Teaching Educational Technology: An Analysis of Course Syllabi from Teacher Education Programs

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Introduction

The literature reveals that courses on education technology are taught sporadically in teacher education programs and there are limited guidelines for course design (Hsu & Hargrave, 2000). Despite the increasing interest in integrating technology in classrooms, teachers often find themselves challenged by the lack of content-specific pedagogical strategies, and the time required to design classes (Bakir, 2016). In response to the need for baseline data for additional research and practice, the present study examines how education technology courses are taught in major teacher education programs in U.S. universities.

By reviewing the literature, we found few studies or reports have been conducted to provide a national landscape view of how educational courses are taught in teacher education in the United States (U.S. Congress, Office of Technology Assessment [OTA], 1995; Hsu & Hargrave, 2000; Moursund & Bielefeldt, 1999). The OTA study (1995) has shown that upon graduation, preservice teachers learned little about technology and its application in teaching and learning. Hsu and Hargrave (2000) surveyed 88 teacher preparation institutions, and their study results showed a shift of course content from educational media or instructional design to computer technology in teacher preparation. Their results also showed that compared with personal technology use or teacher productivity, there was a growing emphasis on integrating technology with curriculum. On the other hand, in recent years scholars and teacher educators have been advocating a stand-alone educational course in teacher education programs (Fedon, 2018; Jia, Jung, & Ottenbreit-Leftwich, 2017). They argued that together with method courses and field experiences, preservice teachers will be better prepared to integrate technology in their teaching (Fedon, 2018).

A major shift occurred in teacher education with the establishment of the International Society of Technology in Education standards (ISTE), previously known as the National Educational Technology Standards (NETS) (Bakir, 2016). In 2013, the National Council for Accreditation of Teacher Education (NCATE) adopted ISTE standards and required teacher education programs to restructure accordingly. The ISTE standards contributed to teacher education program by outlining and guiding fundamental concepts, skills, and attitudes pertaining to technology applications in educational settings (ISTE, 2008). However, there is a limited study on how ISTE standards are applied in the field.

Extensive studies have been conducted on innovative ways to improve preservice teachers' technology integration skills in teacher education programs. A study by Cherner and Curry (2017) showed that preservice teachers tend to use "low-level" technology in their practice. That is to say, instead of using technology to redefine or transform learning experiences for students, preservice teachers utilized technology to as a replacement or enhancement of existing educational activities. Results showed that the level of using technology shift higher as preservice teachers became more experienced and progressed through their internship. In another study, Zipke (2018) reported on the impact of a newly designed course that emphasized authentic learning experienced and field-based applications. Results showed an improvement of technology use in preservice teachers' lesson planning. On the other hand, several studies have shown that preservice teachers improved proficiency in technology use and felt interested in utilizing technology after various interventions, but they were not confident to use technology in their own class later on (Fedon, 2018; Zipke, 2018). Zipke (2018) suggested that it was crucial for preservice teachers to have constant training, modeling, and support from inservice teachers who were tech-savvy in order to extend what they have learned in teacher education programs. By reviewing the literature, we found that more recent data is needed for deeper and more vigorous analysis on how educational technology is taught in teacher education. The following questions guided our research agenda:

1. How is education technology taught in teacher education programs in the United States?
2. What are the foci of learning objectives in educational technology courses?
   a. How are these course objectives aligned with ISTE Standards for Educators?
3. What pedagogical features do education technology syllabi emphasize?
   a. What sources do educational courses use as text or reading(s)?
   b. What technological skills are embedded in educational technology courses?

Theoretical Framework

Ample studies have been conducted to examine pedagogical features associated with positive changes in teachers' knowledge, skills, attitudes, and teaching practices. For example, Darling-Hammond et al. (2017) identified seven course characteristics of effective professional development based on their extensive review of the literature. Courses for technology integration were also studied (An, 2018). By reviewing the literature (An & Reigeluth 2011; Asghar, Ellington, Rice, Johnson, & Prime, 2012; Garet, Porter, & Desimone, 2001), we have developed a combined codebook of pedagogical features (RQ3), which includes eight categories: subject specific, active learning, coherence, models and modeling, coach and expert support, collaboration, feedback and reflection, and technical skills. Description of each category is listed in Table 1.

Table 1. Effective pedagogical features of professional development

Subject focus	This element includes an intentional focus on discipline-specific curriculum development and pedagogies in areas such as mathematics, science, or literacy. (Darling-Hammond et al., 2017; Asghar et al., 2012). If a course has assignments or other course elements that entail subject-specific technology integration ideas, it would also count (An & Reigeluth, 2011).
Active learning	Active learning engages pre-service teachers directly in designing and trying out teaching strategies, providing them an opportunity to engage in the same style of learning they are designing for their students. Such PD uses authentic artifacts,

	interactive activities, and other strategies to provide deeply embedded, highly contextualized professional learning. This approach moves away from traditional learning models and environments that are lecture based and have no direct connection to classrooms and students. (Darling-Hammond et al., 2017).
Coherence	A PD activity is more likely to be to effective if it forms a coherent part of a wider set of opportunities for pre-service teacher learning and development. (Garet et al., 2001; Asghar et al., 2012). Three dimensions: the extent to which it builds on what teachers have already learned; emphasizes content and pedagogy aligned with national, state and local standards, frameworks, and assessments; and, support teachers in developing sustained, ongoing professional communication with other teachers who are trying to change with their teaching in similar ways.
Collaboration	"Collaboration" can span a host of configurations—from one-on-one or small-group interactions to schoolwide collaboration to exchanges with other professionals beyond the school (Darling-Hammond et al., 2017).
Use of Models and Modeling	PD that utilizes models of effective practice has proven successful at promoting pre-service teacher learning and supporting student achievement. Curricular and instructional models and modeling of instruction help pre-service teachers to have a vision of practice on which to anchor their own learning and growth. The various kinds of modeling can include (Darling-Hammond et al., 2017): video or written cases of teaching, demonstration lessons, unit or lesson plans, observations of peers curriculum materials including sample assessments and student work samples concrete sample activities and modules that were ready to go (Asghar et al., 2012)
Coaching and expert support (who delivered PD or provided support)	Coaching and expert support involve the sharing of expertise about content and evidence-based practices, focused directly on pre-service teachers' individual needs. (Darling-Hammond et al., 2017).
Feedback and reflection	Feedback and reflection are two other powerful tools found in effective PD; they are often employed during mentoring and coaching but are not limited to these spaces (Darling-Hammond et al., 2017). Feedback from peers Self-reflection of learning and practice (e.g. journal)
Technological skills	Technology skills in the context of designing learner-centered learning activities in their subject areas (An & Reigeluth, 2011).

ISTE standards contribute to teacher education by outlining and guiding fundamental concepts, skills, and attitudes pertaining to technology applications in educational settings. In the current study, ISTE Standards for Educators (See Table 2) are used as guidelines to analyze learning objectives in the course syllabi that we collected.

Table 2. International Society of Technology in Education Standards for Educators (ISTE, 2016)

Domain	Description
Learner	Educators continually improve their practice by learning from and with others and exploring proven and promising practices that leverage technology to improve student learning.
Leader	Educators seek out opportunities for leadership to support student empowerment and success and to improve teaching and learning.
Citizen	Educators inspire students to positively contribute to and responsibly participate in the digital world.
Collaborator	Educators dedicate time to collaborate with both colleagues and students to improve practice, discover and share resources and ideas, and solve problems.
Designer	Educators design authentic, learner-driven activities and environments that recognize and accommodate learner variability.
Facilitator	Educators facilitate learning with technology to support student achievement of the 2016 ISTE Standards for Students.
Analyst	Educators understand and use data to drive their instruction and support students in achieving their learning goals.

Method

Education technology courses for prospective teachers often go by different names, such as "Education Technology," "Technology Integration," and "Computer Applications in Teaching." Most of these courses are offered by Schools/College of Education (SCOE) in the fall and spring semesters.

In order to answer how education technology is taught in teacher education programs in the United States (RQ1), we selected one university with the largest preservice teacher enrollment in its state in 2017, according to National Teacher Preparation Data (US Department of Education, 2017), from each U.S. state as a representative university (total n=50). We then collected teacher education program information on these 50 universities' websites and whether educational technology courses were included in their teacher education degree plan. Data is reported descriptively.

To look into course objectives, course alignment with ISTE Standards (RQ2), and pedagogical features of educational technology courses (RQ3), we solicited course syllabi from the same education programs in RQ1 via email. Contact information of course instructors was collected on university websites. If no instructor was found, we contacted the director of teacher education programs for a referral to relevant course instructors. Reminders were sent two weeks after the initial request. As the time of writing this conference proceeding, we have collected and analyzed 20 course syllabi from 12 universities in 12 states, as it turned out some universities have more than one educational course in teacher education. The following information was recorded for each syllabus (Merced, Stutman, & Mann, 2018): learning objectives, course assignments, required textbooks, and types of supplementary resources (e.g., journal articles, educational news, videos).

The guidelines of Strauss and Corbin (1990) were followed in the coding of learning objectives (RQ2). First, each learning objective was independently coded by two researchers to generate a list of initial codes. Each code represented one single idea and if a learning objective had more than one idea, each idea counted once, which lead to a list of 187 learning objective ideas for a total 20 of course syllabi. Then the third and fourth researchers reviewed and verified the codes and resolved any disagreement. If there were any questions, the entire research team met again and revisited the raw data, codes, and made necessary adjustments to ensure data validity and reliability. Using the constant comparative method (Creswell & Creswell, 2017), we made coding modification, realignment, and refinement during the coding and recoding process. This process went through iterative cycles until codes were categorized, and 100% inter-rater reliability was reached. After we categorized learning objectives, we coded it with ISTE Standards for Educators (See Table 2) to see to what extent they were matched.

Course pedagogical features (RQ3) were analyzed qualitatively (Creswell & Poth, 2013). We first looked for instances in course syllabi that reflected pedagogical features in the Effective Pedagogical Features of Professional Development framework (See Table 1). Each syllabus was coded by at least two researchers and researchers met regularly to compare notes. Discrepancies were discussed and resolved until 100% inter-rater reliability was reached.

In the following section, we present the results of our preliminary study, an analysis of 20 course syllabi from 12 U.S. universities. Course short names[1] would be used to denote courses when we present data, such as ISTC 302 or EDTL 6272.

Results

Educational Technology Courses in The United States. According to our results, 32 out of 50 universities (64%) require an education technology course(s) for at least one certification area in their teacher education program. Among the 32 universities, 18 universities (36%) offer education technology courses in all their teacher education certification areas. Some universities only require students from certain majors to take the course (n=10, 20%). For instance, an education technology course is only required for undergraduates in Mathematics and Science teacher certification at the University of Georgia.

There are 16 out of 50 universities (32%) do not provide education technology course in undergraduate teacher education programs. Instead, educational technology is embedded in other courses taught in teacher education. Among the 16 non-edtech-course universities, there are three universities (6%) that require the course in their graduate level teacher education programs. In addition, two universities (4%) have an undergraduate minor in educational technology, which is an add-on to their preservice teacher programs, and aim for preparing teacher candidates for technology integration within the instructional contexts where they will teach.

For the 20 course syllabi we collected so far, four of them are optional courses, the other 16 courses are required for at least one certification area in teacher education. Most courses are for undergraduate level (n=17); three course delivery formats were revealed: face-to-face (n=6), blended (n=8), and online (n=6).

Foci of Learning Objectives. Among 187 learning objectives from 20 course syllabi, a total of seven categories emerged (See Table 3). Results show that designing and developing a technology-rich environment to facilitate K-12 student learning is the most frequently mentioned learning objective (42.2%; n=79), which usually involve master technical skills and incorporate digital tools with curriculum and instructional materials. Promoting teacher candidates' digital literacy is another major focus of these courses (18.2%; n=34), which include evaluating and selecting new information resources, implementing digital assessments and using resulting date to inform teaching. Developing knowledge around ethical issues of technology integration is mentioned less often (9.1%; n=17) and focused on including digital equity and responsible social interactions. A certain amount of learning objectives has shown a focus on teachers' awareness of developing digital literacy and 21st century skills of K-12 students (8.0%; n=15), such as critical thinking, creativity, problem-solving skills and collaboration. The category of developing professional learning networks, on the other hand, is less covered in these courses (11.2%; n=21). Teachers are taught to continue to learn and develop their skills within and outside of an digital learning community. In terms of demonstrating pedagogical knowledge and skills (7.0%; n=13), 13 learning objectives out of 187 are categorized in this category. Even though a majority of course objectives are aligned with certain national standards, only in a few courses student teachers themselves are taught to know or use these standards. Only 8 learning objectives among 187 mentioned student teachers should properly explain standards to K-12 students and their colleagues (4.3%; n=8).

Table 3. Learning objectives in educational technology courses

	Categories	Example	Percentage
A	Demonstrate knowledge, skills and participation of designing and developing technology-enriched learning experiences.	Design and customize technology-enriched learning experiences to engage students in activities that deepen understanding in core subject areas (ED 308/CE 444).	42.2% (n=79)
B	Demonstrate proper attitudes towards technology; develop digital literacy to support teaching and learning.	Model and facilitate effective use of current and emerging digital tools to locate, analyze, evaluate, and use information resources to support research and learning (ED 408).	18.2% (n=34)

[1] Course short names were modified to protect data privacy.

C	Demonstrate concerns and consideration of ethical issues in technology integration and use, including digital etiquette and responsible social interactions.	Demonstrate the basic principles of computer ethics and legalities to ensure compliance by professionals and students with laws, guidelines, licenses and security in the use of all media (ED 305).	9.1% (n=17)
D	Knowledge of K-12 student learning in a digital age; focus on using various digital tools to promote students 21st century skills.	Identify and discuss the critical skills, referred to as 21st century skills, essential to student success and vocational preparation in the 21st century and beyond (ED 307).	8.0% (n=15)
E	Develop professional learning network, continue to learn and develop their skills within and outside of an electronic learning community.	Craft a professional learning network, articulating clear goals for continued professional growth and documenting the development of digital skills (EDTL 6270).	11.2% (n=21)
F	Demonstrate pedagogical knowledge and skills.	Compare and contrast a variety of partnering pedagogies, including inquiry-, problem- and project-based methodologies (ED 307).	7.0% (n=13)
G	Knowledge of standards and requirements.	Explain the use of ISTE NETS for students and teachers (ED 410).	4.3% (n=8)
	Total		100% (n=187)

Course Alignment with ISTE Standards for Educators. Our results show an uneven distribution of course content aligning with the ISTE Standards for Educators (2016) (See Figure 1). Most of course learning objectives fell into *Designer* category (n=92, 47%), that is to design technology-enriched learning experience for students. However, compared with ISTE's emphasis on designing authentic and learner-driven activities (ISTE, 2016), most learning objectives in our data corpus put more emphasis on the mastery of computer skills and general technology integration in curriculum. For example, *learn how to use a variety of technology and media resources* (ISTC 301), *develop the basic understanding of productivity and utility software capabilities and be able to use a variety of applications* (EDLT) and *gain experience in planning to integrate technology into the classroom curriculum* (ISTC 301).

There are 42 learning objectives (21%) that could be categorized in *Citizen* domain of ISTE Standards (ISTE, 2016). To be specific, most of the content (n=32, 17%) covers the digital literacy aspect of *Citizen*, e.g. the "establishment of a learning culture that promotes curiosity and critical examination of online resources and fosters digital literacy and media fluency" (ISTE, 2016, p.1) while only a portion (n=10, 5%) covers the ethical aspects of *Citizen*, e.g., "Mentor students in the safe, legal and ethical practices with digital tools and the protection of intellectual rights and property" (ISTE, 2016, p.1).

Following *Citizen*, the next ISTE categories that have the largest number of learning objectives in our data corpus is *Learner* (n=16, 8%) and *Facilitator* (n=16, 8%). First, to be a successful educator in the digital age, ISTE requires teachers to continually improve their knowledge and practice of utilizing technology in a professional learning network. On the other hand, ISTE stressed that teachers need to utilize technology to facilitate student learning in digital age, e.g. taking ownership of their learning goals and outcome, becoming digital content creator. However, our data shows more emphasis on facilitating student critical thinking, creativity and communicative skills. For instance, *promote the development of 21st century skills such as creativity, critical thinking, problem solving, and communication* (ED 308).

As for *Collaborator* (n=14, 7%), our data shows that most of the collaboration in educational technology courses refers to collaboration with colleagues, while ISTE Standards have a unique aspect of collaborating and communicating with K-12 students (ISTE 2016). Given the context of these courses are taught in preservice teacher education programs, it is understandable that course instructors do not put much focus on collaboration with K-12 students.

Results show a limitation of teaching pre-service teachers to be *Leaders* (n=7, 4%) or *Analysts* (n=9, 5%) in educational technology courses. According to ISTE's description on *Leader* (2016), educators need to seek out opportunism to engage with educational stakeholders for student learning empowerment, model digital literacy for colleagues, and advocate for digital equity for all students. Our data show all 7 learning objectives are modeling effective technology use for colleagues and K-12 students. As for *Analyst*, there are nine learning objectives that cover using digital assessment tools and having data-driven decisions.

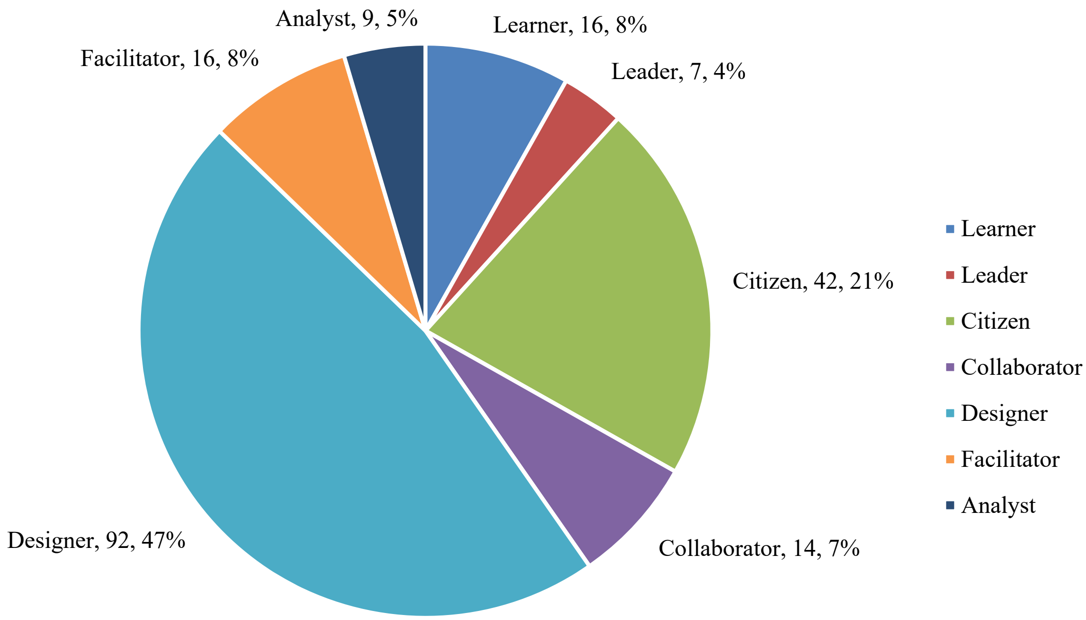


Figure 1. Course Alignment with ISTE Standards

Pedagogical Features. Results show an extremely uneven distribution of pedagogical features among the 20 courses we examined. First, 19 courses were not subject-specific, except for *EDTL 6270 Technology and the Reading Classroom*. There were 14 courses had active learning opportunities that engaged students directly in their practice. For example, in ED 305 Technology & Media in Education, student teachers are required to use SoftChalk course authoring software to create a developmentally appropriate lesson covering the topic of digital citizenship. In this assignment, students are given a chance to develop and practice skills that they will use for their future classrooms.

More than half of the courses required group projects that entailed collaboration. Four courses incorporated models of effective practice in their instruction, either from inservice teachers or previous students. There are 19 courses that required students to master some amount of technical skills. Regarding Coherence, 18 courses touched on at least one dimension, but most of them were not comprehensive. For instance, 18 out of 20 courses are aligned with national or state standards in their syllabus (Coherence 2), but only two courses mentioned that the course content is built on what teachers have learned before (Coherence 1) and seven courses had provided learning chances that support teachers in developing sustained, ongoing professional communication. For Coaching and expert support, four courses indicated that students should talk to the course instructors and receive guidance prior to some assignments. Over half of the courses used peer feedback and provided opportunities for reflection.

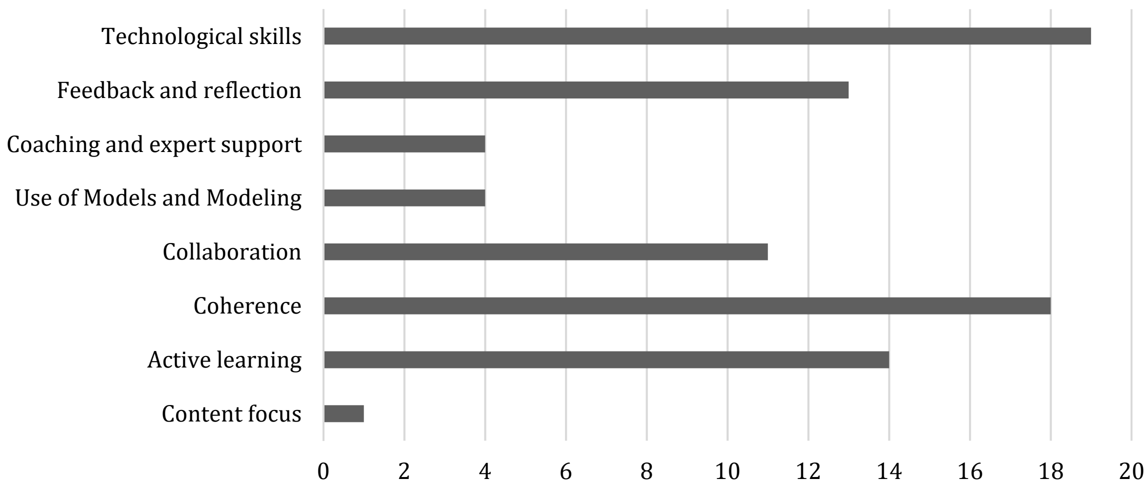


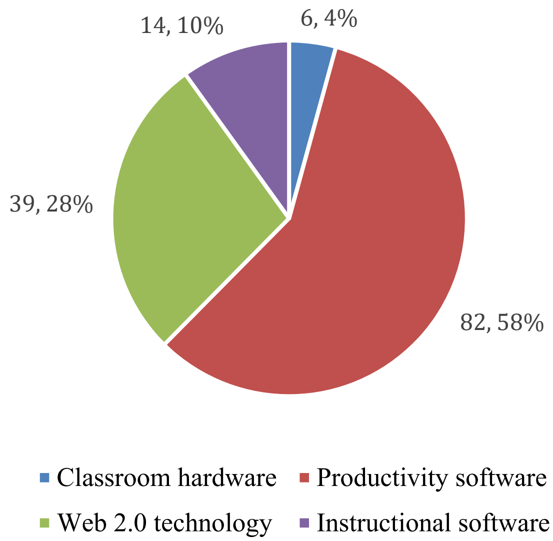
Figure 2. Distribution of course pedagogical features

Readings and Resources. Among 20 courses, six courses required textbooks in their syllabi and only one course required students have a lecture capture software, Snaglt. The other courses used a variety of resources, including news reports, materials written by instructors, blogs, educational websites, videos, and journal articles. Four courses provided supplementary resources for student learning, which included educational websites, blogs, news websites, videos, government report, state standards, journal articles, and book chapters. Notably, the types and range of instructional resources varied drastically from course to course. For example, one course does not require a textbook, but instead offers a wide range of resources from practitioner perspectives, including news, EdTech news, and government reports. On the other hand, another course used only one type of resource (journal articles) for its required and supplementary materials (See Appendix I).

Technological Skills. In the examination of educational technology course syllabi, we identified four categories of technological tools that preservice teachers were required to learn in class, including classroom hardware, productivity software, Web 2.0 technology and instructional software. We used the following inclusion criteria:

- Classroom hardware – tools and equipment that teachers and/or students use in class.
- Productivity software – application software used for producing information, such as documents, presentations, worksheets, charts, graphs, and digital video.
- Web 2.0 technology – tools and websites that emphasize user-generated content and participatory culture for end users.
- Instructional software – application software that include text, pictures, sounds, animations, and other various media used specifically to teach content-specific knowledge and skills.

Our results show that most technological skills that were required from preservice teachers were the mastery of productivity software (n=82, 58%). It reflects that producing digital content, e.g., slides, digital lesson plan and images, is seen as the most important technological aspect in teacher education. Another relatively large aspect is the use of Web 2.0 tools (n=39, 28%). What is worth mentioning is, besides the fluency in using Google Suites, many courses require preservice teachers to create websites or blogs as course assignments. As for instructional software (n=14, 10%), most of applications mentioned in technology courses for pre-service teachers are learning manage system (LMS), while it also includes lecture capture software (SnagIt), and online assessment tool (Quizlet). Classroom hardware is the least mention technology tools for preservice teachers to master (n=6, 4%), which include assistive technology, laptop, interactive white boards (IWB) and Clickers, an assessment tool.



Discussion & Implications

According to the results from our preliminary study, we found remarkable variations in the ways education technology is taught in teacher education programs. Each course had its own emphasis either on technical skills, pedagogical knowledge, or history and theories, reflected in the resources they cited/utilized. The present study could provide meaningful information for designing and teaching educational technology in teacher education programs while providing a current snapshot of the field.

Advocate for a stand-alone technology course in teacher education programs. First, we found out that only part of teacher education programs in our sample offered educational technology courses. Previous studies have suggested that a stand-alone technology course is beneficial for teachers' knowledge and skill development, and future practice with technology (Fedon, 2018). Thus, we suggest there should be a place for educational technology courses in teacher preparation sequence.

More content specific educational technology course in teacher education is needed. Among all 20 courses we examined in the study, only one is subject specific. However, literature has shown that one major feature of effective professional development is discipline specific (Darling-Hammond et al., 2017; Asghar et al., 2012; An & Reigeluth, 2011). They argued that this type of professional development gave teachers "the opportunity to study student work, test out new curriculum with their students, or study a particular element of pedagogy or student learning in the content area" (Darling-Hammond et al., 2017, p.5). Technology courses should have content specific focus as well (An, 2018).

Further effort is needed to align course content with the national technology standards. Our data shows that even though some courses were designed in line with some aspects of national standards, there are some improvement needed. First, instructors should update their references with a newer version of the standards. For example, we found out the prevalent use of NETS in course syllabi while NETS has changed its name and content to ISTE in 2007 and has released a couple of updated versions since. Second, a more comprehensive and in-depth reflection of ISTE standards needs to be considered at designing educational courses. Our results show an uneven distribution of alignment with ISTE standards. Nearly half of the courses learning objectives focus on preparing preservice teachers to become *Designer* (e.g., designing technology-enriched learning experiences for K-12 students), while only 4% has touched on developing professional learning network (e.g., *Learner*). What's more, even within the most popular *Designer* category, many courses didn't reflect the essence of ISTE standards. Compared with ISTE's emphasis on designing authentic and learner-driven activities (ISTE, 2016), most learning objectives in our data corpus remains on the level of the mastery of computer skills and general technology integration in curriculum.

Technology in courses. Our study suggests that technological skills embedded in educational technology courses should move to a higher-level, e.g., from productivity to instructional software, from teacher-centered to student-centered. Our study has confirmed previous study results that the focus of technology use in teacher preparation is still teacher centered and often involves productivity and efficiency (Cherner & Curry, 2017; Hughes, Cheah, Shi, & Hsiao, 2019).

Limitation

The current study has a few a limitation. First, it collected data from only 50 universities that prepare the largest number of teachers. Second, for RQ2 and RQ3, we collected and analyzed course syllabi, which are limiting in many ways. Course syllabi outline the basics of a course, but they do not describe how the course is actually implemented in practice. Some course syllabi were less detailed than others and didn't include enough description of assignments or tasks. Despite these limitations, the need for examining how educational technology courses are taught is needed in the field.

Conclusion

This qualitative research study collected data on teacher education programs and examined course syllabi of education technology that are taught in major teacher education programs in U.S. universities. We are interested in how the course is taught and what pedagogical features do these courses emphasize. Our results revealed a wide range of course objectives, which mostly focus on developing student teachers' knowledge and skills to design and develop a technology-rich environment; on the other hand, ethical issues and professional learning are covered less. Most courses are non-subject specific but certain assignments would involve students to incorporate subject ideas. The present study could provide meaningful information for designing and teaching educational technology in teacher education programs while providing a current snapshot of the field.

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Appendix I Required & Supplementary Resources in Educational Technology Courses:

Required/Optional	Types	Titles
Required	Software	Lecture capture software – SnagIt can be purchased for 29.95 through the educators discount: https://www.techsmith.com/products.html
Required	Book	Roblyer, M. D. and Hughes, J. E. (2019). *Integrating Educational Technology into Teaching* (8th ed.). New York, NY: Pearson Education, Inc.
Required	Book	Hall, T. H, Meyer, A., & Rose, D. H. (Eds.). (2012). *Universal Design for Learning in the Classroom: Practical Applications*. New York, NY: Guilford Press
Required	Book	Bender, W. B. (2012). *Technology and the New Differentiated Instruction from Differentiating Instruction for Students with Learning Disabilities: New Best Practices for General and Special Educators*. Thousand Oaks, CA: Corwin
Required	Book	Bender, W. B. (2012). *Technology and the New Differentiated Instruction from Differentiating Instruction for Students with Learning Disabilities: New Best Practices for General and Special Educators*. Thousand Oaks, CA: Corwin
Required	Book	Prensky, M. (2010). *Teaching digital natives: Partnering for real learning*. Thousand Oaks, CA: Corwin.
Required	Book	Simonson, M. R. (2012). *Teaching and learning at a distance: Foundations of distance education*. Boston: Allyn & Bacon.
Required	Book	Lindsay, J. (2016). *The Global Educator: Leveraging Technology for Collaborative Learning and Teaching*. Arlington, VA: International Society of Technology in Education
Optional	Book	Jonassen, D.H. (2006). *Modeling with technology: Mind tools for conceptual change (*3rd ed.). Upper Saddle River, NJ: Prentice Hall.
Optional	Book	Newby, T. J., & Lewandowski, J. O. (2013). *Teaching and learning with Microsoft Office 2010 and Office 2011 for Mac*. Upper Saddle River, NJ: Pearson
Optional	Book	O'Blannon, R.W., & Puckett, K. (2007). *Preparing to use technology: a practical guide to curriculum integration*. Boston: Allyn & Bacon.
Optional	Book	Prensky, M. (2010). *Teaching digital natives*. Thousand Oaks, CA: Corwin
Optional	Book	Rice, K. (2012). *Making the move to K-12 online teaching: Research-based strategies and practices.* Boston: Allyn & Bacon.
Optional	Book	Roblyer, M.D., & Edwards, J. (2006). *Integrating educational technology into teaching* (4th ed.) . Upper Saddle River, NJ: Prentice Hall.
Optional	Book	Bellanca, J. (2010). *Enriched Learning Projects: A Practical Pathway to 21st Century Skills*. Bloomington, IN: Solution Tree Press

Optional	Book	DuFour, R., DuFour, R., Barell, J., Darling-Hammond, L., Dede, C., Fisher, D., Fogarty, R. J. (2010). *21st Century Skills: Rethinking how Students Learn. Bloomington*, IN: Solution Tree Press.
Optional	Book	Jacobs, H. H. (2010). *Curriculum 21: Essential Education for a Changing World*. Alexandria, VA: ASCD.
Optional	Book	Prensky, M. (2005). *Don't bother me mom – I'm learning!* St. Paul, MN: Paragon House.
Optional	Book	Prensky, M. (2001). *Digital game-based learning*. Columbus, OH: McGraw Hill.
Optional	Reference	Academic OneFile - Academic database with millions of articles in full text with extensive coverage of the physical sciences, technology, medicine, social sciences, the arts, theology, literature and other subjects.
Optional	Reference	Academic Search Premier - Large academic multidisciplinary database with full-text for over 4,000 magazines and journals, 90% of which are peer-reviewed
Optional	Reference	Access Science - Electronic version of the McGraw-Hill Encyclopedia of Science & Technology, featuring information on more than 7,000 scientific topics
Optional	Reference	Chronicle of Higher Education - College and university-related news articles and job information
Optional	Reference	ERIC - Citation and abstract information from over 1,000 journals in education
Optional	Blog	Davis, V. (n.d.). Cool Cat Teacher Blog. Retrieved from http://coolcatteacher.blogspot.com/
Optional	Website| Mindshift	Duncan, A. (n.d.). Mindshift: How we will learn. Retrieved from http://blogs.kqed.org/mindshift/
Optional	Website| Edutopia	George Lucas Educational Foundation. (2012). Edutopia. Retrieved from http://www.edutopia.org/
Optional	Website| ISTE	International Society for Technology in Education. (2012). NETS: Advancing digital age teaching. Retrieved from http://www.iste.org/standards/nets-for-teachers.aspx
Optional	Book	Williams, R. (2014). *The Non-Designer's Design Book 4th Edition*. New York, NY: Pearson Education, Inc.