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Preface

The audience for the *Yearbook* consists of media and technology professionals in schools, higher education, and business contexts. Topics of interest to professionals practicing in these areas are broad, as the Table of Contents demonstrates. The theme unifying each of the following chapters is the use of technology to enable or enhance education. Forms of technology represented in this volume vary from traditional tools such as the book to the latest advancements in digital technology, while areas of education encompass widely ranging situations involving learning and teaching which are idea technologies.

As in prior volumes, the assumptions underlying the chapters presented here 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 is *not* restricted to machines and hardware but includes techniques and procedures derived from scientific research about ways to promote change in human performance.
4. The fundamental tenet is that educational media and technology should be used to:

   (a) achieve authentic learning objectives,
   (b) situate learning tasks,
   (c) negotiate the complexities of guided learning,
   (d) facilitate the construction of knowledge,
   (e) aid in the assessment/documenting of learning,
   (f) support skill acquisition, and
   (g) manage 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. Part I, “Trends and Issues in Learning, Design, and Technology,” presents an array of chapters that develop some of the current themes listed above, in addition to others. In Part II, “Leadership Profiles,” authors provide biographical sketches of the careers of instructional technology leaders. Part III, “Organizations and Associations in North America,” and Part IV, “Worldwide List of Graduate Programs in Learning, Design, Technology, Information, or Libraries,” are, respectively, directories of instructional technology-related organizations and institutions of higher learning offering degrees in related fields. Finally, Part V, the “Mediagraphy,” presents an annotated listing of selected current publications related to the field.

The Editors of the *Yearbook* invite media and technology professionals to submit manuscripts for consideration for publication. Contact Michael Orey (mikeorey@uga.edu) for submission guidelines.

For a number of years, we have worked together as editors and the tenth with Dr. Michael Orey as the senior editor. Within each volume of the Educational Media and Technology Yearbook (EMTY), we try to list all the graduate programs, journals, and organizations that are related to both Learning, Design, and Technology (LDT) and Library and Information Science (LIS). We also include a section on trends in LDT, trends in LIS, and we have a section profiling some of the leaders in the field. Beginning with the 2007 volume, we have attempted to generate a list of leading programs in the combined areas of LDT and LIS. One year, we were able to compose an alphabetical list of 30 of the programs that people told us were among the best. However, each year we have worked on being more systematic. Instead of following the *US News and World Report* model and have one top program list, we decided to use some of the same numbers that they use and generate a collection of top 20 lists, rather than attempt to generate a statistical model to generate the rankings list. One thought was to rank programs according to the number of publications that were produced; however, deciding which journals to include was an issue. We have decided to use a 4-year span, in this case 2011 through 2014, as the years to count (since at the time of writing, it is still 2015 and so we do not have a complete year). Furthermore, we decided to only count actual research reports that appeared in one of two journals, *Educational Technology Research and Development* and the *Journal of the Learning Sciences*. These two journals were primarily selected based on the general sense that they are the leading journals in the area of LDT. Noticeably absent is the area of information and library science. So, while these numbers are pretty absolute, choosing to only count these journals is somewhat arbitrary.

The other top 20 lists are based on self-report data collected as part of the program information in the Educational Media and Technology Yearbook. Every year, we collect general information about programs in LDT and LIS and publish this information in the Yearbook. Each year we also collect some additional data. We asked the representatives of each of the institutions to enter the US dollar amount of grants and contracts, the number of PhD graduates, the number of master’s graduates, and the number of other graduates from their programs. We also asked them for the number of full-time and part-time faculty. We then generated a top 20 list for some of these categories. The limitation in this case is that it is self-report data and there is no real way of verifying that the data is accurate. So, while the list of the 30 top programs from the first year lacked hard data, and the lists this year are based on numbers, those numbers may be just as unreliable. In the end, we have a collection of lists that we hope will be of use to our readers. Many of the universities that

Table 1 Top 20 Graduate Programs in the area of Learning, Design, and Technology as measured by the number of publications in *Educational Technology Research and Development* and the *Journal of the Learning Sciences* during the years 2011 through 2014, inclusive

Rank	Institutions	Points
1	The University of Georgia	6.6
2	Stanford University	5.3
3	Brigham Young University	4.9
4	Utah State University	4.4
5	University of Twente	4.1
6	Purdue University	4.0
7	University of Wisconsin-Madison	3.7
8	San Diego State University	3.4
9	McGill University	3.2
10	Aristotle University of Thessaloniki	3.0
11	University of Missouri	2.8
12	Columbia University	2.7
13	University of Pittsburgh	2.7
14	University of California Berkeley	2.5
15	National Central University	2.3
15	Virginia Tech	2.3
17	The Pennsylvania State University	2.2
18	The University of Texas at Austin	2.1
19	Florida State University	2.0
19	Nanyang Technological University	2.0
19	National Institute of Education, Singapore	2.0
19	University of Southern California	2.0

appeared in the list last year are here again, in addition to many others. More information about many of these universities can be found in Part V of this edition.

There are five top 20 lists in this preface. The first of these top 20 lists is based on a count of publications. We used every issue from the 2011 through 2014 volume years of the *Educational Technology Research and Development* journal and the *Journal of the Learning Sciences*. We eliminated all book reviews and letters-to-the-editor and such. We only used the primary academic articles of these journals. Each publication counted 1 point. If the article had two authors, then each author's institution received 0.5 points. If there were three authors, then 0.33 was spread across the institutions. Also, as an additional example, if there were three authors and two of them were from the same institution, then that institution received 0.66 points and the institution of the remaining author received 0.33. Finally, the unit receiving the points was the university. So, in some cases, you might have publications from two completely different departments in the same journal. Table 1 shows our results. The University of Georgia and Stanford University remained as the top 2 LDT programs in the world. Utah State University (3 to 4), University of Wisconsin (4 to 7), Brigham Young University (9 to 3), University of Twente (7 to 5), and San Diego State (4 to 8) all remained in the top 10 this year. Arizona State dropped from 3 to 12 and Nanyang Technological University dropped from 5 to 20. Indiana University dropped out of the top 20 completely from the number 2 position last year. The University of Texas (6 to 18), Penn State University (10 to 17), and University of

Missouri (7 to 11) all dropped out of the top 10. Purdue University (12 to 6), McGill University (20 to 9), and Aristotle University of Thessaloniki (12 to 10) all cracked the top 10 this year. Those are some of the biggest moves this year.

The two primary measures of research achievement are publications and grants. While choosing ETRD and IJLS was somewhat arbitrary, the numbers are verifiable. For Grants and Contracts, I ask a representative of each institution whose program is described in the section of this book about LDT institutions to report the amount of grants and contracts for their program or department. In Table 2, we present the top 20 programs according to the self-report dollar amount of grants and contracts for that program during the calendar year of 2014. The only institutions that are both on the list for publications and grants are the Utah State University (4 for publications and 7 for grants), University of Missouri (11 for publications and 7 for grants), and Virginia Tech (15 for publications and 6 for grants). So, using publications and grants, Utah State may be the top program in the world for research productivity.

Tables 1 and 2 are measures of research productivity. The remaining three tables are more related to teaching than research. The first, Table 3, shows the top 20 programs in terms of the number of full-time faculty. We also show the total number of faculty which is the sum of full-time and part-time faculty. Southern Illinois University Edwardsville is the number one LDT program in the country with 43 full-time faculty members. Rutgers drops from first to fifth on the list. The University of Balearic Islands has very large number of part-time faculty. It will be interesting to look at those on this list and relate them to the number of graduates (Tables 4, 5 and 6).

The next top 20 list is the number of PhD graduates. This list might be a good measure of research productivity as well as teaching productivity. The number of graduates and grants is self-reported. The number of publications is verifiable, so it is interesting to compare who is on these lists. The only school that is on all three lists is Virginia Tech (15 for publications, 6 for grants, and tied for 4 for PhD graduates). Comparing publications and PhD graduates, those that are on just these two top 20 lists are Brigham Young University (3 for publications and 4 for PhD graduates), University of Georgia (1 for publications and 18 for PhD graduates), and Florida State University (19 for publications and 18 for PhD graduates).

Our last top 20 list is based on the number of master's graduates. In our mind, we might consider this an indication of whether the program is more practitioner oriented than say the number of PhD graduates. There were six universities that were on both the number of faculty and the number of master's degrees—University of North Carolina (3 faculty and 2 master's), Rutgers University (5 faculty and 3 master's), Boise State University's Educational Technology program (9 faculty and 1 master's), University of Hong Kong (7 faculty and 16 master's), Towson University (12 faculty and 7 master's), and University of British Columbia (19 faculty and 9 master's).

For this year, we thought we would also include a table that is the top 20 programs in terms of total graduates. While this list is similar to the total master's degree, there is a bit of shifting around of programs due to the large number of other

Table 2 Top 20 LDT programs by the amount of grant and contract monies

Rank	University	Department	Monies
1	Old Dominion University	Instructional Design and Technology	25000000
2	Arizona State University; Educational Technology programs	Division of Educational Leadership and Innovation; Mary Lou Fulton Teachers College	18000000
3	Boise State University	Educational Technology	12000000
4	Georgia State University	Learning Technologies Division	7850000
5	University of Massachusetts, Amherst	Learning, Media and Technology Masters Program/Math Science and Learning Technology Doctoral Program	5300000
6	Virginia Tech	Instructional Design and Technology	4100000
7	Utah State University	Department of Instructional Technology and Learning Sciences, Emma Eccles Jones College of Education and Human Services	3600000
8	University of Missouri-Columbia	School of Information Science and Learning Technologies	2728506
9	University of North Texas	Learning Technologies (College of Information)	2000000
9	The Ohio State University	Learning Technologies	2000000
11	Wayne State University	Instructional Technology	1600000
12	University of Virginia	Instructional Technology Program, Department of Curriculum, Instruction, and Special Education, Curry School of Education	1500000
13	Université de Poitiers	Ingénierie des médias pour léducation	1000000
13	University of North Carolina	School of Information and Library Science	1000000
15	Ohio University	Instructional Technology	500000
15	University of Geneva	TECFA—Master of Science in Learning and Teaching Technologies	500000
15	Lehigh University	Teaching, Learning, and Technology	500000
18	University of Florida	School of Teaching and Learning	459871
19	University of Central Florida	College of Education and Human Performance, Educational and Human Sciences, Instructional Design and Technology	360000
20	North Carolina State University	Digital Teaching and Learning Program	325000

Table 3 Top 20 LDT and LIS programs by the number of full-time faculty during the calendar year of 2014 (also shown is the total faculty which includes both full- and part-time faculty)

Rank	Name of university	Department	FT faculty	Total faculty
1	Southern Illinois University Edwardsville	Instructional Technology Program	43	46
2	University of Balearic Islands	Sciences of Education	37	100
3	University of North Carolina	School of Information and Library Science	29	74
4	Université de Poitiers	Ingénierie des médias pour léducation	25	50
5	Rutgers-The State University of New Jersey	School of Communication and Information	21	67
6	Valley City State University	School of Education and Graduate Studies	20	31
7	The University of Hong Kong	Master of Science in Information Technology in Education	19	28
8	University of Missouri-Columbia	School of Information Science and Learning Technologies	18	20
9	Boise State University	Educational Technology	14	26
10	University of North Texas	Learning Technologies (College of Information)	14	20
11	Anadolu University	Computer Education and Instructional Technology	13	38
12	Towson University	College of Education	13	22
13	The University of Oklahoma	Instructional Psychology and Technology, Department of Educational Psychology	11	11
14	Anton Chekhov Taganrog Institute	Media Education (Social Pedagogic Faculty)	10	30
15	Hacettepe University	Computer Education and Instructional Technology	10	26
16	Utah State University	Department of Instructional Technology and Learning Sciences, Emma Eccles Jones College of Education and Human Services	10	11
17	Brigham Young University	Department of Instructional Psychology and Technology	10	10

17	University of Georgia	Department of Career and Information Studies; Learning, Design, and Technology Program	10	10
19	University of British Columbia	Master of Educational Technology degree program	9	17
20	Valdosta State University	Curriculum, Leadership, and Technology	8	15
21	Ball State University	Masters of Arts in Curriculum and Educational Technology	8	12
22	Keimyung University	Department of Education	8	11
22	Arizona State University; Educational Technology programs	Division of Educational Leadership and Innovation; Mary Lou Fulton Teachers College	8	11

I included the list all the way to 22nd place because there was a tie for full-time faculty, but I used total faculty as the tie breaker. I thought I should include all the institutions that had eight full-time faculty

Table 4 Top 20 LDT and LIS programs by the number of PhD graduates

Rank	University	Department	PhDs granted
1	University of Central Florida	College of Education and Human Performance, Educational and Human Sciences, Instructional Design and Technology	11
1	Wayne State University	Instructional Technology	11
1	University of Balearic Islands	Sciences of Education	11
4	Virginia Tech	Instructional Design and Technology	10
4	Brigham Young University	Department of Instructional Psychology and Technology	10
4	Arizona State University; Educational Technology programs	Division of Educational Leadership and Innovation; Mary Lou Fulton Teachers College	10
4	Northern Illinois University	Educational Technology, Research and Assessment	10
4	Ohio University	Instructional Technology	10
4	Rutgers-The State University of New Jersey	School of Communication and Information	10
10	University of Houston	Learning, Design, and Technology Graduate Program	9
11	Georgia State University	Learning Technologies Division	8
11	George Mason University	Learning Technologies	8
13	Old Dominion University	Instructional Design and Technology	7
13	University of North Texas	Learning Technologies (College of Information)	7
13	University of North Carolina	School of Information and Library Science	5
13	University of Toledo	Curriculum and Instruction	5
13	University of Virginia	Instructional Technology Program, Department of Curriculum, Instruction, and Special Education, Curry School of Education	5
18	University of Memphis	Instructional Design and Technology	4
18	Florida State University	Educational Psychology and Learning Systems	4
18	University of Georgia	Department of Career and Information Studies; Learning, Design, and Technology Program	4

Please note that the list only goes to 18, but since there was a three-way tie for 18th, the next university would be 21st place

Table 5 Top 20 LDT and LIS programs by the number of master's graduates

Rank	Name of organization or association	Department	Masters #
1	Boise State University	Educational Technology	186
2	University of North Carolina	School of Information and Library Science	130
3	Rutgers-The State University of New Jersey	School of Communication and Information	114
4	Nova Southeastern University—Fischler Graduate School of Education and Human Services	Programs in Instructional Technology and Distance Education (ITDE)	100
5	Azusa Pacific University	School of Education—Teacher Education	90
6	Michigan State University	College of Education	85
7	Towson University	College of Education	79
8	Georgia Southern University	College of Education	75
8	University of British Columbia	Master of Educational Technology degree program	75
10	California State University Fullerton	Program: Educational Technology	68
11	George Mason University	Learning Technologies	60
12	Kennesaw State University	Instructional Technology	59
13	University of Colorado Denver	School of Education and Human Development	58
14	Northern Illinois University	Educational Technology, Research and Assessment	56
15	Virginia Tech	Instructional Design and Technology	55
16	The University of Hong Kong	Master of Science in Information Technology in Education	52
17	Bloomsburg University	Instructional Technology and Institute for Interactive Technologies	50
18	Wayne State University	Instructional Technology	48
19	Boise State University	Organizational Performance and Workplace Learning	45
20	University of Nebraska-Omaha	College of Education; Department of Teacher Education	44

Table 6 Total degrees granted in 2014

Rank	Name of organization or association	Department	Total degrees
1	Rutgers-The State University of New Jersey	School of Communication and Information	364
2	University of North Texas	Learning Technologies (College of Information)	194
3	Boise State University	Educational Technology	186
4	University of North Carolina	School of Information and Library Science	185
5	Kennesaw State University	Instructional Technology	122
6	Nova Southeastern University—Fischler Graduate School of Education and Human Services	Programs in Instructional Technology and Distance Education (ITDE)	100
7	George Mason University	Learning Technologies	93
8	Azusa Pacific University	School of Education—Teacher Education	90
9	Michigan State University	College of Education	85
10	Towson University	College of Education	81
11	Georgia Southern University	College of Education	75
12	University of British Columbia	Master of Educational Technology degree program	75
13	University of Nebraska-Omaha	College of Education; Department of Teacher Education	73
14	University of Central Florida	College of Education and Human Performance, Educational and Human Sciences, Instructional Design and Technology	71
15	California State University Fullerton	Program: Educational Technology	68
16	Wayne State University	Instructional Technology	67
17	University of Missouri-Columbia	School of Information Science and Learning Technologies	67
18	University of Balearic Islands	Sciences of Education	67
19	Virginia Tech	Instructional Design and Technology	66
20	Northern Illinois University	Educational Technology, Research and Assessment	66

degrees (this could be undergraduate or perhaps other things at the graduate level like certificates and specialist or CAGS degrees that are beyond the master's but not quite a doctorate).

We acknowledge that any kind of rankings of programs is problematic. We hope you find our lists useful. If you have suggestions, please let us know and we will try to accommodate those changes in future publications of the *Yearbook*. If your program is not represented, please contact one of us and we can add you to the database so that you can be included in future issues.

Athens, GA, USA

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

Chapter 1
EMTY Introduction

Karah Zane Hagins

Integrating technology and learning has become ubiquitous over the last few years. Access to emerging and innovative technologies has increased in both the private and public sectors. The prevalence of technology has influenced the number of individuals entering the field of instructional technology and instructional design. The increased need for schools, private business, and institutions of higher education to train their employees and faculty in the successful application of technology for education and training will continue to dominate most positions in the field. Therefore, the ability for researchers and practitioners to stay current and competent with these technologies can be a challenge.

Whether these technologies are implemented in educational environments or for business and industry, the correct application to achieve intentional learning goals is imperative. The push for educators to provide integrative and digital learning to their students has increased as funding for technology continues to be popular. Brown and Green (in press) contend that there has been, “continued growth in various instructional approaches (e.g., blended learning, Flipped Classrooms) to online learning, increased use and creation of digital content and curriculum by educators and students, and persistent interest in the use of mobile technologies - especially student owned devices they bring to learning environments” (p. 2). In higher education, the use of learning analytics to identify challenges and improve the student experience has led to questions about physical classroom spaces and how to design them to support mobile learning and technology-enhanced experiences. Guidance and support for organizational use and implementation of innovative technologies will continue to be the role that instructional designers and instructional technologists occupy.

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Understanding the needs of teachers in regards to organizing and utilizing technology appropriately within their classrooms is another area of interest to the field. Curriculum design is important in the classroom to effectively create and achieve learning goals. McKenney, Boschman, Pieters, and Voogt (2016) provide insight into the process by which teachers engage in design talk to determine methods for technology integration and learner success. Exploring the reasoning and internal dynamics of these kinds of decisions are, "especially useful to members of (future) teams or facilitators, to mitigate unrealistic ideals and prepare well for the challenging yet invigorating work of collaborative curriculum design" (McKenney et al., 2016, p. 2). Working together in collaborative teams has proven to be an effective approach to learning and affords access to multiple perspectives as resources when designing learning experiences.

Investigating methods for integrating social learning in online environments is one of the current goals within the field. Faculty and students have displayed concerns with re-purposing collaborative studio design courses into an online environment. However, with the continued growth and demand for online courses perhaps, "social learning theories [can] provide a mechanism to mitigate faculty concerns and facilitate the creation of an online collaborative learning and design space" (George & Walker, in press, p. 1). With the increase of technology tools specifically adapted for communication and interaction, George and Walker's chapter focuses on working with faculty and students to understand these technologies in an online studio context. Learning can be enhanced with peer-to-peer interactions, especially regarding the master to novice relationship. George and Walker (in press) conclude that with proper design, online environments can provide the same authenticity for this relationship as traditional studio courses.

Having a more knowledgeable other (MKO) as a resource has proven invaluable to the novice or intermediate learner. The ability for a student to seek out help when needed allows them to place their learning goals within a context and adjust their cognitive schema appropriately. Er et al.'s chapter expresses the importance of help-seeking behavior in students in a Flipped Classroom. As instructional designers it is important that we understand and meet the needs of the learners regardless of the medium in which the information is delivered. Their chapter emphasizes the benefits of students' ability to receive assistance as well as increase student efficacy within the subject matter. Learning to learn is a valuable skill developed over time within learning environments that are conducive and designed for allowing students to seek-help. Er, Kopcha, Orey, and Dustman (2015) state that, "in help-seeking, students regulate their environments by using use peers, teachers, and parents as sources of support for coping with learning difficulties" (p. 1).

Continuing the discussion of the importance of a collaborative learning environment that provides resources for learners, Richardson and Kozan's (in press) chapter identifies, "the importance of empirically testing theoretical assumptions, which can provide unique insights into how to enhance both theory and practice in online education" (p. 1). Especially important to online learning is providing a community of inquiry, teacher presence, and social presence according to Richardson and Kozan (in press). However, these elements should be thoughtfully considered regardless of the delivery method of the learning materials. Instructional designers need to find innovative ways to integrate all three for each course they design. Collaboration between learners has long been considered a beneficial element for achieving learning goals. New technologies are emerging that allow the field to study this phenomenon using an empirically based scientific method. Using eye-tracking technology, Schneider and Pea (2013) delve deep into the educational psychology behind collaborative problem-solving dyads . Studies like this, "have further implications for teachers' practices; with training, we posit that gaze-awareness tools could teach students the value of achieving joint attention in collaborative groups" (Schneider & Pea, 2013, p. 19). The presence of tools for studying learning such as these, open doors for instructional technology research that has not undergone significant study in the past.

The foundation of instructional technology continues to be the presence of solid design and development practices that provide learning content to achieve intentional goals. Critical thinking can be a difficult element to implement in both online and traditional learning environments. Highlighting activities that allow for critical thinking, Yanchar, Gibbons, Gabbitas, and Matthews (in press) provide an in-depth investigation of the importance of critical thinking activities. This is important to the field, as stakeholders demand more from their learners and the type of content created by instructional technologists. Implementing activities conducive to critical thinking help prepare learners for cross-contextual applications of learning both in educational environments and the real world.

Technology enables people, communities, and companies to be connected more than ever and the globalization of learning is increasing in popularity. Not only is it important for designers to understand the content to design and develop effective learning artifacts, but also the need to explore the end-user or learner within a cultural context is equally important. Wang and Schlichtenmyer (in press) express the importance to the field of integrating cultural research as another step when conducting analysis of learners and determining content design. "In today's increasingly global and digitally connected society, it is essential to assure the alignment between the learning needs of the individuals from different cultures and the way content is designed and delivered, both online and face-to-face" (Wang & Schlichtenmyer, in press, p. 1).

This book provides a series of chapters written by scholars in the field of instructional technology and design. This introduction presents a brief summary of the chapters, which have been categorized into the following topics: (a) Issues and trends in instructional technology, (b) Pedagogical approaches in educational environments, (c) Current researches on teaching and learning with technologies, and (d) Instructional technology challenges and future studies.

Issues and Trends in Instructional Technology

The field of instructional technology, by definition, is in constant flux. With new technologies coming to market and creative ways to integrate them for learning, staying current with such trends is of utmost importance. Brown and Green's chapter provides an overview of their research results on the most popular topics and concerns in instructional technology for 2015. Compiling their information from major annual reports, Brown and Green (in press) categorized this data into four main focus areas: overall developments, corporate training and development, higher education, and K-12 settings. In regards to overall developments, the authors found that the use of instructional technology is a priority due to the slight increase in spending on hardware, software, and training. Unique instructional delivery methods such as blended-learning and the flipped classroom remained steady as all sectors utilized instructional technology's ability to fulfill the learning needs of both private and public institutions. In corporate training and development the authors reported: (a) a slight increase in the average learning expenditure per employee with smaller organizations spending more than larger organizations; (b) one third of corporate instructional content entails management and supervision, mandatory and compliance training, and professional or industry specific training. The remaining two thirds of corporate training content focused on procedures, customer service, sales, and executive training, and (c) 70 % of all corporate training hours were instructor-led with a slight increase in the use of online delivery from the previous year with 25 % of training hours completed online (Brown & Green, in press).

Results on trends and issues in higher education determined that mobile computing is currently the most important campus technology concern. Students and faculty in higher education are using these applications for both academic and nonacademic purposes. Learning analytics and assessment are another emerging technology being considered in higher education as a method to identify challenges and improve student success (Brown & Green, in press). Online learning continues to grow in importance as 74 % of academic leaders that responded to the Babson survey feel learning outcomes are the same or similar to traditional instruction approaches (Brown & Green, in press). Blended learning is an expectation of students and learning management systems continue to facilitate flipped classroom environments on campus. The student demands for technology integrated online and blended courses place greater pressure on faculty to utilize these tools for instruction and communication. Concerns about faculty and student digital literacy have arisen due to the need for intermediate-levels of technology use, beyond simply using social media and/or answering emails (Brown & Green, in press). This trend predicts demands for administrative and instructional support personnel will increase in higher education. Faculty and student training on tool implementation and the use of innovative technology in online, blended, and flipped classrooms will be necessary as technology continues to increase in higher education.

As for K-12 there has been a 6.4 % increase on the total expenditure in instructional technology (Brown & Green, in press). Student access to mobile devices both personal and school owned continues to increase in the K-12 sector. Students continue to utilize mobile devices for emailing their teachers, using online textbook, accessing Web 2.0 resources, and viewing teacher created media (Brown & Green, in press). Initiatives such as BYOT/BOYD, flipped classroom, and virtual K-12 programs continue to influence the procurement and use of mobile devices for education with the biggest challenge being consistent Internet access away from educational locations.

In conclusion, Brown and Green (in press) explain that the growth and acceptance of online learning, mobile devices, and instructional technology in all three sectors will continue to increase. Instructional support personnel and specialists will continue to be in demand as various stakeholders require the implementation of innovative technologies (e.g., mobile learning, information and personalized learning, and gaming) into private and public institutions (Brown & Green, in press).

Pedagogical Approaches in Educational Environments

Pedagogical approaches regarding technology in learning are increasingly important to the field due to the widespread access to a variety of tools. However, technology should not be implemented as a solution, until a problem is clearly identified. A lack of thorough analysis creates situations where technological tools and/or hardware are found in closets gathering dust. Teachers and support personnel must be trained in the uses of technology beginning with a pedagogical approach. McKenney et al.'s (2016) chapter presents a study of the benefits of collaborative curriculum design talks in teacher teams to integrate ICT (Information and Communication Technology) according to subject matter and pedagogy within a specific context. This chapter reports the results of a study in a kindergarten context with a specific focus on developing functional literacy. The teachers in the study designed learning materials for use with PictoPal. PictoPal is a learning environment that entails computer and non-computer supported activities that result in a written product and using this product in an application activity in the classroom (McKenney et al., 2016).

The study explores how teachers make decisions using collaborative curriculum design discussions while designing learning materials and implementing them into their classrooms. The study took place over the course of a 3-year period and involved 21 kindergarten teachers divided into six teacher design teams (TDTs). Using a micro-perspective to explore what design actually is, how it is being conducted by teachers, and how it occurs in and through conversation, their chapter investigates the collaborative design conversations that occurred as TDTs designed PictoPal material (McKenney et al., 2016). Using a qualitative case study methodology, the study explored design talk as it occurred in a real life kindergarten school context. The study investigates the nature of design talk by way of: deliberative interactions, depth of conversations, and how substantive expertise is provided and utilized (McKenney et al., 2016). McKenney et al. (2016) conducted the analyses using four sub-studies and three consecutive design conversations. The conversations in the TDTs were analyzed systematically on three levels: episodes, topic exchanges, and individual utterances. The key findings provide an in-depth exploration of four identified areas: understanding intuitive decision making in collaborative curriculum designs, how do teachers use and develop TPACK during collaborative design, the role of content knowledge in collaborative design, and individual teachers' design knowledge during collaborative design (McKenney et al., 2016).

In conclusion, McKenney et al. (2016) provides recommendations for practice for facilitators and subject-matter experts that desire to provide procedural and substantive support to teachers. They explain that facilitators should be aware of moments in design talk where teachers struggle or when they witness teachers employing designs that have not been thoroughly considered. Subject-matter support should be aligned with teachers' natural inclinations during design. Teachers utilize their pedagogical knowledge and beliefs to create their course designs, but utilized subject-matter expertise when it was offered via recommendations and explanations (McKenney et al., 2016). Finally, preservice teachers require explicit facilitator support when they are designing integrated technology content that aligns with their pedagogical knowledge (McKenney et al., 2016). The chapter provides several recommendations for further research to investigate collaborative design of technology-rich learning.

George and Walker's (in press) chapter continues the exploration of pedagogical approaches in education with a study of social learning theories and communities of practice through the contextual lens of barriers to implementing online education in a higher education setting. The study investigates social aspects of learning and the formation of learning communities. In the context of a landscape architecture course, George and Walker (in press) provide a hypothesis that the slow growth of online design education or distributed design education (DDE) is not due to pedagogical or technological barriers, but rather from faculty reticence to implement DDE. The use of studio courses in design fields provides a learning relationship between master and student in addition to providing the benefit of an open learning community (George & Walker, in press). In the studio space, the master–student relationship is enhanced by interactions with other students as they view and learn from each other. The studio is meant to be a social-based learning environment in which students engage with the complexities of real world design experiences in order to advance their understanding and skills (George & Walker, in press).

This chapter provides an historical overview of DDE, beginning in 1995 with the development of the virtual design studio (VDS). The early VDS were considered innovative explorations of the use of technology for both design and collaboration (George & Walker, in press). However, despite the benefits of DDE, its use remains rare in landscape architecture programs. George and Walker (in press) employed a 1-year Delphi study to develop consensus on the critical barriers to the adoption of DDE using a panel of experts in the field of landscape architecture. Using a 7-point Likert scale to evaluate the importance of each of 24 identified barriers; panelists were then asked to justify their selections in the form of written feedback. After three rounds of reviewing other panelists' feedback and being asked to reconsider the information, 23 of the 24 barriers achieved stability (George & Walker, in press). The results of the Delphi study revealed that the critical barriers to faculty adoption of DDE were related to social interactions, financial compensation, and a lack of confidence in the online medium (George & Walker, in press). Upon identifying the critical barriers to DDE adoption, George and Walker (in press) provide an in-depth analysis of seven critical barriers in order to determine how best to mitigate these barriers. They contend that such mitigation will require a nuanced effort from educators and researchers to create a pedagogy that emulates the social learning environment of the studio (George & Walker, in press). In conclusion, George and Walker suggest that DDE has not been adopted due to faculty concern over the ability of an online learning environment to provide rich and complex social interactions that occur within physical design studios. They propose that a VDS be constructed specifically utilizing social relationships, potentially using social media networks as inspiration for the platform. By applying social learning theories to DDE pedagogy, George and Walker (in press) believe that it is possible to create a robust learning environment that supports the social framework of the traditional design studio.

Despite the prevalence of innovative technology and the increase in access to mobile devices at school and at home, students still struggle with new information acquisition. It is a concern in the field of instructional technology to understand the needs of the end-users and meet the learners where they are academically or in training environments. Understanding methodologies for providing student support in learning environments such as the flipped classroom is important for student success. Er et al's (2015) chapter provides an approach to college student support by investigating help-seeking behaviors of students in a flipped science classroom. Students display help-seeking behaviors by relying on peers, teachers, and parents for support when they experience learning challenges (Er et al., 2015). Despite the positive effects of help-seeking behavior, not every student utilizes this resource. The chapter provides an overview of the literature describing the factors that influence a student's inclination towards help-seeking behaviors and identifies factors that create impediments.

Er et al. (2015) provide a conceptual mediation model that explores the direct and indirect effects of help-seeking behavior concerning instructor support, relatedness, and goal orientation using students' perceptions of costs and benefits as the mediator. Focusing on students' intentions to seek help and individual students' styles, Er et al. (2015) determined that there are two types of help: executive and instrumental help. The research findings further support the understanding of students' help-seeking behavior in a flipped classroom. Students' intention to seek help and the styles utilized were influenced by instructor support, relatedness, and goal orientations (Er et al. 2015). Student perceptions regarding the benefits and costs of exhibiting help-seeking behavior played the role of both determinants and mediators. The implications of instructors cultivating an environment in which help-seeking behavior is encouraged are discussed and contextual applications of instructor support designs are provided. In conclusion, Er et al. (2015) provide a better understanding of college students' help-seeking behavior in flipped classrooms, which informs the design of such classrooms, and therefore student learning.

Current Researches on Teaching and Learning with Technologies

In the field of instructional technology the importance of integrating theory with practice is a foundational principle for technology and design integration. Facilitating online learning by encouraging online learning communities is one of many tactics employed to bridge the gap between theory and application. Richardson and Kozan's (in press) chapter researches the theoretical and practical implications of research within online learning communities at Purdue University . The authors conducted this research using the Community of Inquiry (CoI) lens (2015). Their research is comprised of eight studies conducted from 2013–2015 in the context of Purdue's online Learning, Design, and Technology Master's (MS) program (Richardson & Kozan, in press). The study highlights the importance of empirically testing theoretical assumptions, which can provide insight into the enhancement of both theory and practice in online education (Richardson & Kozan, in press). Richardson and Kozan's (in press) study empirically tests the theoretical foundations of the CoI in order to ensure efforts spent on the quality of online learning are effective.

Richardson and Kozan (in press) explain that the CoI framework assumes a learning community or a community of inquiry depends on three interdependent constructs of teaching presence, cognitive presence, and social presence. The chapter continues with historical research and outcomes of several studies conducted related to the CoI framework at Purdue University. Using a Likert scale, the data analysis was utilized for two purposes: (1) to provide summative evaluations for instructors/courses; and (2) to gather information that could be used to improve the online MS program (Richardson & Kozan, in press). The chapter continues as the following three insights from previous research are discussed in more detail: (a) interrelationships between and among teaching, cognitive, and social presence; (b) validity of the CoI Framework; and (c) extending the CoI framework to include instructor presence (Richardson & Kozan, in press). Research continues at Purdue University using the CoI framework, including a study focusing on an instructor's use of social presence, teaching presence, and dissonance for attitudinal change in a massive open online course (MOOC) (Richardson & Kozan, in press). Although there is limited research regarding the potential of the CoI in an MOOC setting, the concept of collaborative learning and instructor as co-participant are at the center of a social constructivist environment (Richardson & Kozan, in press). The authors seek to continue their line of inquiry in online learning environments via CoI based upon the results of this study in addition to continuing to investigate similar studies (2015).

Investigative methodologies to support collaboration among students in learning environments continue to be a topic of interest in the field of instructional technology. Students often respond positively to working in teams and can learn more from each other as they work to solve complex problems. Schneider and Pea (2013) research this concept from an educational psychology perspective by way of an eye-tracking study on collaborative problem-solving dyads. Using an experimental design combined with qualitative and quantitative data analysis, Schneider and Pea (2013) studied two groups of students. In one condition, dyads were able to view the gazes of their partner on the screen; in the control group, the dyads did not have access to this information (Schneider & Pea, 2013). Schneider and Pea (2013) concluded that the real-time mutual gaze intervention allowed students to engage in a higher level of collaboration and thus, a higher learning gain overall. The chapter continues as the authors present implications for supporting group collaboration.

Schneider and Pea (2013) investigate the benefits of joint attention as a fundamental mechanism for establishing connection between individuals. The goal of their study is to design technological interventions to facilitate this process. The authors assume that higher levels of visual synchronization are positively associated with students' quality of collaboration and learning experiences (2013). They provide an in-depth analysis of previous work on joint attention and awareness tools finding that eye-trackers are a possible way to understand and influence factors responsible for high-quality collaboration (Schneider & Pea, 2013). Basing their study on the "Preparing for Future Learning" (PFL) framework, Schneider and Pea (2013) designed tasks to prepare students for traditional instructional activities (e.g., attending a lecture or reading a textbook chapter). By employing PFL tenets, Schneider and Pea (2013) hope that their study will be more likely to have an impact on existing classroom practices when eye-trackers are commonly utilized in society. The authors validated their hypothesis in that they found that participants in the "visible-gaze" group outperformed the dyads in the "no-gaze" group with a total learning gain of: $F(1,40) = 7.81$, $p < 0.01$ (2013). These findings demonstrate the importance of mediating technologies in order to support joint attention in collaborative learning activities (Schneider & Pea, 2013). The results of their study have provided further implications for teachers' practices; with training, the authors posit that gaze-awareness tools could teach students the value of achieving joint attention in collaborative groups (Schneider & Pea, 2013).

Instructional Technology Challenges and Future Studies

The field of instructional technology, while constantly evolving and providing new opportunities for growth and innovation also presents challenges. By incorporating concepts like critical thinking, instructional designers can implement approaches to projects that directly address challenges from the preliminary stages of design. In the chapter by Yanchar et al. (in press), the need for critical thinking as an integral piece of the foundations of educational technology is discussed. Critical thinking, although widespread in its importance to a variety of fields, is especially relevant as a target skill for learners in a new and changing world (Yanchar et al., in press). The chapter provides an exploration into the nature, theory, methods, practices, and importance of implementing activities that encourage critical thinking in education. The authors explain that in educational technology critical thinking is primarily a skill to be cultivated in learners through a variety of techniques such as technology-mediated activities, facilitated peer interactions in a learning environment, and methods for scaffolding the development of critical thinking (Yanchar et al., in press). Yanchar et al. (in press) continues by discussing critical thinking in education using a twofold approach: (1) they describe two critical thinking activities determined to be needed in the field; and (2) they identify areas of educational technology that seem to require critical thinking at its most advanced levels.

The chapter continues with an examination of assumptions and implications of critical thinking in the context of scholarly literature and explores the use of Finn's criteria for professionalism (Yanchar et al., in press). Specifically, in the audio-visual field, Finn argued for increased professionalism. This emerging field eventually evolved into the professional community referred to today as Educational Technology (Yanchar et al., in press). Yanchar et al. (in press) continue their chapter with an investigation and explanation of three criteria developed by Finn as well as provide the corresponding Vincenti knowledge categories for each criterion. Finn's primary concerns were of the use and implementation of theory into practice. Yanchar et al. (in press) explains that research indicates that the average instructional designer is confused when it comes to theory and thus, ignores it completely and looks to models of other existing products to find learning solutions. This ignorance or uncertainty about theory may still be a concern today as rapid-prototyping methods of development continue to be intrinsic to the empirical methods for instructional development and in the systematic textbooks of today (Yanchar et al., in press).

Yanchar et al. (in press) provides some activities conducive to generating critical thinking within areas of instructional design that they believe would have the most impact. These areas of the field include: the nature of human action, inquiry methods, and professionalism (Yanchar et al., in press). Yanchar et al. (in press) concludes that one way to combat the challenge of a lack of critical thinking in the field of instructional design could be in the training of future designers. Instructional design programs could include a course on critical thinking in curricula, and thus facilitate the importance of this particular type of inspection (Yanchar et al., in press). Successful implementation of critical-focused programs could bring many positive benefits to the field and could be a major step in the field's progress into a future that demands creative, forward-thinking educational technologists (Yanchar et al., in press).

In the field of instructional design, understanding the end-user is very important. The needs of the learners and end-users may derive from diverse backgrounds and cultures. Therefore, the designer must conduct thorough learner-analysis and attempt to align the learning materials and content delivery accordingly. Wang and Schlichtenmyer's (in press) chapter focuses on working with learners that have different backgrounds and cultures from the instructional designer developing the materials. The authors present a review of theories and models related to instructional design, learning preference, motivation, and culture (2015). It is the responsibility and the challenge for instructional designers and project managers to conduct the appropriate research in order to develop training that motivates and clearly communicates expectations according to culture and background of the learners (Wang & Schlichtenmyer, in press). The chapter continues with explaining the importance of Cultural Sensitivity Training (CSI) and culture-integrated instructional design models in the context of learning styles and learning preferences (Wang & Schlichtenmyer, in press). A Multicultural Model of Learning Style is presented as a possible solution for the increasing globalization of industry and learning that account for the cultural diversity within and among groups of