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Physical Education Teacher Education Faculty Self-Efficacy Toward Educational Technology

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Abstract

The role of technology in physical education instruction has expanded greatly over the past few years. Because of the influence that physical education teacher education (PETE) faculty have on the development of teacher candidates' technology knowledge and skills, this study sought to examine the technology integration self-efficacy levels of PETE faculty. Participants included a sample of 76 PETE faculty from the United States who completed the Educator Technology Self-Efficacy Survey consisting of items related to the ISTE Standards for Teachers (Standards-T) and physical education–specific technology. Statistical analyses revealed a moderate overall rating of technology self-efficacy ($M = 3.7$, $SD = 0.63$), with facilitating and inspiring student learning and creativity with technology being the highest rated of the Standards-T ($M = 3.83$, $SD = .66$). Faculty self-efficacy for projectors and faculty self-efficacy for pedometers were among the highest rated specific PE technologies. Findings suggest that PETE faculty are generally confident in their technology integration capabilities, which is a positive for PE teacher candidates.

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Technology has become an integral part of the educational landscape, so much so that integration has been shown to enhance teaching and learning (Henderson, Selwyn, & Aston, 2015). This is also true in the area of physical education (PE), where the use of specific technologies, such as activity monitors, digital video, and PE-specific applications, are widely available for teachers and students and enrich PE experiences and contribute to enhanced learning opportunities (Jodoin & Robertson, 2014; Juniu, 2011; National Association for Sport and Physical Education, 2009; Sibley & McKethan, 2012). As a result, technology-specific standards have been established to guide the quality of technology integration. The International Society for Technology in Education (ISTE), whose mission is to advance teaching and learning excellence through innovative uses of technology, established standards for teachers, students, and administrators for use in all subject areas (ISTE, 2008, 2017). Specifically, the ISTE Standards for Teachers (Standards-T) state that teachers should model and apply the ISTE Standards for Students (Standards-S) while they design, implement, and assess learning experiences to engage students and improve learning, providing positive models for students, colleagues, and the community (ISTE, 2008, 2017). The Standards-T require teachers to (a) continually improve their practice through self-learning, (b) seek opportunities for leadership to support student empowerment and success with technology, (c) inspire students to positively contribute to and responsibly participate in the digital world, (d) dedicate time to collaborate with both colleagues and students to create authentic learning experiences that leverage technology, (e) design authentic learner-driven activities and environments that use digital tools and resources, (f) facilitate learning with technology to support student achievement, and (g) understand and use data to drive the instruction (ISTE, 2008, 2017).

Not only is high-quality technology incorporation recommended in K–12 settings, it has also become a requirement for teacher education programs. ISTE standards are also embedded throughout the 2013 CAEP standards (Council for the Accreditation of Educator Preparation, 2019), which provide the requirements to obtain and maintain accreditation for most teacher preparation programs in the United States. The CAEP standards state that teacher candidates of these programs must "model and apply technology standards" and have "technology-enhanced learning opportunities" (Standard 1.5 and 2.3, respectively) that show "integration of technology in all of these domains" (Standard 3.4). Specific to PE teacher education (PETE) programming, the National Standards for Initial Physical Education Teacher Education (NSIPETE; Society of Health and Physical Educators, 2017) state that PE teachers must integrate technology for planning, implementation, instruction, management, and professionalism. Specifically, the following NSIPETE (2017) standards involve technology:

- 3.e: Plan and implement learning experiences that require students to use technology appropriately in meeting one or more short- and long-term plan objective(s).
- 4.e: Analyze motor skills and performance concepts through multiple means (e.g., visual observation, technology) in order to provide specific, congruent feedback to enhance student learning.
- 6.c: Describe strategies, including the use of technology, for the promotion and advocacy of physical education and expanded physical activity opportunities.

These accreditation and teaching governing bodies demonstrate a deliberate increased emphasis toward, and support behind, empowering both teacher and students to maximize educational experiences in a digitally connected world.

Despite the increased support for technology-enhanced learning in general education, there have been varying and inconsistent levels of technology integration self-efficacy, attitudes, and behaviors among preservice and in-service PE teachers (Gibbone, Rukavina, & Silverman, 2010; Krause, 2017; Woods, Goc Karp, Hui, & Pearlman, 2008). Additionally, despite teacher professional development opportunities (e.g., workshops, conferences, and trainings), paired with need for improved technology preparation practices (Jones, Bulger, Illg, & Wyant, 2012), many PE professionals, while genuinely attempting to integrate technology, still have to actively seek help with strategies (Krause, Franks, & Lynch, 2017).

Even with these increased efforts by governing and accrediting bodies to require technology-rich educational environments in PE, there still remains a disconnect with preservice and in-service teachers in the value they place on technology and their self-efficacy toward technology application (Baek, Jones, Bulger, & Taliaferro, 2018; Gibbone et al., 2010; Juniu, Shonfeld, & Ganot, 2013). Many of the barriers influencing this disconnect can be rooted to the lack of socialization associated with technology applications in PE. "Teachers' pedagogical beliefs and attitudes towards teaching and learning with technology are constructed during a formative period (K–12 years), also known as the "apprenticeship socialization period" (Baek et al., 2018, p. 174). Though technology has been used in PE for the past two decades or so, it has been very much a novelty of highly motivated, tech-savvy individuals, with only a relatively recent growth in programming and requirements that use technology as a tool to enhance student learning (Juniu, 2011). As a result, many of today's in-service, and arguably many preservice, teachers did not grow up in those formative K–12 years socialized with the mastery experiences demonstrating how technology can vastly enhance learning in PE. Thus, PETE programming and in-service professional development efforts must detach from old social norms, old problems, and antiquated pedagogies and work together to find new ways to support today's learner (Robinson, 2011). Casey, Goodyear, and Armour (2017) summed this point up best by stating, "The starting point for a pedagogy of technology is a desire to do things *differently*, rather than do the same thing using 'flashy' tools and tech gizmos" (p. 15).

Much of the teacher education literature surrounding technology-infused pedagogy heavily highlights the many barriers associated with technology use in PE (Baek et al., 2018). Some of these barriers most cited by in-service and preservice physical educators include inadequate support from school administration and technical staff (Gibbone et al., 2010), budget and access to technology (Gibbone et al., 2010; Kopcha, 2012), time to implement and practice technology efficiently (Kopcha, 2012), and the internal factors (e.g., self-efficacy, attitudes, and perceptions of toward technology; Baek et al., 2018). Of specific concern, many in-service and preservice physical educators feel they have not had adequate and relevant experience and training using and implementing technology in the PE classroom (Baek et al., 2018; Gibbone et al., 2010; Juniu et al., 2013). Krause and Lynch (2018) discovered that even in PETE programs with a technologically proficient faculty, barriers such as budget, administrative support, other faculty buy-in, and lack of access to technology-friendly field experiences existed, which led to many preservice teachers gaining less than desirable experiences with technology in their PETE programs. Additionally, they found that many in-service teachers were implementing very little technology into their teaching in field placements. This research showing perceptions of inadequate training, and lack of rich experience, should be specifically alarming for PETE professionals and faculty.

Despite challenges in PETE, research highly suggests that it is necessary for teacher preparation institutions to ensure that students have discipline-specific technology skills required for teaching, and that preparing technologically proficient educators relies on multiple components (Carroll & Morrell, 2006). Two of these components include basic instruction in educational technology and observation of technology-proficient faculty (Duran, Fossum, & Luera, 2007; Wetzel & Williams, 2004). It has been a long and widely held belief that a teacher's instruction often directly resembles the way they were taught (Lortie, 1975). In addition, classroom decisions and pedagogy are often highly guided by teachers' beliefs (Palak & Walls, 2009), which are derived from experiences they have had with technology and their college professors' use (Sadaf, Newby, & Ertmer, 2012). Scrabis-Fletcher, Juniu, and Zullo (2016) found that PETE faculty modeling of technological, pedagogical, and content knowledge (TPACK) significantly predicted TPACK among PETE students, who believed their PETE faculty delivered effective modeling of TPACK. Additionally, the PETE faculty in this study regularly modeled the use of activity monitors and presentation software. Beliefs that reflect on one's capabilities, or self-efficacy beliefs, have been shown to influence teaching behaviors (Tschannen-Moran, Hoy, & Hoy, 1998).

Bandura (1997) described perceived self-efficacy to be one's "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3) and self-efficacy has been found to have a strong relationship with behavior, motivation, and persistence (Bandura, 1986). Bandura (1997, 1986) found an individual's perception of self-efficacy to be multidimensional and consisting of (a) efficacy expectations and (b) outcome expectations. Efficacy expectation is the belief that one has the ability to successfully execute the behavior required to achieve a specific outcome, while outcome expectancies are an individual's estimate that a given behavior will lead to certain outcomes (Bandura, 1997, 1986). He further acknowledged the two need to be differentiated because a person can believe that a particular course of action will produce desired outcomes, but if the person has self-doubt regarding his or her capability to perform the necessary skill/behavior, the individual may choose to avoid any attempt altogether (Bandura, 1997, 1986).

The beliefs that PE teachers have about their abilities to integrate technology into their teaching, therefore, may influence future implementation as expected by the standards. Self-efficacy beliefs are most in flux early in learning and tend to become fairly stable and resistant to change once set (Bandura, 1997). Since PE teachers' first exposure to educational technology comes from the observation of technology-proficient PETE faculty, it is essential that faculty model and promote the use of technology-enhancing learning environments when preparing teacher candidates (Duran et al., 2007). It is the faculty who must be the focus for changing the landscape of educational technology knowledge and skill construction and future implementation in K–12 schools.

Because of the task- and situation-specificity associated with defining characteristics of self-efficacy (Bandura, 1997, 2006), global self-efficacy instruments should be avoided and instead instruments specifically designed to assess a given construct comprehensively should be used (Bandura, 1997). Given teacher education faculty play a vital role in the exposure and education of technology-based pedagogy practices (Sadaf et al., 2012), shockingly little research has been conducted related to the self-efficacy, or even overall confidence, levels of teacher education faculty use and modeling of technology in the classroom, and this is true of PETE as well.

Thus, it becomes vital to center attention and research on PETE faculty's ability to model and implement educational technology instruction aligned with the Standards-T, as well as their self-efficacy perceptions toward following through with such technology-infused instruction. The purpose of this study was to determine the educational technology self-efficacy levels of PETE faculty and this was investigated through the following research questions: (a) What are the overall levels of educational technology self-efficacy among PETE faculty? (b) What technologies are PETE faculty most and least confident with using in their roles as faculty members?

Method

Sampling

A cross-sectional survey design was used to survey participants, who were either full faculty members of PETE programs or faculty who teach courses specific to PETE, about their self-efficacy perceptions toward instructional technology. Because there is no official publically available database of all PETE programs and faculty in the United States, the researchers used www.educationdegree.com and www.a2zcolleges.com to conduct their search. Using these two sites, they searched for all U.S. universities listed as having a licensure program in PETE. For each of the 50 states, all PETE institutions listed in the search results were recorded and organized by state and SHAPE America District affiliation. A total of 709 PETE programs represented the overall population across the United States. When separated by SHAPE America district affiliation, PETE programs numbered (a) Southern District, 324; (b) Eastern District, 109; (c) Midwest District, 144; (d) Central District, 70; (e) Northwest District, 22; and (f) Southwest District, 41.

The researchers randomly sampled 20% of PETE programs from each of the six SHAPE America districts. For each of the PETE programs in the final random sample, they collected names and e-mail addresses of PETE faculty by visiting each program/department website. When they searched the department website, only PETE faculty contact information were collected, specifically excluding faculty of related content areas (e.g., exercise science, sport management, health). The final database of all PETE faculty contact information from each of the six SHAPE America districts was used for e-mail distribution of the survey.

Participants

In the PETE programs sampled across the United States, 76 faculty members agreed to participate in the study. Of those participants responding, 40.5% were male ($n = 30$) and 59.5% were female ($n = 44$), with 88.2% of the individuals self-identifying as White/Caucasian ($n = 67$), 6.6% as Asian/Pacific Islander ($n = 5$), 1.3% as Hispanic/Latino ($n = 1$), and 2.6% as Other ($n = 2$). The participants taught in a wide distribution of states, with 35 out of the 50 states represented in the study. The states with the highest number of participants were Tennessee (11.8%, *n* = 9) and Wisconsin (6.6%, *n* = 5), with Georgia, Michigan, New Jersey, and Texas representing 5.3% (*n* = 4). The mean age of PETE faculty was 47 years of age (*SD* = 11.43) with a minimum age of 31 and a maximum of 80. Participants reported an average number of years as PETE faculty member of 14.28 years (*SD* = 10.6). Finally, participants reported their institutional faculty rank. Results showed that 30.3% were full professors (*n* = 23), 27.6% were associate professors (*n* = 21), 27.6% were assistant professors (*n* = 21), 2.6% were clinical assistant professors (*n* = 2), and 11.8% were instructors (*n* = 9).

Instrument

The survey instrument used for this study was a modified version of the validated and reliable Educator Technology Self-Efficacy Survey (ETS-ES; Gentry, Baker, Thomas, Whitfield, & Garcia, 2014; see Table 3). The Gentry et al. (2014) instrument was designed to seek classroom teachers' level of self-efficacy toward modeling and implementing 21st century technology skills in the classroom. This instrument was created to align with the Standards-T (ISTE, 2008). The ETS-ES included survey items that addressed the following five standards of the Standards-T: (1) facilitating and inspiring student learning and creativity (with technology), (2) design and develop digital-age learning experiences and assessments, (3) model digital-age work and learning, (4) promote and model digital citizenship and responsibility, and (5) engage in professional growth and leadership (ISTE, 2008). The Cronbach's alpha of the original survey was 0.958.

Because the original ETS-ES was quite large, with 10 items associated with each of the five standards (50 items total), the researchers chose to only use six items from each standard, eliminating the four items for each standard with the lowest factor loadings to address potential survey participant fatigue for redundant items relating to the same construct (Gentry et al., 2014; Hinkin, 1995). The modified survey maintained a high level of overall internal consistency, with a Cronbach's alpha of .955. The ETS-ES items were both positively and negatively worded and asked participants to rate their level of agreement with each statement (1–5 scale, *strongly disagree–strongly agree*).

In addition to ETS-ES items, the researchers chose to add an additional section to the end of the survey in this study. These new items listed specific educational technology tools (e.g., heart rate monitors, handheld devices, classroom management software, interactive whiteboards) and asked faculty to rate their self-efficacy toward implementing and modeling each tool in a PETE classroom setting. For this section, survey participants responded with their level of agreement (1–5 scale, *strongly disagree–strongly agree*) associated with the statement (repeated for each technology tool) "I am confident in my ability to use the following technology in my role as a PETE faculty member." The final survey consisted of 30 items from the ETS-ES and an additional 17 items for specific forms of technology.

Procedure

All procedures were approved by the researchers' respective institutional review boards. The final 47-item survey instrument was then sent to a random sample of PETE faculty representing all six SHAPE America districts via an e-mail soliciting their voluntary participation in the survey. Upon informed consent, PETE faculty were given a SurveyMonkey link where they could take the survey.

Data Analysis

All survey responses were transferred to SPSS 23 for data transformation and analysis. Prior to statistical analyses, all items from the ETS-ES that were negatively worded were reverse coded into new variables in SPSS. Data analyses sought to explore (a) overall self-efficacy scores toward technology instruction; (b) overall self-efficacy scores specific to each Standards-T construct; (c) potential statistical differences in overall self-efficacy scores based on the variables of faculty rank, gender, and number of years of PETE instruction; and (d) self-efficacy perceptions based on specific technology platforms. Results were completed via descriptive analyses, ANOVA, regression, independent *t* test, and correlation, as appropriate.

Results

Participant Demographics

Specific to PETE programs, faculty members reported that the approximate average number of undergraduate PETE students graduating from their programs over the past 5 years ranged from 1 to 125 graduates, with a mean of 21.25 (*SD* = 25) per year. The courses that faculty most reported having taught over the past year included elementary PE methods (43.4%), secondary PE methods (47.4%), and measurement and evaluation of PE (44.7%), and the least reported included dance/movement education (9.2%), educational technology (6.6%), and outdoor education (5.3%).

Educator Technology Self-Efficacy Survey (ETS-ES) Scores

The overall mean self-efficacy of ETS-ES items for all participants was 3.7 (1–5 scale; *SD* = 0.63). Items from each of the five Standards-T were examined for all participants. The highest mean was associated with the standard of *facilitating and inspiring student learning and creativity with technology* (*M* = 3.83, *SD* = .66) and the lowest mean with standard of *engaging in professional growth and leadership* (*M* = 3.56, *SD* = .74; Table 1).

Table 1
Descriptive Statistics for Each of the Standards-T Based on Total Population Self-Efficacy Scores (1 = low self-efficacy, 5 = high self-efficacy)

	Self-efficacy score	
Standard	***M***	**SD**
1. Facilitate and inspire student learning and creativity in technology	3.84	.66
2. Design and develop digital-age learning experiences and assessments	3.71	.74
3. Model digital-age work and learning	3.80	.70
4. Promote and model digital-age citizenship and responsibility	3.73	.66
5. Engage in professional growth and leadership	3.56	.74

A one-way analysis of variance (ANOVA) compared the statistical differences of overall technology self-efficacy based on faculty rank. The ANOVA analysis found a nonsignificant difference in self-efficacy scores compared to faculty rank, $F(5, 70) = 2.25$, $p = .058$. A follow-up Tukey HSD confirmed these results ($ps > .05$): instructors ($M = 3.17$, $SD = .73$), assistant professors ($M = 3.90$, $SD = .50$), clinical assistant professors ($M = 4.0$, $SD = 0$), associate professors ($M = 3.6$, $SD = .77$), and full professors ($M = 3.85$, $SD = .46$).

Correlations were examined between the variables of faculty rank and years as a PETE faculty compared to overall self-efficacy. A nonsignificant correlation was found between faculty rank and overall self-efficacy ($r = .18$, $p = .12$) and between years as a PETE faculty member and overall self-efficacy ($r = -.16$, $p = .17$). A simple linear regression was also calculated for the degree to which age and years as a PETE faculty have an effect on overall technology self-efficacy. Both variables were found to be nonsignificant in their ability to predict overall self-efficacy, age: $F(1, 74) = 3.38$, $p = .70$, $R^2 = .044$; years as PETE faculty, $F(2, 73) = 1.72$, $p = .18$, $R^2 = .045$.

Finally, an independent samples *t* test showed that no statistical difference in overall self-efficacy scores between males ($n = 30$, $M = 3.8$) and females ($n = 44$, $M = 3.7$), $t = .42$, $p = .68$.

Self-Efficacy Toward Specific Educational Technology

In addition to the data collected from the ETS-ES, the survey asked PETE faculty to rate their perceived self-efficacy toward a list of 16 educational technology tools (1 = *low self-efficacy*, 5 = *high self-efficacy*). PETE faculty reported that their highest self-efficacy was associated with LCD projectors ($M = 4.57$, $SD = .57$), pedometers ($M = 4.51$, $SD = .57$), and laptop mobile stations ($M = 4.49$, $SD = .68$). Faculty reported the lowest self-efficacy toward interactive whiteboards ($M = 3.53$, $SD = 1.13$), classroom management software ($M = 3.55$, $SD = 1.06$), and accelerometers ($M = 3.64$, $SD = 1.2$; Table 2).

Table 2
PETE Self-Efficacy Toward Specific Educational Technology

Technology	*M*	*SD*
LCD Projectors	4.57	0.574
Pedometers	4.51	0.577
Laptop Mobile Stations	4.49	0.683
Online Professional Journals	4.43	0.789
Electronic Rubrics	4.43	0.789
Online Classroom Software	4.38	0.879
Handheld Devices	4.36	0.687
Digital Photo	4.33	0.823
Digital Video	4.31	0.805
Heart Rate Monitors	4.22	0.759
Aerobic Equipment	4.22	0.759
Wireless Microphones	4.2	0.895
Fitnessgram/Activitygram	4.08	0.99
Accelerometers	3.64	1.197
Classroom Management Software	3.55	1.063
Interactive Whiteboards	3.53	1.131

Table 3
Survey Items Adapted From ETS-ES and in Alignment With Standards-T Categories

Survey item	ISTE Standards-T category
1. I empower my students to demonstrate their creative thinking by using digital tools to generate new ideas and develop innovative products and processes.	Facilitate and Inspire Student Learning
2. I am able to develop technology-enriched learning environments that enable all students to pursue individual curiosities in an active setting.	
3. I regularly involve my students in activities where they use digital tools to plan and manage projects focused on real-life events and problems.	
4. I am unsure of how to set up a classroom where students can express themselves using technology.	
5. I find it difficult to model collaborative learning for my students.	
6. I find it challenging to help my students find and use digital tools to solve real-world problems.	

Table 3 (cont.)

Survey item	ISTE Standards-T category
7. I am confident in customizing and personalizing learning activities to address students' diverse learning styles, working strategies, and abilities using digital tools and resources.	Design and Develop Digital-Age Learning Experiences and Assessments
8. I feel overwhelmed when asked to integrate digital tools to promote student learning and creativity.	
9. I train my students to use digital tools to independently manage their own learning objectives, plan their learning strategies, and assess their own progress and results.	
10. I feel challenged and overwhelmed when I try to incorporate digital tools to personalize learning activities.	
11. I am confident in my ability to design authentic learning experiences that incorporate contemporary tools and resources.	
12. I am unsure of how I can use digital tools and resources to design authentic learning experiences for my students.	
13. I would describe myself as an innovative educator.	Model Digital-Age Work and Learning
14. My prior learning has prepared me to use digital tools to collaborate with students, colleagues, and parents.	
15. My lack of technology skills may hinder my ability to acquire and keep pace with new technological advances in the future.	
16. I feel as though I lack the knowledge and skills I need to teach in our global and digital society.	
17. I feel confident in my ability to effectively communicate relevant information to students, parents, and peers using a variety of digital-age media.	
18. I feel like it's a struggle to use digital tools to communicate and collaborate with colleagues, parents, students, and members of the community to support learning in my classroom.	
19. I rarely use digital communication tools for my students to interact with other students for online discussions and project teamwork.	Promote and Model Digital Citizenship and Responsibility
20. I struggle to provide equitable access to digital tools, curriculum, and online resources.	
21. I frequently model digital etiquette (netiquette) and online social interaction responsibilities.	
22. I am continually considering and addressing different student needs, including access to software, hardware, curriculum, and online resources.	
23. I do not fully understand the local and global societal issues and responsibilities in our evolving digital culture.	
24. I actively promote, model, and teach the safe, legal, and ethical use of online information, including author's rights, copyright issues, privacy, cyber-bullying, and securing data.	

Table 3 (cont.)

Survey item	ISTE Standards-T category
25. I have been described as a good role model for infusing technology into teaching.	Engage in Professional Growth and Leadership
26. I consistently engage in professional development that enables me to be confident in demonstrating effective use of digital tools in my classroom.	
27. I don't always keep up with trends in the research for practical effectiveness of current and emerging digital tools for teaching and learning.	
28. I struggle to join or maintain any informal learning communities/networks for learning new digital tools for teaching and learning.	
29. I rarely discuss educational technology tools and resources with my colleagues.	
30. I demonstrate and discuss with my colleagues the effective use of digital resources to improve student learning and the profession of teaching.	

Discussion

This study examined PETE faculty self-efficacy perceptions toward the use of educational technology that aids instruction. Participants were surveyed via a modified version of the ETS-ES (Gentry et al., 2014) survey instrument that was derived from the ISTE (2008, 2017) technology standards for teachers. In general, participating PETE faculty members perceived themselves as having high overall self-efficacy toward technology instruction. These ratings are inconsistent with the varying levels of self-efficacy, attitude, and behavior measures among pre- and in-service teachers, which are all related attributes (Gibbone et al., 2010; Krause, 2017; Woods et al., 2008). This could be due to the increased reduction in barriers (e.g., cost of technology, increased training) to educational technology over time, as well as access to technology for higher education faculty compared to access in public schools or for teacher candidates. In addition to the overall high self-efficacy perceptions, there was nonsignificant variability in scores that were statistically analyzed by faculty rank, years as a PETE faculty member, or gender. These results show that PETE faculty not only feel confident in the use of technology-infused education but also will model and promote the use of technology-enhancing learning environments, as recommended by the ISTE standards. Unless people feel that their actions can produce positive or influential results based on the outcomes they desire, they will have very little incentive to attempt or pursue action in facing those difficulties (Bandura, 1997). Thus, this high self-efficacy will lead to higher possibility of perseverance in challenging situations in the future and therefore a higher integration of technology in PETE.

In addition to the ETS-ES self-efficacy data, this study asked PETE faculty to rate their perceived self-efficacy toward specific forms of technology. As expected, faculty rated themselves high on technology platforms that are typical to many PETE classrooms (projectors, pedometers, laptop mobile stations) and moderate on less typical platforms (interactive whiteboards, classroom management software, and accelerometers). Jones et al. (2012) found that both the highly and moderately rated technologies had a positive effect and were feasible within PETE, which compares similarly to the technology ratings in this study. While the faculty in this study rated themselves as moderate-to-high in terms of technology integration self-efficacy, it is not to say that all PETE faculty are in the same position. A possible limitation of this study is that faculty who are confident and interested in technology were more willing to participate in this study and those who are not may have passed on the survey invitation. Another inherent limitation of this study is the nature of being a self-reporting measure. Many researchers are skeptical about self-report results that come from questionnaires that ask participants to report on their own perceptions (Feltz, Short, & Sullivan, 2008). However, Bandura (1982) argued that in situations that participants do not have reason to distort their responses, self-reporting can be an accurate representation of cognitions. Thus, self-efficacy is best measured when evaluation apprehension has been minimized and participants are asked to respond in private (Feltz et al., 2008)

Suggestions on ways to improve educational technology in PETE include programmatic integration of educational technology throughout PETE courses, maintaining high expectations for educational technology integration in coursework, and having educational technology faculty or experts coteach or codevelop courses with teacher education faculty, which would expand the much needed faculty technological modeling (Hughes, Liu, & Lim, 2016). The inclusion of an educational technology faculty/expert's assistance may provide an avenue for PETE faculty to increase self-efficacy through the vicarious experience or social persuasion of the expert (Bandura, 1997).

This study provided insight into the status of educational technology self-efficacy among PETE faculty. It is theorized that self-efficacy can influence behavior (Bandura, 1997), and therefore, one would assume that the faculty in this study would be actively integrating technology into their roles as faculty members. This, however, is unknown, and therefore, future research should investigate the educational technology integration behaviors of PETE faculty and possible strategies for and barriers to success. Additionally, an investigation of the sources of self-efficacy among PETE faculty could help determine what experiences (i.e., mastery, vicarious, social persuasion, etc.; Bandura, 1997) may influence self-efficacy and then allow PETE faculty and doctoral students to capitalize on those experiences.

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