students connected and engaged. There is a lack of connectedness with solely online offerings. Teaching online, faculty do not engage with students as much; it is still a skill that needs developing in many instructors. Assignments must be built to connect with them as a person and between learners, and these assignments need to take advantage of the richness of physical interaction. In the online class, it is just the learner and the screen, but it can be so much more.

Directions

What lessons can we learn from the new reticence toward online tools and ubiquitous computing? There are efforts that those involved in educational technology can make given the recognition that technology use is being challenged and restrained.

First, instructional design must be more mindful in the selection of technology in education, as opposed to the "more is better" approach. The inherent affordances, good and bad, between online, hybrid, and non-line must be recognized. Instructional design must also avoid the tendency to use single media for learning and accept a broader definition of "hybrid."

Second, the value of synchronous education needs to be recognized, whether as a broadcast model or for live, interactive learning. Newer technologies have the capability to engage learners in both a synchronous and an asynchronous manner.

Finally, more focus must be on active, grounded and embodied education with learners experiencing, engaging, and interacting in-person, with results uploaded through technology. Digital images and videos can capture complex performances and can present, for example, mold growth in remote student biology experiments. Music or dance lessons can be synchronous around the world as they are business meetings. And the exploration of the Arctic or the Amazon can be connected with students elsewhere, or the students can do the traveling independently and report their activities online as well.

How we choose to use and to not use the technologies at hand can create a richer online educational experience, as well as a broad range of possible learning experiences for our students.

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Chapter 3
Enhancing Student Critical Literacy Through Social Annotations

Yu-Tien Huang, Shu-Min Shih, and Sheng Shiang Tseng

Introduction

The rapid growth of the internet and other Information and Communication Technologies (ICTs), such as blogs, wikis, search engines, and social media, has changed the meaning and nature of literacy. One of the new literacy skills that students have to develop is critical literacy (Abdel Halim, 2011; Britt & Gabrys, 2001; Leu et al., 2011; Yang, Gamble, Hung, & Lin, 2013). Critical literacy refers to the skills to (a) locate the most useful information needed to understand text (Leu et al., 2011), (b) critically evaluate the accuracy, reliability, and bias of text information (Sanchez, Wiley, & Goldman, 2006), and (c) synthesize text information (Jenkins, 2006). Students equipped with critical literacy are active readers who can analyze a text, recognize controversial ideas, offer critiques and arguments, and judge and confirm that what they read is accurate, significant, and reliable (Jaffar, 2004; Medina & Pilonieta, 2006; Mayfield, 1997; Shihab, 2011). However, English as a Foreign Language (EFL) students in Asian countries such as China, Taiwan, and Korea were reported to lack critical literacy skill (Huang, 2013; Liu, 2006; Lo, Yeh, & Sung, 2013). These EFL students are typically passive readers and tend to comprehend passages in English texts by using memorization. Owing to their low critical literacy, EFL students may encounter difficulties in locating essential information, synthesizing information, and critically evaluating the information in foreign language reading (Huang, 2013; Lo et al., 2013). Developing students' critical literacy skill has become one of the essential foci in reading instruction in recent years.

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