When Physical Education Meets Technology: Responding to Technological Needs of Teaching Physical Education in the U.S.

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Abstract

The increasingly critical role of technology in teaching has resulted in noticeable reform efforts and updating Physical Education Teacher Education (PETE) programs to meet new educational needs. This study investigated the technology components included in PETE undergraduate curricula in U.S. public research universities. Using comparative content analysis, descriptive analysis, and proportion test, 89 PETE undergraduate curricula were examined focusing on technology course credits. The results revealed that: (a) PETE undergraduate programs were less likely to include technology components in their PETE curriculum across the U.S.; (b) among the programs that had technology components, 75% of them included technology credits in their degree/certificate requirements; and (c) fewer PETE oriented technology courses were specifically offered to PETE students. The data from the study suggested that there was a lack of technology-related training in the existing PETE undergraduate programs. More research is needed to ensure that preservice teachers possess the needed technological knowledge.

Keywords: physical education teacher education, curriculum, technology components

Introduction

Technology integration plays an important role in teacher education in all disciplines across the globe. For teaching physical education in the digital era, teachers and teacher preparation programs often encounter challenges caused by using new technologies. In the U.S., how preservice teacher are prepared in terms of using technologies for educational purposes through their physical education teacher education (PETE) programs will directly affect how they will teach physical education in the future. This in turn will impact the overall health of the next generations (Cawley, Frisvoldc, & Meyerhoeferd, 2013; Sallis, Floyd, Rodríguez, & Saelens, 2012). As a matter of fact, it has been suggested that teachers need to develop their technological pedagogical content knowledge (TPACK) for effective teaching with technology in class (American Association of Colleges of Teacher Education and the Partnership for 21st Century Skills, 2010; Koehler, Mishra, & Cain, 2013; Muilenburg & Berge, 2015). In addition, current guidelines of technology integration in the U.S. such as International Society for Technology in Education (ISTE) (2017), and curriculum standards such as Common Core State Standards (CCSS) in K-12 education (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010) all highlight the importance of the development of teachers' knowledge of using technology in teaching practices in various disciplines.

In addition to the above standards and guidelines, according to the U.S. National Standards for Initial Physical Education Teacher Education (SHAPE America, 2017), physical education teacher candidates need to plan and implement appropriate learning experiences through the effective use of technology to address the diverse needs of all students. Furthermore, many in-service physical education teachers agreed that technology is an important instructional tool and should be integrated in their teaching (Eberline & Richards, 2013; Juniu, Harris, & Hofer, 2012; Luptákovál & Antala, 2017). However, studies on these topics have reported a lack of adequate knowledge to effectively implement technology in real teaching (Ince, Goodway, Ward, & Lee, 2006; Strand & Bender, 2011; Woods, Karp, Hui, & Perlman, 2008).

Researchers and practitioners explored various theoretical frameworks and guidelines that could support effective technology integration (Hughes, Liu, & Lim, 2016; Koehler & Mishra, 2009;

Koehler et al., 2013). In addition, scholars have pointed out that the design and implementation of curricular could improve teacher pedagogical content knowledge and other abilities to deal with complex problems in teaching (Kent, Pligge, & Spence, 2003; Noh & Webb, 2015). Meanwhile, previous studies suggested that physical education teacher education (PETE) programs have the potential to shift pre-service teachers' thinking towards positive perceptions of technology integration (Gotkas, 2012; Krause, 2017).

Therefore, current PETE programs play important roles in preparing pre-service teachers for their future teaching careers. Yet, few studies have investigated undergraduate PETE programs in curricular ways that how they implement technologies for better teacher preparation. To fill the gap in knowledge and provide insights for PETE researchers, educators, and policymakers from the U.S. perspective, this study aimed to investigate the technology components embedded in undergraduate PETE curriculum in public research universities in the U.S. as our initial project—public university programs usually share their course and curriculum information publicly compared to private universities.

Technology Integration in Teacher Education and Curriculum

With rapid technology development, teachers are challenged by various technology integration daily. Regarding how teachers can develop necessary knowledge for effective teaching with technology in class, Koehler and colleagues (2009, 2013) suggested the technological pedagogical content knowledge (TPACK) framework. Built on Shulman's pedagogical content knowledge (PCK), the TPACK framework indicated that technology integration requires not only teachers' knowledge of technology, but also their content and pedagogical knowledge to employ new technologies in the various learning contexts.

To guide more effective technology-supported teaching and learning, researchers and educators have provided practical guidelines for using technology in teaching. For example, the importance of preparing educators to implement different technological tools into teacher education programs has been recognized by the National Council for Accreditation of Teacher Education (NCATE) (2008) and the International Society for Technology in Education (ISTE) (2017). ISTE published five sets of standards for different groups in education such as students, educators, administrators, technology coaches, and computer science educators. Particularly, The ISTE standards for educators define pedagogical approaches using technology to empower students and improve their teaching practices (ISTE, 2017). Teachers' technological skills can also be aligned to the Common Core State Standards (CCSS) in different content specific subjects in K-12 education. For instance, the College and Career Readiness (CCR) anchor standards for writing standards provide guidelines for English language arts teachers on what students should understand and be able to do (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). For instance, under the production and distribution of writing type section for 7th grade students, the guideline mentions the use of technology to produce writing and share with others, indicating teachers need to "use technology, including the Internet, to produce and publish writing and link to and cite sources as well as to interact and collaborate with others, including linking to and citing sources" (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010, p. 43). This standard indicates that students are already using technology "strategically and capably" for their language use (p. 7) and teachers can tailor the instruction for the standards by better understanding students' needs and competence in using technology.

Scholars also suggested teacher education programs to include the use of the most innovative technology in teacher education programs as part of the transformation of teacher education program (Resta & Carroll, 2010), because studies have indicated that teacher education programs provide learning opportunities that preservice teachers can observe while their faculty use technology in classrooms (Caughlan & Jiang, 2014; Ertmer, 2003). Particularly, these learning experiences can be integrated as a part of class while preservice teachers are taking courses in their program (Funkhouser & Mouza, 2013; Kim, Kim, Lee, Spector, & DeMeester, 2013). Situated in Lortie's concept of the "apprenticeship of observation" with preservice teachers (Lortie, 1975), the modeling experience of teaching with technology aligns with how preservice teachers develop their perceptions of teaching with technology. Technological modeling is the conceptual framework to provide direct or indirect teaching practice for pre-service teachers by focusing on "what and how instructors use technologies in the presence of pre-service teachers" (Hughes et al., p. 185). Teacher preparation programs often require pre-service teachers to complete a set of courses. During the training, pre-service teachers can observe how their faculty use technology to teach in the classroom. And such learning experiences would eventually affect their future technology use (Ertmer, Ottenbreit-Leftwich, & Tondeur, 2014; Mouza, Karchmer-Klein, Nandakumar, Ozden, & Hu, 2014; Valtonen et al., 2015).

Overall, current guidelines of technology integration highlight the importance of teacher preparation and development of teacher knowledge of using technology in teaching practices. In addition, while technologies support preservice teachers' learning by supporting instructional objectives, they also create opportunities for pre-service teachers to observe how technology can be used in class.

Technology Integration in Physical Education Teacher Education

PETE researchers in the U.S. have also recognized the importance of pre-service teachers' technology learning (Ayers & Housner, 2008; Krause & Lynch, 2016). Ayers and Housner (2008) suggested that physical education content, curricular issues, technology, and diversity should be the four specific areas included in the PETE program. Specifically, the authors pointed out in the PETE program, "integration of technology and diversity is improving, but there is still a reliance on single courses and unsystematic sets of experiences" (Ayers & Housner, p. 65). Krause and Lynch (2016) noted that PETE programs which focus on improving students' TPACK may need to design lessons with technology and use a variety of technologies for learning content to better meet teacher preparation standards and prepare students for effectively using educational technology in teaching in the future.

Although many in-service physical education teachers agreed that using technology is an important skill and should be integrated in their teaching, many of them reported the lack of adequate knowledge to effectively implement technology in real teaching (Ince et al., 2006; Lee & Tsai, 2008; Russell, 2007; Strand & Bender, 2011; Woods et al., 2008). Russell (2007) examined in-service physical education teachers' knowledge, experience, anticipated scholastic usage perception, and attitudes regarding active gaming. They found the majority of teachers demonstrated less favorable attitudes, a lack of knowledge and experience towards education technology, which resulted in less usage of technology. A study by Lee and Tsai (2008) also found that older and more experienced in-service physical education teachers had lower levels of self-efficacy regarding their TPACK.

Among various challenges for technology integration, one major concern is that physical education teachers, if they lack critical consideration, will choose to use technology when it is accessible, rather than with meaningful educational purposes, which will become distractive rather than facilitating student learning (Juniu, Shonfeld, & Ganot, 2013). Therefore, physical education teachers must have a clear understanding on how technology may support pedagogical strategies and contribute to data collection for skill analysis, as well as assessment of physical activity, cognitive learning and health-related fitness.

In summary, current PETE programs offered in the U.S. must address all the technological skills that physical education teachers need to provide quality physical education. With these technology skills, students graduated from PETE can be better prepared to promote various physical education aspects including movement skills, physical activity and health-related fitness.

Importance of PETE Curriculum in Teachers' Technology Application

It has been well documented that the design and implementation of curriculum could improve teachers' PCK, and the value of curriculum as the vehicle to increase teachers' content knowledge has been recognized by many educators and school leaders (Kent et al., 2003). In addition, literature also suggested that curriculum serves as a critical factor regarding teacher ability to deal with complex problems (Noh & Webb, 2015).

Moreover, it is very important to understand how teacher knowledge and skills can be addressed effectively to support their teaching (McLachlan et al., 2017). To improve teacher competencies in technology to assist their teaching practices, Polly and his colleagues (2010) applied introductory information and communication technology in their curriculum, which aimed to develop pre-service teacher technological knowledge and skills with a set of basic competencies that they can employ to their future teaching practices. In addition, many researchers suggested that providing pre-service teachers with the opportunities to experience technology content by integrating TPACK across the curriculum is needed (Tondeur, Roblin, van Braak, Fisser, & Voogt, 2013).

Among various factors that may determine physical education teachers' use of technology, technology training is one of the most influential factors that affects teacher attitude towards technology (Ince et al., 2006). Meanwhile, interventions that were designed to develop pre-service physical education teachers' technology integration competency could increase their perception and technology integration (Gao, Tan, Wang, Wong, & Choy, 2011). A study by Lim (2005) examined pre-service physical education teachers' learning outcome after taking a technology-integrated undergraduate course in PETE, and found significant improvements in both technology competency and attitudes toward technology. Additionally, it has been pointed out that the more PETE candidates are exposed to technology, the greater possibility that they will utilize it (Kul, 2013). Hence, PETE programs have the responsibility to create opportunities for PETE pre-service teachers to learn technological content and experience the use of technology so that their TPACK can be developed in ample methods (Scrabis-Fletcher, Juniu, & Zullo, 2016).

To date, researchers have studied PETE programs regarding technology integration in the PETE courses. A study examining technology integration in PETE programs indicated that technology was not effectively used across the PETE courses (Leight & Bachtel, 2010). However, few studies have investigated undergraduate PETE programs from the curricular perspective focusing on how technology related courses are integrated in PETE programs. Thus, this study aimed to reveal the technology related courses or statements that are provided by undergraduate PETE programs in public research universities in the U.S., which could provide insights for PETE researchers, educators and policy makers to better prepare teacher candidates in technology competency for their future teaching in physical education.

Research Questions

To understand the PETE curriculum regarding technology related courses and statements in the public research universities in the U.S., our overarching research questions are: (a) what is the status of technology preparation in undergraduate PETE programs in the U.S.? And (b) how are technology components configured in undergraduate PETE programs in the U.S.? Specifically, what are credits, requirements, and content relevancy to those technology components included in PETE curriculum?

Method

A mixed-method approach was used for this study (Tashakkori & Teddlie, 2009). Specifically, a parallel mixed design was applied during the data collection, where both qualitative and quantitative data were collected at the same time and emphasized as evenly as possible in the analysis of the data (Tashakkori & Teddlie, 2009). Because the "research involving publicly available data does not require IRB review" (Office of Research Support and Compliance, 2018), no IRB approval was needed.

Procedure

According to the Carnegie Classifications of Institutions of Higher Education (Carnegie Classification of Institutions of Higher Education, 2016), there are three main categories among colleges and universities in the U.S.. The first category is termed "doctoral", which indicates the institutions award a minimum of twenty research/scholarship degrees. The second category is titled master's colleges and universities, which includes institutions that provide a minimum of fifty master's degrees, but fewer than twenty doctoral degrees. And lastly, the third category is designated for baccalaureate colleges, which includes bachelor-based institutions (i.e., over 50%), with less than fifty master's degrees and twenty doctoral degrees awarded.

In this study, we focus on the first category – "doctoral" institutions that also are public universities in all 50 states because they are usually the flagship universities in the states. Based on the four census regions and divisions (i.e., West, Midwest, South, and Northeast) of the 50 states in the U.S. (U.S. Census of Bureau, 2009), we selected 2 universities as the sample for each state in different divisions. Take Arizona state for example, we selected "The University of Arizona" and "Arizona State University". However, some states only have one public doctoral university (e.g., Alaska and Wyoming). Therefore, there were 89 selected PETE undergraduate programs in public doctoral universities among all 50 states. See Table 1 for the detailed demographic information.

We defined technology components in a program according to the following two criteria: (a) the program has course credits related to enhance student knowledge and practical use of technology in teaching and learning; and (b) the program has a description about using technology for teaching and learning, even though a specific course is not included in the curriculum. For example, a three-credit course named "Technology in Teaching Health and Physical Education" is considered as the first type of technology components in the program, whereas a description on the program official website stating, "use information technology to enhance learning and to enhance personal and professional productivity" is considered as the second type of technology components.

The websites of selected PETE programs were found through Google search engine, followed by the examination of the page content with a focus on technology-related information. Key words were used to target specific information, including "technology", "technological", "computer", and "media". Based on the proposed research questions, four factors were specifically examined and recorded, including technology components (i.e., technology-related course or description), technology course credits, course requirement (i.e., required, elective, and other), and content relevance (i.e., courses are related to PETE specific, general teacher education, all students, and other). All data were recorded in an excel file for further analysis.

Data Analysis

Comparative content analysis (Charmaz, 2000) was firstly used to examine the data included in the program website. Specifically, all researchers examined the qualitative data and consented to code them into four quantitative variables including technology components, technology course credits, course requirement, and content relevance. The researchers independently coded all selected universities in each geographic region. All codes have reached agreements among four coders. Peer debriefing was also used to ensure the trustworthiness and credibility of the data and resulting interpretations.

Data cleaning and recoding were conducted prior to the statistical tests. Technology component, course requirement and content relevance were recoded into dichotomous variables, while course credit remained as a numerical variable. Proportion tests (e.g.., Binomial tests, Pearson's Chi-Square tests) were used to examine whether there were statistically significant differences of the aforementioned technology configurations by geographic locations, because many new technologies are first invented in some states on the west coast, resulting possible discrepancy in adopting technologies. All statistical analyses were conducted in SPSS. v21. After the quantitative analysis, using interpretive approach (Merriam, 2002), we further analyzed one university's curriculum regarding its technology components because it could provide a good example on integrating technology components in PETE curriculum.

Results

Overall Program Comparison

According to the data, there are 64 out of 89 universities that have PETE programs. Among those 64 universities, only 32 PETE programs (50%) have technology components. By looking at each geographic region, only 31.5% and 33.3% of the PETE programs in the West and Northeast regions, respectively, have technology components in their curriculum, while the percentages of the technology components included in the PETE program in the Midwest and South are higher (i.e. 70.6% and 54.5%, respectively) (see Table 1).

Table 1 *Technology Components Information in Different Universities and Programs*

Areas	# of State	University (Total)	# of PETE program (PETE)	# of Programs with Technology Components (TC)	Percentage (TC/PETE)
West	13	23	19	6	31.5%
Midwest	12	23	17	12	70.6%
South	16	30	22	12	54.5%
Northeast	9	13	6	2	33.3%
Total	50	89	64	32	50%

The Binomial tests presented that in general, 32 out of 89 universities in this study have incorporated technology components in their PETE curriculum, indicating significant fewer (i.e. less than 50%) technology-incorporated curriculum (p = .011). Particularly, such differences were mainly contributed by the West and Northeast regions (p_{West} = .035, $p_{Northeast}$ = .022). Furthermore, although the West and Northeast regions had fewer technology components in their PETE curriculum, they were not statically significantly lower than other regions according to the Pearson's Chi-Square tests (χ_{region} 2 = 5.516, p = .138), indicating that technology incorporation in PETE curriculum is independent of region. Therefore, regardless the region, the technology components in the PETE program of public research university U.S are overall low.

Credit Comparison

Differences of credit numbers were further analyzed among those 32 PETE programs which had technology components (See Table 2). The results indicated that programs had one technology course with various course credits, ranging from one to 10 and three was the median given that 18 PETE programs' curricular had three credits for a technology-related courses. Noticeably, one university has 10 credits (about 3 courses), which specifically described that their students “will use video cameras and computer software to analyze sport skills and improve teaching effectiveness, K-12 student accountability and personal reflection”.

Table 2 *Credit Comparison by Regions*

Credits	1	2	3	4	6	7	10	Other	Total
West	0	1	4	1	0	0	0	0	6
Midwest	1	1	5	2	1	1	1	0	12
South	1	1	8	0	1	0	0	1	12
Northeast	0	0	1	0	0	0	0	1	2
# of programs	2	3	18	3	2	1	1	2	32

The category listed as “Other” indicates programs that include descriptions about using technology in the program website but did not have specific courses offered in the program. For example, one program was categorized into “Other”, because it listed "use information technology to enhance learning and to enhance personal and professional productivity" as student learning outcome in their website. However, it does not list any specific technology-related courses.

Required vs. Elective Course Requirement

Besides the credit numbers, programs also differed in whether technology credit is required in the PETE program. Particularly, among the 32 PETE programs incorporating technology components, 24 programs require students to take technology-related courses to complete their program study, indicating that significantly more universities (i.e. 75%) have technology requirement for their PETE students ($p = .007$). On the other hand, a few programs (i.e., 8) do not have such requirement according to the binominal test ($p = .007$).

Physical Education Content Relevancy

Content relevancy indicated that significantly more PETE programs offer technology courses specifically to PETE students in combination of PETE-specific content ($p = .001$). Specifically, only 6 out of 32 PETE programs (i.e., 23%) offer technology courses that are specifically designed for PETE major, while the majority did not.

An Example Case

The example case is a PETE program (program U, pseudonym name) in Department of Kinesiology at a university in the Mid-west region. We selected this program because 1) it offered three credits required technology course specifically for PETE students, which followed TPACK framework to integrate technological knowledge (TK), specific content area knowledge (CK), and pedagogical knowledge (PK) together to achieve effective teaching using technology (Koehler & Mishra, 2009); 2) it provided a webpage to host all the material for this course such as syllabus, calendar, weekly projects instruction, and other class resources, which was similar to what College and Career Readiness (CCR) anchor standards in “use technology, including the Internet, to produce and publish writing and link to and cite sources as well as to interact and collaborate with others, including linking to and citing sources” (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010, p. 43). The webpage also showed there are social media presence (e.g., Twitter, Facebook and Pinterest) for this course. Based on this information, we consider this PETE program as a good example of active technology integration in courses and effective student support.

The course in program U is titled “Microcomputer Applications in Kinesiology”. The purpose of the course is to “offer students an introduction to computer applications in Kinesiology”. There are two instructors in this course, who teach three times a week (i.e., M-WF) during Fall 2017 semester. During 16 weeks’ class, students need to finish 8 weekly projects, and learn about Microsoft Office Tools, including word processing, spreadsheet, database, and presentation. They also study how to use electronic mail, audio and video file editing for podcasting, the World Wide Web, and Website development (Weebly and Dreamweaver). By working on projects and practicing using technology, students have opportunities for intensive study and practice of current technologies as a part of their preparation into the Kinesiology professions, such as being a PE teacher. however, it is important to note that widely instructional technologies such as white boards, classroom clickers, etc. were not included, considering such a course was not designed for preservice teachers only.

Discussion and Conclusions

As noted earlier, modern educational technology has greatly influenced how teaching and learning will occur in physical education settings. Traditional teaching strategies have been greatly challenged by new technologies (Eberline & Richards, 2013; Juniu et al., 2012; Krause, 2017). Teacher preparation programs need to reform their curricular to meet the new changes in the digital era so that future citizens are well prepared to use technologies (Funkhouser & Mouza, 2013; Kim et al., 2013).

PETE programs play a pivotal role in preparing high quality future physical education teachers (Krause & Lynch, 2016). In order to be aligned with the rapid educational technology development, both learning technology and physical education specialists need to collaborate to develop quality technology courses for PETE students in a timely manner given that the subject matter of physical education is unique. Thus, special efforts are needed to integrate technology with teaching physical education. Unfortunately, to the best of our knowledge, very limited attention has been given to preservice physical education teachers’ TPACK. This line of research warrants more investigation in the future.

This study sought to fill the research gap by revealing the status of technological preparation that undergraduate PETE programs offer in public universities in the US. Using a purposeful sampling method, our study marks the first attempt to examine preservice physical education teachers’ TPACK training through PETE programs. There are three major findings: (a) PETE programs are less likely (i.e. less than 50%) to include technology components in their PETE curriculum; (b) among the programs that have technology components, more than two thirds (i.e. 75%) include technology credits in their degree/certificate requirements; and (c) there are significantly less PETE-oriented technology courses (i.e., 23%) offered specifically to PETE students.

Findings from the current study could shed new lights on preservice teachers in their future teaching. The results of this study could provide guidelines for further developing quality technology related requirements for PETE students. It is hoped that this study would stimulate more research on the topic which is currently understudied. In essence, this study contributes to our knowledge base by (a) identifying the gap in PETE students' TPACK preparation embedded in their degree programs; and (b) pointing out future directions for technology integrating with teaching physical education.

In addition, in line with previous findings, this study contributes by confirming the low prevalence of technological preparation among pre-service physical education teachers in public research universities in the country, which is a cause for concern for the PETE professionals. Professionals in PETE program should consider incorporating technology components in program planning and curriculum design. More importantly, this study recognized the weakness of low subject relevance in technology courses, indicating more PE-oriented technology components should be integrated into the PETE curricular to effectively enhance pre-service PE teachers' technological self-efficacy.

Although previous studies on the topic have suggested a promising future with positive pedagogical changes (i.e., academic learning and health outcomes via more active engagement), it is only if technology is effectively implemented. To this end, PETE programs must integrate technology for those pre-service teachers to improve the effectiveness of content delivery in physical education. Based on the data from 64 out of 89 public universities in 50 US states, over half of the PETE programs had technology components in their curriculum, varying greatly in course credits (i.e., 3 to 10 credits). This means that the quality of technology preparation for PETE students is different across programs.

It is interesting that the Midwest universities have the highest prevalence of technology integration in their undergraduate PETE programs. The higher application of technology in PETE programs could be related to the local educational technology policies in the Midwest universities. According to Moran and associates (2010), it was noticeable that all students were required to purchase standard issue Tablet computers enabled with varied digital features to enhance teaching and learning at a small Midwest university. Additionally, to the best of our knowledge, universities in Midwest region have many reported studies regarding technology and education research as well as the development of technology courses for teacher preparation (see Pan & Franklin, 2011; Renes & Strange, 2011). Another possible reason is that university in Midwest region may have a closer relationship with each other due to closer geography connection, therefore, once one university adopted the curriculum, the others could easily adopt the same curriculum, or build similar ones.

As for the course credit requirement for technology preparation in different programs, most courses are 3 credits, and are mostly required by the programs. However, the percentage of programs with specific technology course credits was low (i.e., 23%). This is a cause for concern. According to TPACK framework, Koehler and his colleagues (2009, 2013) suggested that teachers need to integrate technological knowledge (TK), specific content area knowledge (CK), and pedagogical knowledge (PK) together to achieve effective teaching using technology. Without training on using technology towards specific PE subject, preservice PE teachers might face challenges in their future career. Therefore, we suggest that a greater endeavor by PETE programs to offer more technology-related course specific to PETE students, so as to prepare pre-service teachers with higher level of TPACK to enhance their technology ability in the PE content area.

The example curriculum we chose and analyzed is a good example of apply TPACK framework to design their technology course. This program has detailed syllabus, webpage, social media presence, and other course resources to support PE students learn about technology use specifically in PE content area. This curriculum is promising in preparing preservice teachers for their future teaching career.

Admittedly, due to the data collection method, search engine was the only way to locate the programs and their curriculum. Because some programs did not explicitly list their curriculum online, we counted it as having no technology components. In addition, due to the web design inconsistencies among the selected universities, it was challenging to locate the curriculum content, possibly leading to missing data and misinterpretation. However, we assumed these universities did not have technology components in their PETE curriculum because of their lack of technology ability to display the curriculum online or they did not have a good web design for the program.

There is a need to contact coordinators in each PETE program to connect further information and consider the state policy about physical education in each state to understand more about the university curriculum in the further study. In addition, future study should also include the curriculum of PETE program in U.S. teaching universities. Survey research on the topic warrants more attention of professionals in the fields of educational technology and PETE as it is still unclear how PETE students gain knowledge and skills needed to use technology in teaching physical education.

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