Educational Media and Technology Yearbook 43

Robert Maribe Branch
Hyewon Lee
Sheng-Shiang Tseng *Editors*

Educational Media and Technology Yearbook

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Preface

Welcome to Volume 43 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. The *Yearbook* editors have dedicated themselves to providing a record of contemporary trends related to educational communications and technology. They also strive to highlight special movements that have clearly influenced the educational technology field.

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 as follows:

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. That 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 the *Educational Media and Technology Yearbook* with the editor at rbranch@uga.edu.

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

Issues and Trends in Instructional Technology: Increased Engagement with Distance Learning Informs Live Instruction and Classroom Design

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 comprised 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, The eLearning Guild, Gartner Incorporated, Inside Higher Ed and Gallup, the Babson Survey Research Group, Education Week, 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, 2020).

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1 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, 2018, 2019). Spending on instructional technology in the three sectors increased over the previous year. The estimated spending for the year was slightly over $13 billion in K-12 with $8.4 billion of this amount spent on software (Davis, 2019; J-Pal North America, 2019). The total spending on state and local education instructional technology was estimated at $28 billion (GovTech Navigator, 2019). During the year under review, the use of instructional technology supported innovative design and delivery of teaching and learning with continued emphasis on the use of mobile devices and access to digital content (including open educational resources). Evident across all three sectors was the continued use of online delivery methods for instruction and training.

2 Corporate Training and Development

As with previous issues and trends chapters of this yearbook (e.g., Brown & Green, 2018, 2019), we continue to track corporate application of instructional technologies primarily by referring to the *State of the Industry* (Ho, 2019) 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 2018 from 318 business organizations, 59 of which are ATD Best Award winners; the average number of employees is 14,406 (Ho, 2019). Additional sources used in this section are The eLearning Guild's *2018 Global eLearning Salary & Compensation Report* (Smolen, 2018), the U.S. Bureau of Statistics' *Occupational Outlook Handbook* (2019), and Gartner Incorporated's strategic technology trends report (Cearley & Burke, 2019).

2.1 Learning Expenditures

Among business organizations responding to ATD's *State of the Industry Report* survey, the average learning expenditure in 2018 was $1299 per employee (Ho, 2019). This represents a slight increase over the previous year and continues the upward trend from previous years. On average, this amount represents just under 4% of the organization's payroll and a little over 1% of its annual revenue (Ho, 2019). Expenditures for instructional development, delivery, and administration

were divided among direct learning expenditures (62%), outsource learning suppliers (27%), and tuition reimbursement (11%) (Ho, 2019). This is similar to previous years' expenditures (Brown & Green, 2019).

When examining learning costs per person, company size is an important consideration. Large companies with 10,000 employees or more had an average direct learning expenditure of $707, while companies with fewer than 500 employees paid $2412. Larger companies reported workers engaged in considerably more hours of learning; the economies of scale work in favor of the larger organizations that can spread development and delivery costs (Ho, 2019).

2.2 Instructional Content

According to ATD's *State of the Industry Report*, the three most common instructional content areas developed and delivered in 2018 were related to management and supervision instruction (14%), mandatory and compliance training (13%), and interpersonal skill instruction (10%) (Ho, 2019); this is similar to previous years (Brown & Green, 2019). In 2018, ATD and LinkedIn both noted the need for interpersonal skill instruction in particular (Ho, 2019).

In their *Gartner Trend Insight Report*, Cearley and Burke (2019) describe the impact of artificial intelligence (AI), the Internet of Things (IoT), immersive digital experiences (such as virtual reality and augmented reality), and the increasingly seamless blending of digital and "real-world" activities on businesses. The authors note from a review of articles collected for their podcast series (Brown & Green, 2020) that a significant portion of instruction was devoted to each of these areas to prepare organizations and their constituents for their integration into general business practice.

2.3 Methods of Instructional Delivery

Instructor-led, face-to-face classroom instruction was the delivery method for 54% of the instructions documented in ATD's most recent *State of the Industry* report. This is consistent with the past few years (Brown & Green, 2019; Ho, 2019). Live and asynchronous, virtual classrooms were used for 11% of the documented instruction. About 22% of documented instruction was delivered as self-paced, online learning or eLearning (Ho, 2019). Overall, this indicates that the vast majority of instruction was delivered by a live facilitator, though a smaller but significant amount of instruction was delivered as eLearning. Ho's commentary (2019) emphasizes the importance of the live facilitator as a constant element in corporate instructional delivery.

2.4 Instructional Designers' Professional Prospects

According to The eLearning Guild's latest salary and compensation report, the average eLearning salary increased approximately 2% in 2018 from the previous year (Smolen, 2018). Globally, annual salaries range widely, between $84,421 in the United States (the highest ever reported) and $38,534 in India (Smolen, 2018).

In its *Occupational Outlook Handbook* (2019), the United States Office of Occupational Statistics and Employment Projections lists Instructional Coordinators and Training and Development Specialists as occupation categories encompassing instructional design in school and corporate settings, respectively. School positions typically require a master's degree and the median salary is $64,450; corporate positions typically require a bachelor's degree and the median salary is $60,870. According to Recruiter.com (2020), the instructional design/technology position vacancies in the United States have increased over 20% since 2004 and are expected to continue going up. Following the trend of recent years (Brown & Green, 2019), instructional design/technology positions have continued to be an attractive and lucrative career choice in the corporate sector.

3 Higher Education

We review higher education's instructional technology application by referring primarily to the *EDUCAUSE Horizon Report: 2019 Higher Education Edition* (Alexander et al., 2019); the Babson Survey Research Group's *Grade Increase: Tracking Distance Education in the United States* (Seaman, Allen, & Seaman, 2018); the EDUCAUSE Center for Analysis and Research (ECAR) studies, *ECAR Study of Undergraduate Students and Information Technology, 2019* (Gierdowski, 2019), and *Higher Education's 2019 Trend Watch and Top 10 Strategic Technologies* (Brooks & McCormack, 2019); and the *2019 Survey of Faculty Attitudes on Technology: A Study by Inside Higher Ed and Gallup* (Jaschik & Lederman, 2019). The EDUCAUSE and ECAR data, the Inside Higher Ed and Gallup study, and the Babson Research Group's report are based on large-scale survey results. *The Horizon Report* is a synthesis of responses from an international panel of experts.

3.1 Technology on Campus, in Classrooms, and Online

The *Horizon Report*: *Higher Education Edition* (Alexander et al., 2019), *Higher Education's Trend Watch and Top 10 Strategic Strategies* (Brooks & McCormack, 2019), and the *ECAR Study of Undergraduate Students and Information Technology* (Gierdowski, 2019) identify on-campus learning spaces as both critically important and an opportunity to incorporate technology in innovative ways. The ECAR

undergraduate study found a large majority of students (70%) to prefer face-to-face learning environments (Gierdowski, 2019). The Horizon Report describes redesigning learning spaces as a short-term trend accelerating technology adoption (Alexander et al., 2019), while Brooks and McCormack (2019) report that private and public doctoral institutions are engaged in creating "active learning classrooms" (ACLs) which make use of movable furniture, large monitor displays, and other tools to support innovative instructional practice.

The past year's discussions regarding redesigning learning spaces were not limited to physical classrooms on campus. Virtual reality (VR), augmented reality (AR), and the umbrella term for both extended reality (XR) received a great deal of attention from digital learning leaders. The Horizon Report (Alexander et al., 2019) notes VR, AR, and XR as a short-term trend accelerating technology adoption similar to that of physical ACLs.

The ECAR study of undergraduates indicates that students continue to bring a variety of their own devices to campus. Over 60% of the students responding reported that their instructors use technology in their teaching, though it is not always with students' own devices (Gierdowski, 2019).

The increasing complexity and diversity of digital security threats are noted by Brooks and McCormack (2019) and it was a trend regularly reported by the authors over the past year (Brown & Green, 2020). Security concerns influence who is provided access to institutional networks and what devices are allowed to operate within those networks. These concerns therefore guided how technologies were employed for instructional purposes.

It must also be noted that the credentialing initiatives, referred to within the Horizon Report as "modularized and disaggregated degrees," were a topic of interest over the past year (Alexander et al., 2019; Brooks & McCormack, 2019; Brown & Green, 2020). The discussion and initiatives are focused on providing shorter, more flexible learning experiences that are credit bearing or otherwise validated.

3.2 Faculty Use of Technology for Instruction

The 2019 Survey of Faculty Attitudes on Technology (Jaschik & Lederman, 2019) found 35% of responding faculty to be identified as "early adopters" of new educational technologies. The study also reports a significant increase in faculty support for increased use of educational technologies (up 7% from the previous year). There was a significant increase in the number of faculty teaching blended, hybrid, or completely online courses as reported by Jaschik and Lederman (2019) as well as Seaman et al. (2018), though the vast majority of faculty make use of their institution's learning management system (LMS) primarily to share syllabus information and record grades (Jaschik & Lederman, 2019).

3.3 Teaching and Learning Online

Seaman et al. (2018) reported continued distance education enrollment increases in spite of general enrollment declines at higher education institutions and the issues surrounding the largest for-profit distance education institutions. More students studying in traditional campus settings have enrolled in online courses and the majority of online students are local; more than half took distance courses in combination with on-campus courses (Seaman et al., 2018).

Faculty are increasingly engaged in teaching online (Jaschik & Lederman, 2019) and the vast majority report that the experience has improved their teaching overall. Thirty-nine percent of faculty responding to the *Faculty Attitudes on Technology* survey reported working with an instructional designer and over 90% reported the experience as a good one (Jaschik & Lederman, 2019).

3.4 Student Use of Technology for Learning

As noted earlier in this section, students are bringing to campus a variety of networked computing devices (Gierdowski, 2019). Students also report finding online tools provided by their institutions that help with things like degree planning and auditing, as well as self-service referral systems for social and community resources to be increasingly useful (Gierdowski, 2019).

While undergraduate students generally prefer live activities such as lectures, labs, and conferences, they view technology as a means to extend their engagement with instructors and classmates. Blended learning designs are considered a trend driving technology adoption in higher education settings (Alexander et al., 2019) and the majority of students surveyed prefer forms of blended learning in which networked technologies facilitate collaboration, assignment submission, peer review, and question and answer (Gierdowski, 2019).

4 K-12 Education

We predominantly consult annual reports published by the Digital Learning Collaborative, Education Week, National Education Policy Center, and Project Tomorrow. The major reports we accessed were by the Digital Learning Collaborative, Education Week, National Education Policy Center, and Project Tomorrow. The major reports we accessed were *Keeping Pace with Digital Learning Report* (Digital Learning Collaborative, 2019); *Technology Counts 2019: Educators Tear Through the Hype* (Education Week, 2019); and *Digital Learning: Peril or Promise for Our K-12 Students* (Evans, 2019). *Technology Counts 2019* is the 20th edition of the report published by *Education Week*. This annual report focuses on the

use of educational technology in K-12 schools. *Digital Learning: Peril or Promise for Our K-12 Students* is the most recent report published from the annual Speak Up Survey conducted by Project Tomorrow. This report focuses on students, parents, teachers, and administrator perceptions about and use of educational technology. The report was an analysis of data collected from 343,500 K-12 educators, students, parents, and administrators in the United States. *Keeping Pace with Digital Learning Report* is an annual report (except for 2017 and 2018) on the state of digital learning in K-12 in the United States.

4.1 Technology Availability and Use in Classrooms

The estimated spending for the year was slightly over $13 billion in K-12 with $8.4 billion of this amount spent on software (Davis, 2019; J-Pal North America, 2019). This is an increase from what was reported in our last review when we reported that approximately $12 billion was spent on instructional technology in K-12 (Brown & Green, 2019). Spending on instructional technology has continued to increase and the use of instructional technology continues to remain prevalent in K-12 classrooms.

According to the *State of the States Report* by Education Superhighway (2019), 99% of school districts have Internet access at the minimum of 100 kpbs. They reported that 46.3 million students have access at this speed. This is an increase of 1.6 million from 2018 to 2019 (p. 4). In addition to the students, there were 2.8 million teachers connected. The report also indicated that the median cost of Internet access has significantly decreased since 2013 from $22 per Mpbs to $2.24 per Mpbs in 2019 (p. 8).

The *State of the States Report* (2019) indicated, "Since 2015, students with access to digital learning in every classroom every day has grown" (p. 13). This has resulted in currently 94% of school districts with at least half of their classrooms using digital learning every week. According to the report, "90% of school districts are providing software, digital curriculum and devices specifically to encourage personalized learning and more than two-thirds of schools have dedicated instructional technologists" (p. 14). The report also indicates that about half of the teachers surveyed indicated that they were incorporating coding and over 50% were using video-based content (p. 14). This data is similar to the data reported by Gallup (2019) in the *Educational Technology Use in Schools Report*, which indicated that 65% of K-12 teachers surveyed (3210) indicated using digital learning tools every day to teach while 22% indicated using them a few days a week and 13% used these tools one or fewer times per week (p. 9).

Students have access to a variety of digital learning tools using various computing devices. The *Educational Technology Use in Schools Report* (Gallup, Inc, 2019) indicated that the 2696 US students surveyed indicated, "they use devices in a library or other room (41%), are given their own device to use (41%) or access devices on carts that are shared across classrooms (38%). About one-third say their classrooms are equipped with devices and 23% say they use their own personal

device" (p. 9). The use of personal devices in K-12 schools by students surveyed was reported as 32% of high school students indicated that they are allowed to use personal devices "often or always to learn at school, compared with 15% of middle school students and 7% of elementary school students surveyed" (p. 9).

According to the Project Tomorrow's Speak Up Report, *Digital Learning: Peril or Promise for Our K-12 Students* (Evans, 2019), "students are likely to use multiple devices to support class-based learning" (para. 9). The report indicated, "The type of computing device varies by grade level with the youngest students more likely to use a tablet while their older siblings use a Chromebook type appliance" (para. 8). Sixty-four percent of students surveyed indicated having access to a Chromebook—an increase of 138% in student access to Chromebooks over the past 4 years (para. 7). Despite the use of digital technologies in K-12 classrooms, emerging technologies may not be used as widely as would be expected. The report indicated, "Other emerging technologies that are popular in media or at education technology conferences such as augmented reality, virtual reality environments or artificial intelligence have been implemented to date by less than 10% of schools" (para. 7).

In addition to instructional technology use in physical classrooms, the use of technology to support online schools increased. The *Keeping Pace with Digital Learning Report: Snapshot 2019 – A Review of K-12 Online, Blended, and Digital Learning Report* (Digital Learning Collaborative, 2019) indicates, "Enrollments in online schools that serve students across entire states are growing slowly but steadily, at a rate of about 6% per year" (p.). The report estimated that 310,000 students are enrolled in these schools across 32 states. Additionally, "State virtual schools (generally, supplemental online course programs that are state-supported) operate in 23 states, and serve about 420,000 students with almost a million online course enrollments" (Digital Learning Collaborative, 2019, p. 5).

4.2 Trends to Watch in K-12

We indicated in last year's review (Brown & Green, 2019) that data from reports we reviewed indicated that trends to watch were makerspaces, computer science (e.g., programming and coding), robotics, augmented reality, virtual reality, artificial intelligence and deep learning, and the Internet of Things. These trends were in addition to the continued trends of online learning and personalized learning that we discussed in our 2018 review (Brown & Green, 2018). For our current review, reports we reviewed along with our observations made on our biweekly podcast on trends and issues in instructional design, educational technology, and learning sciences (Brown & Green, 2020) indicate that online learning, mobile devices, mixed reality, open educational resources, cybersecurity, student data privacy, and digital citizenship are trends to watch.

5 Conclusion

The use of instructional technology remained pervasive in corporate training, higher education, and K-12 settings during the review period comprising this chapter. There remains a positive outlook for job prospects for instructional designers, training and development specialists, and eLearning practitioners in the upcoming year. The use of online learning remained a strong approach used in higher education and in K-12. An increase in corporate settings was observed. Continued use of online learning is predicted with the increase in fidelity and availability of different delivery tools (e.g., mixed reality, mobile devices, open educational resources). Access to and use of mobile devices and digital content continued to be used in all three sectors. Spending on instructional technology in all three sectors saw a slight increase from the previous review. Predictions are for continued spending on IT for the near future.

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Synchronous Distance Education and Being Live Online

Brad Hokanson and Senenge T. Andzenge

How much has been lost in pursuit of convenience with the "learning anytime, anywhere" model? This aphorism stresses delivery and access as central goals of its broad application. Distance or technology-enhanced learning is an important step forward for education in general, but the learning effectiveness is low. Much of the challenge has come from a lack of learner engagement caused at least in part due to a lack of regular meeting times and personal connections. Education has surrendered to expediency in seeking learner access for an increasing heavy use of online education.

Compared to a face-to-face class experience, success in online learning is hindered by choices organized around an anytime learning model. Educators are not able to use many of the social elements of synchronous or face-to-face education to support learners. These include immediate feedback and interaction, high-fidelity communication, timely response to questions, and personal attention from faculty.

At the same time (pun intended), a developing technology trend available for higher education to use is synchronous video communication. Bolstered by technological improvements for video meetings, bandwidth, and interaction, some areas of education already make significant use of synchronous educational practice. For example, online high schools often make heavy use of online audio and video technologies. These have the potential to communicate with greater fidelity and immediacy than the inherent delay of asynchronous communication. As online classes

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rely on student self-motivation, synchronous activities can also increase participation and engagement.

In addition to online tutoring by audio and video connection, some high schools offer a broad use of video meeting technology for student group meetings, study groups, and team projects. An example of the bricolage-form applications of video meeting technology is described by Elisha Raffa of the Minnesota Online High School:

> We wanted a system that could support active learning. We chose Elluminate, now Blackboard Collaborate, for the collision potential—especially the interactive whiteboard and breakout rooms. We planned to use it for online office hours, counseling and tutoring sessions, class meetings, open houses, back-to-school nights, and student council (StuCo) meetings. We never imagined how creative collisions like party games and talent shows could also knit together an online learning community (Raffa, n.d.).

Synchronous, set time events have a richness and immediacy that are more compelling and engaging than asynchronous events. As proof, we can view the example of our own practice in other areas. Most sports fans would eagerly view a live television broadcast, while few prefer to record a sports event for later viewing. Tickets to live concerts are often sold out even though studio-quality recording is readily available. And museums often tout the value of the live, viewing experience. These events are immediate, personal, and not offered at "anytime." They are also designed to be shared, authentic, and more like experiences learners will have in real-world contexts.

An early precursor of the technology, remote, coax television-based classrooms are also common in K-12 education, and are currently being upgraded to Internet-based systems. While some higher educational systems utilize the technologies, their use is still at the nascent level and is generally limited to meetings and not educational purposes.

Away from curricular uses, there are a number of available tools in use that provide synchronous communication and interaction inside and outside of education. For example, BestBuy Corporation uses synchronous technology to coordinate between offices in Minnesota, India, and Washington. Organizations such as AECT use it to support meetings across time zones and countries. Synchronous video meetings are now offered by a range of providers, including Zoom, Webex, Adobe, Skype, and Saba Meeting. These are commonly used in a variety of ways such as candidate interviews, planning sessions, and brainstorming sessions. It is now common for educational searches to have "Skype" interviews for a first round. While the technology is widely used, it is not currently widely utilized for supporting learners. It is also beginning to be integrated into major course management systems such as Canvas, Moodle, and Brightpoint/D2L.

Besides uses of video for synchronous online communications, live web chat is widely used by companies such as Internet service providers for tutorials and technical support. Although these experiences happen randomly and sporadically, instructors have used web chat to facilitate tutorials and hold office hours for camera-shy students or for students who require texts and transcripts to better accommodate their learning.

Like regularly scheduled face-to-face classes, regular synchronous events can be added into learner's schedules, as they would do in a regular class. The authors have experienced some pushback during online courses in scheduling set-time group meetings, but it is not uncommon for individuals to schedule personal distant connections. For example, we all set times for a special FaceTime call.

Synchronous events can also help provide the learner with a cognitive scaffolding in developing a regular habit for addressing online classwork. When not provided with a scheduled class session, online students may forget their needed participation in class. Physical, scheduled classes provide a regular, habitual commitment to the learning activity. Regular times for online courses may also alleviate some of the "virtual" yet less real aspect of an online class.

Despite some resistance across some delivery modes, online synchronous webinars have increased in popularity and availability in recent years, demonstrating the capability to present educational material to a broad audience. Although they can be used synchronously or asynchronously, attendance is generally higher at the initial event. This is perhaps because of the ability for interaction with presenters and other participants. While webinars can be recorded and made available for review at a different time, this may not be as effective and best practices would argue for different designs of presenting material if the audience is time delayed or not immediate.

Potential applications of synchronous technology that could be easily applied in higher education include online office hours, remote tutoring sessions, live webinars, selected classes, and student-to-student live discussions. An online video tutoring session can be very effective with small groups of students meeting a professor where it is intended to be highly interactive, with work done live by participants. Remote tutoring sessions can provide the intense, personal interaction with individual students or a group and have been found to be effective (Park & Bonk, 2007). There is a great difference between online tutorials such as those from YouTube and live, online tutoring sessions, where feedback, engagement, and interaction provide more than timely information.

Based on the experience of the authors, synchronous video and web chat communications may improve the efficacy of office hours. Currently, office hours are seldom used by students, but can provide the capability to resolve student problems, privately address student concerns, and discuss ideas in greater depth. Synchronous online learning activities can provide greater access and privacy as well as immediacy of interaction, but clearly new models are needed for this form of educational activity.

As with online classes there are skills that need to be developed for both instructors and learners. Synchronous events may be more like small seminars, which could hinder the development of introverted learners; management of live discussions online would require more skill from the instructor as well. Students often need to be trained to properly participate in online classes, and this form requires a considerably different set of interaction and learning skills.

Based on the authors' experiences, there are a number of implications for increased synchronous learning activities for online courses. Students often are irregular with their schedules, and online courses, even when times are pre-listed.

"Anytime" remains the expectation, but often results in "no time." Use of institutional resources for regular broadcast sessions may not be available as most resources are focused on generating stable, reusable elements such as video clips. This may shift online tutoring sessions or office hours to faculty offices. There will be more bandwidth pressure due to the wide range of technology access solutions. And there will be an increased pressure on audio quality as this appears to be a strong challenge for live, online sessions.

Learning and class engagement is increased when educational activities occur at a common time, increasing the potential for direct interaction with others. This is one of the potential areas for improvement in the field of educational technology, and one which will see increased use and development in the near future.

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The Preparation of Instructional Designers: An Exploration of Design Pedagogy and Praxis

Jill Stefaniak, Xigui Yang, and Philena DeVaughn

Instructional design is the process of creating detailed specifications of instructional solutions to support a situation warranting improvement. Instructional designers are responsible for assessing situations, identifying project needs, designing, developing, and implementing instructional solutions that are customized to address the needs of a project. The utility of instructional designers has become recognized across a variety of fields ranging across business and industry, healthcare, higher education, and K-12 education.

Throughout the past several decades, the instructional design field has identified a number of competencies required to support the systematic process and steps involved in instructional design. Competency is "a knowledge, skill, or attitude that enables one to effectively perform the activities of a given occupation or function to the standards expected in employment" (Sims & Koszalka, 2008, p. 569). The International Board of Standards for Training, Performance and Instruction (IBSTPI) developed a set of core competencies required of instructional designers in 1986. These competencies have continued to be revised, as needed, with the most recent revisions occurring in 2012. The current IBSTPI (2012) standards cover a number of performance-related tasks across five domains including professional foundations, planning and analysis, design and development, evaluation and implementation, and management (Koszalka, Russ-Eft, & Reiser, 2013).

The Association for Educational Communications and Technology (AECT) developed their own performance indicators to support the National Council for Accreditation of Teacher Education (NCATE) standards in 1982. These standards

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and performance indicators have been updated a number of times to accommodate advancements in technological innovations. The most recent standards and performance indicators were revised in 2012 to address content knowledge, content pedagogy, learning environments, professional knowledge and skills, and research (AECT, 2012).

A number of studies have been conducted exploring competencies expected of instructional designers (Dooley et al., 2007; Ritzhaupt & Kumar, 2015; Ritzhaupt & Martin, 2014; Sugar & Moore, 2015; York & Ertmer, 2016). These studies have consisted of surveying instructional designers in the field and reporting on performance standards required of them on a regular basis. Additional studies have been conducted examining instructional design job postings (Ritzhaupt, Martin, & Daniels, 2010; Sugar, Hoard, Brown, & Daniels, 2012).

In addition to recognizing the value that instructional designers may offer an organization, a number of organizations have increased their expectations regarding instructional design-related tasks. To date, a number of studies have been conducted to gather data on managing organizations' expectations of the instructional design role (Klein & Kelly, 2018; Larson, 2005; Larson & Lockee, 2004; Thompson-Sellers & Calandra, 2012; Villachica, Marker, & Taylor, 2010). These studies have indicated that discrepancies exist between employers' expectations and competencies promoted and valued among the instructional design field.

The results of these studies that have explored competencies and the alignment and discrepancies between instructional designers and their clients' and employers' expectations demonstrate the need for instructional designers to be prepared to serve in a number of expanded roles as instructional designers. As instructional design becomes more valued in different industries and settings, the need for instructional designers to be prepared to design in a number of different environments and along different career paths is further illuminated (Larson & Lockee, 2009).

Studies that have explored instructional design practices in the field have confirmed the need for instructional designers to be trained in designing decision-making practices (Bannan-Ritland, 2001; Jonassen, 2012; York & Ertmer, 2011), project management (Schwier & Wilson, 2010; van Rooij, 2010), and interpersonal skills (Visscher-Voerman, 2017). To accommodate the growing landscape of fields valuing instructional design work, instructional designers need to be prepared to be resilient and able to design among uncertainty and project constraints (Boling et al., 2017; Tracey & Boling, 2014).

An analysis of ID studies examining professional instructional designer practices revealed common practices in writing objectives, selecting instructional strategies, developing test items, and selecting media formats (Sugar, 2014a, 2014b). The analysis showed mixed results or no consensus, among ID practitioners in reference to evaluation activities, such as pilot testing. ID models were not represented in ID practice, rather instructional design events were supported by learning theories and context. ID competencies were a common thread.

Real-world projects, peer review process, case studies, and instructional support were determined as the most effective teaching methods in response to the question of how to best teach critical ID competencies. Although models were considered

supportive in teaching design skills and provided a springboard for instructional design work, the review failed to suggest a standard instructional system design model used by practitioners (Sugar, 2014b). The study reported that no decisive view of ID practice could be ascertained from the research; however, a significant difference between expert and novice instructional designers was disclosed. ID experts approached design projects from a systemic view that allowed for faster problem-solving and more efficient use of time.

In order to prepare instructional designers for what will be expected of them upon entering the instructional design workforce, graduate programs need to look at which competencies are being emphasized through their respective curricula. While a number of case studies have been conducted examining individual instructional design programs (Dabbagh & English, 2015; Larson & Lockee, 2009), additional studies are needed examining how instructional design programs are responding to the competencies and performance indicators identified by professional organizations such as AECT and IBSTPI as well as the expectations of organizations hiring graduates.

It is important that instructional design programs are preparing their graduates to effectively emulate and demonstrate competencies expected of the field as well as the ability to adapt to increasing technological demands that are inevitable for the future. The purpose of this chapter is to explore instructional design course offerings among programs across the United States as they relate to design pedagogy and praxis. We also offer discussion on the types of instructional exposure needed to prepare aspiring instructional designers for the field.

1 Overview of Instructional Design Programs and Offerings

We searched for higher education institutes that offer master's degrees in instructional design and analyzed their plan of study as shared on their website. A total number of 30 instructional design programs from 29 institutes were included in the analysis (see Appendix A). Despite the fact that the two ID programs offered by Boise State University have very distinct concentrations, they share quite a few courses, which were counted twice in our calculation because we treated each and every program as an individual unit. This way, the analysis of the programs of study included 458 courses.

The purpose of the analysis was to see which courses were most frequently offered across these programs. Courses with similar names and similar descriptions were grouped together under the typical course names and the frequency was recorded. Table 1 provides a list of courses that appeared at least three times in the list of all courses. Alternative names are also provided to clarify the variations of the courses in each category. The top ten courses are related to multimedia design, e-learning design, program evaluation, instructional design, research methods in education, foundations of instructional design, teaching and learning with technology, advanced instructional design, instructional game design, and educational technology integration.

Table 1 Frequency of course offerings by instructional design programs

#	Typical course names	Frequency	Alternative course names
1	Multimedia Design	39	Visual Design, Graphic Design, Visual Literacy, Message Design, Video Production
2	E-Learning Design	29	Online Learning, Online Teaching, Distance Education
3	Program Evaluation	28	Analysis of Performance, Evaluation and Assessment, Instrument Development, Evaluation of Needs and Performance, Measurement
4	Instructional Design	28	Instructional Design and Development, Instructional Design Process, Instructional Systems Design, Introduction to Instructional Design, Design and Development of Instruction
5	Research Methods in Education	24	Educational Research, Research in Educational Technology, Design Research in Practice
6	Foundations of Instructional Design	23	Instructional Design Foundations, Theoretical Foundations of Instructional Technology
7	Teaching and Learning with Technology	13	Technology for Teachers, Technology-Enhanced Teaching
8	Advanced Instructional Design	12	Instructional Design II, Advanced Instructional Systems Design, Application of Instructional Design Process
9	Instructional Game Design	10	Games and Learning, Games and Simulations, Gaming to Learning
10	Educational Technology Integration	9	Innovative Integration of Technology in Teaching, Integration of Technology into the Learning Environments
11	Seminar in Instructional Design and Technology	9	Readings Seminar in Learning Technologies
12	Trends and Issues in Instructional Design and Technology	9	Current Trends in Instructional Technology, Issues and Trends in Instructional Design and Technology
13	Educational Psychology	8	Learning and Cognition, Motivation
14	Educational Technology Leadership	8	Technology and Leadership, Leadership and Education
15	Special Topics	8	Selected Topics
16	Learning Environments Design	6	Designing Interactive Learning Environments, Designing Constructivist Learning Environments
17	Quantitative Research	6	Analysis of Quantitative Data, Statistics
18	Technical and Grant Writing	6	Grant Writing, Editing Professional Writing
19	Web Design for Instruction	6	Web Design and Development, Creating Educational Website
20	Adult Learning	5	Adult Learners, Adult Education
21	Learning Theory	5	Sociocultural Learning Theory
22	Blended Learning Environments	4	Blended Teaching

(continued)

Table 1 (continued)

#	Typical course names	Frequency	Alternative course names
23	Computers as Learning Tools	4	Computers as Cognitive Tools, Computers, Critical Thinking and Problem-Solving
24	Management of Instructional Technology	4	Managing Computer Applications, Management of Distance Education
25	Qualitative Research	4	Ethnographic Research
26	Design and Development Tools	3	Instructional Development Tools
27	Design Thinking	3	Design Thinking and Knowledge
28	Needs Assessment and Analysis	3	Instructional Needs Analysis
29	Project Management	3	Managing Educational Projects, Management of Instructional Projects

2 Discussion

Professional instructional design education programs that teach students practical knowledge for ill-structured and complex problems presented in the workplace, as well as technical knowledge and skills, were addressed through ID programs offering situated learning experiences. Learners perceived value in situated learning experiences when they could choose personally meaningful instructional topics and experience an eclectic problem-solving approach with a group. The research also found that learners ascribed value differently to various ID activities (Woolf & Quinn, 2009).

The knowledge and skills essential to the ill-structured problem-solving instructional design process are determined by environment, circumstances, and resources (Dabbagh & Blijd, 2010). The field of instructional design is tasked with mounting problem-solving responsibility (Jonassen & Hernandez-Serrano, 2002). Students without the opportunity for authentic experience may lack the depth of knowledge necessary for competent practice. Didactic models that encourage student understanding of expert instructional design practice through authentic experience, and foster a collaborative perspective to problem-solving, strengthen the preparation of ID students for various work experiences. ID students can be better served through immersion in problem-solving learning than focusing on a systems model approach (Dabbagh & Blijd, 2010).

Sugar (2014b) offered nine recommendations to consider for future research and education of instructional design professionals:

1. Replicate common studies of ID practices completed in the 1990s.
2. Consolidate data collection measures.
3. Conduct studies of ID practices that are all-inclusive.
4. Complete longitudinal studies.
5. Establish interrelated ID competencies.
6. Understand ID relationships and roles.