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The impact of a semester-long practicum on Physical Education preservice teachers' self-efficacy of teaching children with autism

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Abstract: As the number of students with disabilities grows in general physical education, it is imperative that preservice physical education teacher candidates are adequately prepared to meet the increasingly diverse needs of all students. This study aimed to examine the effects of pre-practicum experience delivering physical education (PE) content to children with autism spectrum disorder (ASD) on PE teacher candidates' self-efficacy toward working with children with disabilities. Participants were general PE teacher education candidates enrolled in a required adapted PE course (n = 16). Data were collected using the Pre-Physical Educators' Self-Efficacy Toward Including Students with Disabilities-Autism (PPESEISD-A), artifact collection, and focus group interviews. Analysis of PPESEISD-A responses examined the degree and direction of change in participants' self-efficacy. Focus group data were analyzed using open coding and constant comparison to identify themes across participants. Findings suggest positive changes to teacher candidates' self-efficacy in planning and delivery of instruction to learners with ASD. Qualitative data highlight key elements of the practicum that facilitated change. Findings from this study have implications for how PETE programs prepare general physical educators to work with students with autism.

Keywords: Autism Spectrum Disorder; Teacher Education; Students with Disabilities; Clinical Experience

Introduction

The demographic composition of public-school students aged 5 to 17 has changed considerably over the past several decades worldwide, an unavoidable consequence of an increasingly diverse world (Civitillo et al., 2017; Oh & Graber, 2017). Teachers and preservice teachers encounter much diversity in the classroom including factors associated with race, socioeconomic status, and the number of students with diagnosed disabilities. According to the National Center for Education Statistics (2024), students with diagnosed disabilities has increased from 8% in 1974 to 15% of the total U.S. public school population in 2022-2023. Although data indicate there are fewer students with diagnosed disabilities in developing countries as compared to developed nations, the prevalence of disability in school-aged children has increased from 32% to 68% globally across the past decade (Mizunoya et al., 2018).

According to Klin and colleagues, (2020), the definition of autism spectrum disorder (ASD) has not changed significantly since it was first observed in the early 1940s. ASD has been defined as a cluster of behavioral symptoms in areas of social and communicative function, behavioral rigidities, and sensory sensitivities. It has become one of the most well-

researched and validated topics among different fields such as psychiatric and behavioral studies. As of 2020, the Centers for Disease Control and Prevention (CDC) estimates that approximately 1 in 36 children (aged 8 years) in the United States was diagnosed with ASD (Maenner et al., 2023). Chiarotti and Venerosi (2020) also report an increased prevalence of ASD in European Union countries across the past decade. Although, these numbers vary by country for instance Iceland has the highest prevalence of 31.3 out of 1,000 and Italy with the lowest prevalence with 4.2 out 1,000 (aged 8-10 years old) diagnosed with ASD.

Social skills, including communication and peer interaction, play important roles in student success in general physical education settings. For example, learners within a physical education setting may participate in team or small group activities that require effective verbal and nonverbal communication skills to develop strategy, problem solve, share responsibilities, and encourage one another. Opportunities for peer interaction arise often in physical education where students are encouraged to demonstrate empathy, assume responsibility, and abide by established rules for the safety of self and others (Rivera-Pérez et al., 2020). For students with ASD, differences in these areas may sometimes contribute to challenges in peer and teacher connections, highlighting the need for supportive and inclusive approaches in these environments. For instance, when competitive situations and activities requiring social interactions are introduced in physical education, students with ASD report significant barriers to engagement and participation (Obrusnikova & Dillon, 2011).

As students become more diverse, teachers and preservice teachers have expressed difficulty planning for and meeting the unique needs of all students (Hauck & Felzer-Kim, 2023; Hodge & Akuffo, 2007). Overall, physical education teachers often note they have little, inadequate, or incomplete training on how to develop appropriate learning environments, social interactions and instructional challenges for all students (Block, 2007; Case et al., 2020; Hodge et al., 2009; Hutzler et al., 2019; Lieberman et al., 2007; Obrusnikova & Dillon, 2011). As the number of children diagnosed with ASD continues to rise, public school teachers must be prepared to meet diverse student needs. This is particularly true in physical education classrooms where students with disabilities are likely to receive services by professionals trained as general physical educators (National Center on Health, Physical Activity and Disability [NCHPAD], 2020). Despite the responsibility to deliver appropriate instruction for all learners, general physical educators often receive marginal training to effectively address the diverse needs of learners – especially those with diagnosed disabilities (Piletic & Davis, 2010). Although certification and licensure requirements vary by region, many U.S. states have minimal Adapted Physical Education (APE) requirements, typically ranging from 1 to 17 credit hours, with an average of 3.35 credit hours ($SD = 1.726$) within a 120-credit hour program that leading to general K-12 physical education licensure (Phelps et al., 2024). This limited formal preparation to work with children of differing abilities has been shown to negatively affect teachers' sense of competence, confidence, and desire to work with children with disabilities (Ammah & Hodge, 2005; Hodge & Akuffo, 2007). Limited experiences working with students with special needs within pre-professional training can contribute to a perceived lack of efficacy in one's ability to provide meaningful learning experiences for children.

One way to increase the likelihood that future physical educators develop the skills, knowledge and dispositions needed to provide quality APE services is to expose them to extensive, hands-on experiences working with children with disabilities within their teacher preparation and training programs (Hodge et. al., 2002; McGrath et. al., 2019). A growing body of research exists on the practicum and practical experiences that provide general physical education preservice students with opportunities to apply what they have learned in an APE course while working with children with disabilities (Block et al., 2020; Hershman

& Hodge, 2010; Wilson et al., 2022). Guided practicum experiences working with children with disabilities have been found to yield positive results toward influencing attitudes of teacher candidates to teach children with disabilities (An, 2021; Hodge, et al., 2003; Lirgg et al., 2017) and have been found to be one of the most important factors related to establishing self-efficacy beliefs of both pre- and in-service teachers toward working with students with disabilities (Hutzler et al, 2005). In a study of preservice physical education teacher candidates, Taliaferro and colleagues (2015) found that APE coursework combined with hands-on practical experience can be an effective way to influence teacher candidates' attitudes toward working with children with disabilities. This was particularly true when preservice physical educators were provided with experience working with children with ASD. Further exploration of practicum experiences that combine hands-on work with children with ASD that aids in the development of self-efficacy is needed.

Theoretical Framework

One theory used to examine preservice physical education teachers' beliefs in their ability and motivation to effectively work with students with disabilities has been Bandura's Framework of Self-Efficacy (Block et al., 2010). Self-efficacy can be enhanced through information gained from four main types of experiences, (1) mastery experiences, (2) vicarious experiences, (3) social persuasion, and (4) physiological responses (Bandura, 1977). According to Bandura's theory, individuals, including preservice teachers, gather information from these experiences to inform their sense of efficacy. Self-efficacy is a central factor in Bandura's social cognitive theory because these beliefs influence the relationships between personal factors, knowledge, and behaviors, and operate within the environmental context of specific situations (Dellinger et al., 2008). The self-efficacy beliefs that physical educators have about their abilities to meaningfully include students with disabilities, therefore, may influence their behavior toward working with students with disabilities.

Self-efficacy beliefs directly and indirectly influence how people put their knowledge and skills to use. Increased knowledge and awareness can enhance self-efficacy which in turn, promotes a willingness to set goals, pursue tasks, maintain high expectations, persevere, and put in greater effort (Bandura, 1977). Conversely, these experiences and information can serve to decrease self-efficacy, which can lead to less confidence, increases in stress, feelings of helplessness, anxiety, and depression (Bandura, 1977). People are likely to avoid tasks and situations in which they do not feel competent (Bandura, 1997; Pajares, 2002). Those who have high levels of self-efficacy are more likely to view difficult tasks as a challenge to be overcome rather than avoided, are more likely to put forth more effort and persist longer in these tasks and are more likely to successfully perform the activity than are people with low self-efficacy (Bandura, 1977, 2006). Physical educators with higher levels of self-efficacy, therefore, are likely to make more of an effort toward including students with disabilities in their classes and work to address associated challenges.

To best support preservice teachers in the development of high levels of self-efficacy (Ornelas Contreras et al., 2012), in working with children with disabilities, hands-on practical experiences must be carefully designed to provide meaningful mastery, vicarious, social persuasion, and physiological response experiences (Hodge, Davis, et al., 2002). These experiences must be monitored and intentionally designed to support meaningful learning of preservice teachers' learning to teach children with disabilities. While Taliaferro and Bulger (2020) identified essential components of effective APE practicum experiences (e.g., program organization, setting, learner characteristics, skill-centered instruction, assessment, etc.), what is less certain is how preservice physical education teacher candidates internalize and synthesize information from experiences to form and impact their self-efficacy beliefs about working with children with disabilities. The application of Bandura's

Framework of Self-Efficacy can be used to guide the development of hands-on, practical experiences for general physical education teachers as they learn to work specifically with students with ASD (Blagrove, 2017; Block et al., 2010; Taliaferro et al., 2015).

Purpose

The purpose of this mixed methods study was to (1) examine the change in preservice physical education teacher candidates' self-efficacy toward working with children with autism pre-post practicum, and (2) examine what variables preservice teacher candidates attributed to their learning and self-efficacy for working with children with autism.

Materials and Methods

This was a mixed methods study implementing an explanatory sequential design (Creswell & Plano Clark, 2017). The value of implementing a mixed methods approach is to increase understanding by combining two distinct methodologies. An important feature of an explanatory sequential research design is that its use helps to gain an in-depth and comprehensive understanding of a phenomenon. In this case, the focus was on examining preservice physical education teacher candidates' self-efficacy in working with children with autism.

Participants

Twenty-nine preservice physical education teacher candidates who were enrolled in the only required 3-credit APE class at a large Midwestern University participated in this study. The inclusion criterion was current enrollment in the APE course at the time of the study. On the first day of class, students completed the Pre-Physical Educators' Self-Efficacy Toward Including Students with Disabilities–Autism (PPESEISD-A) instrument. While some reported prior volunteer or family experience with children with disabilities, none had received professional development specifically focused on best practices for working with children with autism or other disabilities. The required 16-week APE course is taken in the fourth year, at the end of the Physical Education Teacher Education (PETE) program.

The course includes a 12-week, once-weekly lab component, during which students complete 24 clinical hours working directly with children with disabilities. During the 12-week lab, preservice physical education teacher candidates worked one-on-one with a child (ages 3-22) to assess gross motor development using the Test of Gross Motor Development-2 (TGMD-2). Based on the assessment data, they created individualized goals, designed weekly lesson plans, and documented progress through weekly reports for parents/guardians. Each teacher candidate worked with the same student and their family throughout the semester, fostering relationships that helped facilitate student and teacher candidate learning.

The course was led by a PETE faculty member who, while not formally credentialed as an APE specialist, actively pursued professional development in the field. This included earning certification as an Autism Exercise Specialist through the American College of Sports Medicine (ACSM). To further support the course, an ASD specialist – a board-certified behavior analyst specializing in evidence-based support for students with Autism – was brought in as a consultant for the instructor, the preservice physical education teacher candidates, and the families of participating children.

Children with autism were intentionally selected as the focus of the practicum experience in this APE course. This was a deliberate decision by the instructor, as it would provide teacher candidates with hands-on practicum experience with a population frequently integrated into general K-12 physical education classes. Although the course addressed a range of disabilities, conditions, and adaptive strategies in physical education

and movement-based settings, the practicum was purposefully designed to deepen candidates' understanding and practical skills related to teaching learners with ASD. Children with autism from the community were invited and accepted to attend the practicum if they met the following criteria: (1) primary diagnosis of ASD was documented, (2) were of school age (3-22), and (3) had parental permission to participate. Recruitment flyers were made and distributed to local community autism-supportive agencies such as *Marc First*, *Easter Seals*, and *The Autism Place*. In addition, information was shared by word of mouth as the autism community is highly active.

Procedures

Institutional Review Board approval and written informed consent were obtained prior to data collection. As part of the required 16-week APE course, participants completed a 12-week on-campus practicum. This practicum involved a weekly, one-hour session in which learners with ASD (ages 3-22) were paired with a preservice physical education student for individualized instruction. Little information about the individual children was known at the start of the practicum; therefore, child and teacher candidate pairings were made based on scheduling logistics and convenience matching (e.g., which practicum timeslots the child [per their caregivers] was available and when was the teacher candidate available [e.g., given that the practicum extended beyond the regularly scheduled course time]). The weekly sessions were scheduled outside regular school hours and held on the university campus. As a result, parents/guardians played an important role in dropping off and picking up learners with ASD—many stayed to observe the lessons or waited in the lobby area during the sessions. Each session consisted of free play and instruction based on individualized visual schedules. Teacher candidates collected baseline motor skills and fitness levels using the TGMD-2 and FitnessGram to support their instructional planning and create progress reports for parents. These data were used exclusively to support instruction and guide individualized lessons and were not collected or reported for research purposes.

The APE practicum in the current study emphasized structured, intentional opportunities for preservice teachers to collaborate with peers, course instructors, parents/guardians, and the on-site Autism specialist. While the role of parents/guardians was limited, they provided support when needed - serving as guest speakers, modeling behavior regulation techniques, and in some cases, helping to motivate their children. Additionally, preservice teachers prepared weekly progress reports that were sent home to parents/guardians.

Prior to the start of the practicum, preservice physical education teacher candidates received intensive training on working with children with autism. This was co-delivered by the course instructor and the ASD specialist. The training emphasized the importance of structured environments, the use of visual schedules for each lesson, and the application of Universal Design for Learning (UDL) principles throughout the semester. The ASD specialist also supported the teacher candidates by developing and assisting with the implementation of behavior management strategies, such as the 'first this, then that' approach based on the Premack Principle (Premack, 1959), positive reinforcement for targeted behaviors, and additional self-regulation techniques as needed. For example, when working with a child who loved shooting baskets but disliked doing crunches, teacher candidates were taught to use the phrase "*First do five crunches, then we can shoot baskets for two minutes.*"

The study was conducted across two academic semesters (spring and fall 2019). Participants completed the PPESEISD-A survey both before and after the practicum to measure their self-efficacy toward working with children with autism. Following the practicum, participants were invited to take part in a focus group interview, which was

facilitated by a trained qualitative researcher. These interviews were audio recorded, transcribed, and de-identified prior to analysis.

Instrumentation

Two different data collection methods were used. First, the Pre-Physical Educators' Self-Efficacy Toward Including Students with Disabilities–Autism (PPESEISD-A) survey instrument was used pre- and post-practicum to measure preservice teachers' self-efficacy beliefs. The PPESEISD-A, used in a study by Taliaferro and colleagues (2015), is a slightly modified version of the original Physical Educators' Self-efficacy Toward Including Students with Disabilities–Autism (PESEISD-A; Taliaferro et al., 2011) instrument worded for preservice teachers that removed the word “my” from the items. This 10-item instrument assessed participants' self-efficacy beliefs in regard to performing tasks associated with the inclusion of students with autism in general physical education classes, including their confidence in their ability to manage behaviors, modify rules to games, motivate students, and collaborate effectively with other teachers/professionals. Responses were scored on an 11-point Likert scale of 0–10 (0 = *cannot do at all*; 5 = *moderately can do*; 10 = *highly certain can do*). Each participant's scores were averaged across all 10 items. The original PESEISD-A instrument has been confirmed to demonstrate evidence of reliability and validity, with a one-factor solution accounting for 57.1% of the variance, high levels of internal consistency (Cronbach's $\alpha = .93$), and a test–retest reliability at $r = .86$ (Taliaferro, 2010), with similar levels of internal consistency reported in a study by Beamer and Yun (2014) of Cronbach's $\alpha = .92$. Psychometric properties on the modified PPESEISD-A instrument indicated a one-factor solution accounting for 74.67% of the total score variance and Cronbach's $\alpha = .967$ (Taliaferro et al., 2015).

Second, the 60-minute semi-structured focus group interview was developed to capture participants' perspectives of the impact of the practicum on self-efficacy. Four separate focus groups were hosted with a range of three to five participants each. Specifically, the interview was set up to allow participants to collectively discuss critical experiences, both positive and negative, that led to changes in self-efficacy to work with children with autism. The focus group interviews were used to explore and identify teacher candidates' perception of supports across the course and practicum experience that they felt were valuable or were missing and needed to further develop a strong self-efficacy for working with children with autism in physical education contexts. Interview questions began with an overview of participant experience within the practicum and progressed to targeted reflections and individual interpretations of their pre- and post-self-evaluations (i.e., PPESEISD-A). The interview also prompted each participant to identify critical incidents that occurred throughout the practicum that led to learning and enhanced self-efficacy, supports that were perceived to be essential for learning, and future supports needed to address observed efficacy declines in working with children with autism in physical education settings. Sample questions included: “In your opinion, have you found value in participating in Jon's Heroes in Training as a future physical educator? If so, please describe what has influenced this perspective” and “For those of you whose scores have changed, which items and in which direction did your efficacy change? Looking back, what resources and learning/instructional supports or experiences do you believe contributed/influenced this/these change(s)”

Interview Qualitative Data Analysis

Inductive content analysis (Elo & Kyngäs, 2008) was used to analyze focus group qualitative data to help identify patterns and themes. Constant comparative analysis was employed throughout the qualitative data analysis to support a more in-depth identification of themes (Lincoln & Guba, 1985). Open and axial coding occurred to reveal initial patterns,

codes, and identify common linkages among the data. Peer debriefing and researcher triangulation occurred until theme refinement and operational definitions were finalized. Meaningful, holistic categories were combined to form themes to capture the essence of these categories (Nowell et al., 2017).

PPESEISD-A Statistical Data Analysis

Descriptive statistics were calculated across the sample as a whole and by item, and Cronbach's alpha coefficient was used to measure internal consistency of the PPESEISD-A instrument with Cronbach's $\alpha = .936$. A dependent-samples *t*-test was used to determine significance of change in participants' self-efficacy beliefs from pre- to post-test. A priori power analysis was conducted using JASP (Version 0.19.3) to determine the minimum sample size required to test the study hypothesis. Results indicated the need for a minimum sample size of 27 to achieve 80% power to detect a medium effect size ($|\delta| \geq 0.5$) at a significance criterion of $\alpha = .05$ for a one-sided test. The sample size obtained of $N = 29$ is therefore adequate. Item-level changes in mean scores were calculated to compare differences specific to teaching and management functions.

Results

Participants included 29 college-aged individuals ($M = 22.63$, $SD = 4.49$) enrolled in a required 16-week adapted physical education course in 2019. Twenty (68.9%) participants identified as male ($N = 20$). Participants were Physical Education Teacher Education majors enrolled in their third, fourth, or fifth year of university (24.1%, 55.2%, 20.7% respectively). Most participants (75.8%) reported prior teaching experience with individuals with disabilities in school or community settings beyond the required course. Of the total participants, only 14 volunteered to engage in a 45-minute focus group interview session. Of the 14 participants who took part in the focus group, 10 (71.4%) reported having experience teaching individuals with disabilities. Among the full sample of 29 participants, 21 (72.4%) had similar experiences (see Table 1).

Pre- and Post-Practicum Self-Efficacy Change

To determine the degree to which participants' self-efficacy beliefs changed across the 16-week practicum, a dependent-samples *t*-test was performed. Prior to conducting the analysis, the assumption of normally distributed difference scores was confirmed. Results of a dependent-samples *t*-test indicated significant increases in self-efficacy scores from pre-test ($M = 6.53$, $SD = 1.65$) to post-test ($M = 8.20$, $SD = .89$), $t(28) = -6.140$, $p < .001$. Cohen's $d = 1.14$, indicating a large effect size. Average scores for 26 of the 29 participants increased from pre- to post-test ($range = -1.40$ to 4.40 , $M = 1.67$).

While there was positive change reported across all items (see Table 2), the greatest pre- to post- change scores were reported in managing behavior ($M_{post-pre} = 2$, $SD = 1.55$), modifying instruction ($M_{post-pre} = 2.04$, $SD = 1.13$), modifying rules to games ($M_{post-pre} = 2.14$, $SD = 1.47$), and modifying equipment ($M_{post-pre} = 1.93$, $SD = 1.21$). Collectively, these items are strongly associated with planning and managerial teaching functions. Only one item reflected an average change score less than 1.00, which was Item 10 motivating students ($M_{post-pre} = .92$, $SD = 1.37$).

Table 1. Participant demographics

	Focus group (n = 14)		Full sample (n = 29)	
	n	%	N	%
Gender				
Male	11	78.5	20	68.9
Female	3	21.4	9	31.0
Year in school				
Junior	4	28.5	7	24.1
Senior	9	64.2	14	48.2
Post-baccalaureate	1	7.1	6	20.6
Did not report			2	6.8
Experience teaching individuals with disabilities				
Yes	10	71.4	21	72.4
No	3	21.4	6	20.6
No response	1	7.1	2	6.8
Interaction with individuals with disabilities				
Not at all	1	7.6	2	7.1
A few times a year	5	38.4	14	50.0
At least once a month	4	30.7	5	17.8
At least once a week	3	23.0	7	25.0
Almost daily	0	0.0	0	0.0
Did not report	1	7.6	1	3.4
Family member with a disability				
Yes	8	57.1	12	41.3
No	6	42.8	17	58.6
Close personal friend with a disability				
Yes	5	35.7	10	34.4
No	9	64.2	19	65.5
Do you have a disability				
Yes	1	7.1	1	3.4
No	13	92.8	28	96.5

Table 2. Pre- and Post-test item averages

Item	Pre		Post		Mean difference
	Mean	SD	Mean	SD	
1. Modify equipment	6.31	2.44	8.24	1.21	1.93
2. Modify activities	6.34	1.97	8.17	1.14	1.83
3. Create a safe environment	7.38	1.76	9.00	1.31	1.62
4. Promote social interactions with peers	6.93	2.07	8.17	1.23	1.24
5. Manage behaviors	5.03	1.80	7.03	1.55	2.00
6. Modify instructions	6.03	2.11	8.07	1.13	2.04
7. Assess motor skills	6.14	2.15	8.03	1.68	1.89
8. Modify rules to games	6.03	2.29	8.17	1.47	2.14
9. Collaborate with others	7.90	2.06	9.03	1.21	1.16
10. Motivate students	7.18	2.06	8.10	1.37	0.92

Focus Group Data

Two themes emerged from the qualitative data: (1) motivating, managing, and maximizing learning; and (2) learning to differentiate instruction. Both themes are described alongside participants' insights into facilitators and support needed to further develop their self-efficacy in working with learners with ASD.

Theme 1: Motivating, Managing, and Maximizing Learning

Participants emphasized the importance of understanding their learners' personal attributes and interests. They described getting to know their learners' interests, affinities, and unique personality traits during free time before and after planned activities, as well as benefiting from the consistency of working with a single learner throughout the practicum. One female participant stated, "I think it was really important to develop good rapport with your hero [learner] first and then from there it was easier to plan lessons knowing your students" (Female, FG2). Participants discussed having conversations with their learners to 'find out what they like' and 'what distracts them' in order to build trust between the learner and the teacher.

As the participants gained insights about their learner's interests and abilities, planning individualized learning activities became an area of strength and confidence for them. Beyond the learners themselves, parents and guardians were identified as critical sources of information. Regular interactions with parents and guardians were facilitated through initial information profile sheets and weekly progress reports detailing goals and at-home activities. Participants utilized this information to tailor personalized lessons, instructional cues, and environmental prompts, as well as to inform equipment selection, modes of information delivery, and the pacing of planned instruction. One participant described:

...whatever he told me he wanted to do I would do it. We'd always spitball a couple of different ideas. There was always a central theme, for the most part, it was Pokémon. So, it was always like a Pokémon-affiliated activity, whether it was Pokémon and fitness, or whatever. So, I had to figure out how he could, you know, use cardiovascular endurance to move around the gym and find Pokémon (Male, FG3)

Creativity in lesson planning was identified as another area of growth across participants. One participant stated, "It taught me how creative I could be with lesson plans" (Female, FG4).

Others noted how important it was to pay attention to how their learners were reacting and interacting with the activities and to adjust accordingly. For example, one participant recalled:

...before I really didn't think too much about it, or even have a clue" but once he realized his learner wasn't interested in the task, "...I modified the equipment, just so he'd stay engaged... and just like that I'm putting 'guys' [action figures] behind bowling pins as targets...and instead of sticking to one task, maybe I had to throw something else new in (Female, FG1).

Other participants indicated that using pictures of affinity-related images or incentive rewards was effective in motivating learners and keeping them engaged in the lesson activities.

Given the highly individualized nature of the instructional plans, participants described the need for additional support and resources to be successful. They specifically identified a need for greater access to instructional resources, including behavior management supports, sample lessons and content ideas, and practical strategies for modifying equipment from the course instructor. One participant noted, "I spent a lot of time looking at the equipment list... and just trying really hard to be creative with activities...I don't think there was a section on there for adaptive PE" (Female, FG3). While adjusting equipment for a single student seemed manageable, some participants lacked confidence in their ability to modify equipment for a group of students with diverse physical and social skills on the Autism Spectrum. Participants emphasized the importance of helping their learners develop social skills in physical activity settings. They suggested increasing opportunities for large group instruction and peer-to-peer interactions during the practicum.

Increased access to a variety of physical environments was noted as beneficial for engaging learners according to their interests. One participant mentioned:

...if we had access to like a little hiking trail, [my student] would probably love to do that, or something like maybe a park or like something where they can be active, where you can teach them but like maybe not so much sport skill (Male, FG4).

While some participants felt their greatest improvements were in modifying equipment, activities, instruction, and rules, others indicated this as an area needing further improvement.

Participants noted that understanding their learner increased their confidence and ability to motivate, manage outbursts, de-escalate frustrations or disinterests, and design tasks with modified equipment and instructions to maximize learning. On-site access to the ASD specialist during the practicum was helpful to teacher candidates in navigating challenging behavioral situations as they arose. Participants emphasized the significance of 'seeing the individual', the value of 'talking with them to know what motivates them,' and being able to 'motivate my student because I got to know them.' One participant reflected on how he adjusted his communication and motivational strategies with his student:

It's not like drill sergeant motivating like "Come on, you can do it." Sometimes it was jokingly, and he would enjoy it. For the most part it was more positive reinforcement. It taught me a lot more about empathy and sympathy for kids and you know put myself almost in their shoes to see maybe this is really hard for this student. (Female, FG4)

Participants acknowledged that non-instructional factors often influenced their learner's readiness to engage in the planned activities. Seasonal changes, such as the weather and time change, were noted as affecting engagement levels. Participants reported feeling underprepared for these situations and described the value of future case studies or 'real-life

examples' of what teachers are doing for students with ASD specifically in the general PE classroom. Another participant described her experiences with individualized learning:

Learning that each student is different. Different strategies and teaching approaches work differently for each student. So, learning her specifics, like what works for her. I feel I learned a lot in that sense and that is something I can carry on into my teaching profession – learning about each student.
(Female, FG3)

Theme 2: Learning to Differentiate Instruction

The second emergent theme provided insights into participants' learning associated with differentiating instruction. Specifically, two sub-themes were identified: (a) Defining success individually, and (b) Knowledge beyond myself and the need for collaboration.

Defining Success Individually

Data from the first sub-theme reflects an evolving sense of awareness and responsiveness to the lived experiences of learners with autism. Participants reported increased confidence, understanding, and appreciation for how they observed successes differently in each student. Based on the wide range of skill and ability levels of the learners in the program, participants often found themselves modifying or extending their activity plan based on the learners' response. Some realized their plans were too simple, while others found learners disinterested in activities that lacked challenge, were not tailored to suit their interests or focused solely on isolated skill practice. Some participants acknowledged their expectations were either too high or too low. One participant noted his learner, who had won medals in Special Olympics events, would often remark, "Why am I with all the younger kids?" (Male, FG1). After this realization, the participant began making lesson plans informed by the learner's skills level, interests, and developmental goals. Another participant recognized abruptly during a practice session that the learner self-modified a task to better suit her own needs:

What stood out to me the most was within a couple of our lessons, [we] did kicking and we always wanted her to kick a ball, but she just insisted on kicking the pins...her kicking form was good, so, if she was more interested in kicking the pins down, than kicking the ball...[that] really focused on the process rather than the product. (Male, FG3)

Participants described the time spent with their learners shifted their perspectives on the skillfulness of individuals with disabilities. One participant noted that while looking for resources to plan his lesson, he "didn't search for anything to do with ASD;" instead he looked for "regular activities and tried to adapt them to what I thought she needed" (Male, FG3).

Another participant highlighted seeing the unique traits of students, stating "disabled or not, we'll have behavioral issues, you just have to adapt to teach them the best way possible" (Male 1, FG1). Others described how the regular interactions were reframing their perspectives and challenging them to consider their planned tasks from the lens of the learner. For example, "it taught me about empathy and sympathy for kids ... and you know, like 'tone it down' and put myself in their shoes to see [that] maybe this is really hard for this student" (Male, FG1).

The practicum was designed to include continuous monitoring of skill development and behavioral traits of the learners. Participants noted that documenting progress and change over time contributed to heightened self-efficacy, increased awareness of learner strengths, adaptation of teaching strategies, and the necessity of designing individualized and "emotionally safe environments" (Male, FG3). One participant put it this way, "...more often

than not, he was able to do a lot of the things. I was able to work to his strengths” (Male, FG 4). Further, this participant indicated he appreciated tracking progress as it “made it easier to manage, see progress, and keep [the learner] interested” (Male, FG4). However, some described the expectation of continuous monitoring to be a challenge, because it highlighted instances where he “was not seeing the progress [I] wanted to see... [which] became a little bit discouraging” (Male, FG3). Participants suggested that a more robust learner profile be provided at the start of the experience. This profile could include previously experienced lessons, units, activities, benchmarks of achievement (skill, fitness, social, and behavioral), and relevant affinities, interests, and possible triggers. They noted that such a portfolio, built and maintained across the semesters, could support participants lacking confidence in planning progressive and developmental learning experiences for children with autism.

Knowledge Beyond Myself and the Need for Collaboration

Data from the second sub-theme reflects teacher candidates’ recognition of the importance of collaboration with and observation of peers and other professionals. These experiences contributed to an appreciation of the range and variability of learner success. Participants noted the need for greater emphasis on collaboration throughout the field experience. They suggested increased opportunities for idea sharing, group planning, and reflection to enhance their experience and learning during the practicum. An example of collaborative planning and brainstorming was described:

... I'm sure other students before us, and other students after us, are going to be creative [in planning], so it would be great to be able to look at those to know what types of things that have been done, and liked, before (Male, FG1).

Another example was described:

Another participant indicated she felt stuck not knowing how to adapt lessons for her learner but was sure that “insight from somebody else seeing and hearing how they would go about it maybe would help us as well” (Female, FG3).

Participants acknowledged the need for and value of social and planned peer interactions across the practicum. The suggested recalibration of the field experience format seemed to encompass benefits for the learners as well as the preservice participants. Enhanced interaction among learners during the field experience would be valuable if they were grouped based on skill rather than age. If structured properly, it could facilitate opportunities to focus on interpersonal communication, social skill development, and self-management, such as impulse control. However, there were caveats regarding how to integrate students who were nonverbal and those with lower functional skills. Participants noted that integrating small and large group learning opportunities might better prepare them for an authentic physical education classroom. For example, a female participant noted:

it would be more beneficial because I think that's where a lot of [the learners] are going to be in the general PE setting. So, how often are they going to do individual lessons in a regular PE setting? That's why I think more group activities would actually be really good (Female, FG2).

Another perspective was that it would increase their exposure to students at different levels of the Autism Spectrum and help them “to understand how to incorporate the different students together, create a lesson plan that works for all of them, and even collaborate with your fellow teachers” (Male, FG3).

Participants noted parents and guardians as critical supports in understanding their learners’ capabilities and limits. With the field experience structured outside of the school

day and taking place at the university, parent/guardian drop-off and pick-up were integral to the experience. While not required, many parent/guardians stayed in the lobby during the session, offering valuable information about the learners to the preservice teachers. Some participants noted that connecting with parents/guardians could be a valuable addition to future practicums. For example, one participant described:

The parents were a big help for us. I think even at times they thought they were overstepping us, which was weird because, especially her dad, he would ask, 'do you mind if I jump in and help you guys or show you?' And it's like, yes, please! Cause we were kind of lost the first couple of weeks not knowing what to do. So, they were a very big help (Male, FG3)

Of particular significance to the participants were the guest speakers at the start of the semester. The instructor of the course arranged for parents of a deceased young man who had autism to come speak to the class prior to the start of the field experience. The parents shared their son's story as a child with ASD and described the challenges they faced with structured school environments, namely physical education. Participants used statements such as "eye opening" and a "huge motivation factor and an encouragement to me" to describe parents' testimonials. One participant stated: "I will never forget when those parents came in and told that story" (Male, FG 4) and another expressed how the session helped her see "how different pieces of his life [were] impacted or made him who he was and then how he's impacting people now, even when he's gone" (Female, FG 4). Another participant stated that while he was listening to the testimonial, he "couldn't stop thinking about [hero's name] and wonder how he's being treated at school" (Male, FG 4). Based on these data, connecting preservice teachers to lived experiences of those with ASD was valuable in increasing awareness of life beyond the gymnasium as well as the impact school and teachers have on families beyond the school day.

The cross-disciplinary connection with special education professionals and preservice teachers was noted as an area of potential that was not fully realized at the point of the study. Participants mentioned that the inclusion of special education professionals within the practicum helped moderate behavioral issues and model interactive strategies for redirection and behavior management, which was essential for skill instruction and skill development to occur. This sentiment was reflected here:

...there was one Special Ed Major that came in a couple times, just like walked around helping out our groups. She was able to work with [the learner's] - you could tell she had way more experience than us. She was able to get them to cooperate. Like they talked to her, they all liked her, and she help me out because she knew [learner's' name] was a ball of energy, running around the minute she got in, and she would help me get him on task or talk about this to him. That helped me a lot. [I suppose] from a Special Ed major's aspect they probably deal with, and see a lot of different stuff (Male, FG1)

Coordinated interactions with school professionals, such as adapted physical education teachers, special education teachers, and parents, were identified as significant learning experiences. Participants noted that enhancing these interactions would further bridge gaps in their knowledge, skills, and understanding. They identified a range of professional resources and supports that would expand the experience for future preservice teachers, including partnerships with special education faculty and preservice teachers, and in-service adapted physical education professionals.

Further, participants noted that course content stressed the significance of Individualized Education Programs (IEPs) and 504 Plans, covered under section 504 of the Rehabilitation Act, but did little to orient them to the documents, processes, or how to navigate an IEP meeting. One participant noted that it could have been helpful to bring a

special education teacher or a case manager for the county/school district to provide IEP examples or describe how “they run the IEP” (Female, FG2).

Discussion

The current research mirrored work by Taliaferro and colleagues, (2015) to better understand the effects of a practicum experience and associated APE course on preservice teacher candidates’ self-efficacy for working with children with autism. The qualitative and quantitative data collected in this study were used in an integrated manner to explore patterns among key variables and to enrich the interpretation of participant experiences. Results indicated a statistically significant increase in teacher candidates’ self-efficacy beliefs toward working with learners with ASD in physical education/movement settings across a 16-week APE practicum experience. Individual items that reflected the greatest change from pre- to post-test included manage behaviors (2-point change), modify instructions (2.04-point change), modify rules to games (2.14-point change), and modify equipment (1.93-point change). When considering that individuals often overestimate their actual ability levels when they lack the experience on which to base these appraisals, such as during the timepoint of the pre-test in the current study, these improvements in self-efficacy beliefs are promising. Findings from this study support Bandura’s (1997) theory that self-efficacy is an ever-changing characteristic that can be shaped through mastery, vicarious, and social persuasion experiences. It is hypothesized that the significant changes in self-efficacy scores may be linked to the experiences described by participants as being particularly meaningful in this purposefully designed APE program, with specific examples described below.

Participants reported having the highest levels of self-efficacy at both pre-and post-test on Item 9, collaborating with others. This finding highlights a well-established need for professional preparation programs and APE practicum experiences to provide purposefully structured opportunities in which preservice teachers can develop and strengthen collaboration, communication, and consultation skills regarding APE service delivery (Hodge et al., 2003; Lytle et al., 2003; Taliaferro & Bulger, 2020). Piletic and Davis (2010) found that consulting is among those content areas receiving the least amount of focus within APE introductory courses, with 75% of programs reporting 2 hours or less of course time devoted to this topic. The APE practicum experience in the current study emphasized structured, intentional opportunities for preservice teachers to collaborate with peers, parents/guardians, and the ASD specialist.

Access to the ASD specialist and special education professionals onsite was noted by participants as being particularly helpful in modeling how to manage challenging behaviors. Participants described these vicarious and social persuasion experiences involving collaboration and consultation as influential in facilitating their learning. Collectively, these results support the idea that intentional opportunities to work within a collaborative approach can have a positive impact on the development of self-efficacy beliefs, which once established, can generalize to other situations (Bandura, 1977; Román-Oyola et al. 2018).

These opportunities for collaboration helped to facilitate participants’ abilities to motivate the learners and manage challenging behaviors. In the open-ended interviews, participants emphasized many strategies they implemented to motivate their learner including using creativity in lesson planning, understanding the interests of their learners, developing rapport with their learner, and adjusting tasks to maintain engagement. Given this emphasis on mastery experiences with motivating learners in the qualitative data, it was surprising that scores on this survey item (Item 10) remained relatively steady and had the lowest average change from pre-post evaluation (0.92-point change). According to self-efficacy theory, individuals may overestimate their true ability levels when they do not have adequate experience to base these appraisals on (Bandura, 1997; Blanco Ornelas et al., 2019;

Thrasher et al., 2016). It is hypothesized that participants may have inflated their estimated ability to motivate learners with ASD prior to the start of the practicum experience, when they lacked relevant experience. The mastery, vicarious, and social persuasion experiences that participants gained during the practicum, combined with feedback from these experiences, may have enabled participants to make more informed and accurate assessments of their abilities to motivate learners with ASD on the post-test.

Though there was a relatively large positive change over time, participants in the current study held the lowest levels of self-efficacy beliefs at both pre- and post-test on the item related to managing behaviors ($M = 7.03$). Further, participants noted in the focus group interviews that behavior management was an area where future support was needed. These findings are consistent with previous research, as managing challenging behaviors of students with disabilities has been noted as one of the most significant impediments to successful inclusion and an area in which teachers report feeling unprepared and unsupported (Hodge et al., 2004; Lavay et al., 2011; Morley et al., 2005). According to Obrusnikova and Dillon (2011), teachers have voiced the importance of and the need for additional training, including at the preservice level, to address teaching challenges specific to the inclusion of students with autism in physical education classes. This is also consistent with Tripp and colleagues (2007) mentioning that the value of inclusion is important in any teaching environment, since teachers must be qualified to create what they describe as changing the culture in physical education environments.

The wide range of behaviors and unique learner attributes of students with ASD pose unique challenges to effective teaching in the physical education setting (Obrusnikova & Dillon, 2011). There are identified nine themes of teaching challenges specific to instructing students with autism in the general physical education setting, including inattentive and hyperactive behaviors, social impairment, difficulties understanding and performing tasks, emotional regulation difficulties, narrow interests, inflexible adherence to routines and structure, and the need for instructional support such as cueing, prompting, and physical assistance. These challenges represent significant considerations because they were found to impact instructional, managerial, and social task systems within the PE setting. How and when preservice teachers develop competencies related to managing challenging behaviors within undergraduate PE teacher training programs, including how to mediate their impact on task systems, is a phenomenon in need of further exploration.

Results of the qualitative data, combined with the significant change in self-efficacy scores, support the influence of the interactions among the four sources of self-efficacy on the development of preservice teachers' self-efficacy beliefs toward inclusion. The impact of mastery experiences, the most influential source of self-efficacy, was evident through participants' description of weekly hands-on experiences providing 1:1 instruction to learners with autism. These experiences allowed opportunities to prepare lessons, provide prompts, and select equipment to deliver effective instruction. Vicarious experiences through guest presentations from parents of children with autism and collaboration with an on-site autism specialist were also noted as influential components of practicum design. Open-ended responses from participants reinforced the value of parent/guardian feedback, which provided social persuasion opportunities. The quality of feedback received from each of the sources of self-efficacy can both positively and negatively affect self-efficacy beliefs (Bandura, 1997). Therefore, intentionally structured opportunities for teacher candidates to gain successful experiences and positive reinforcement across multiple sources are important considerations when designing quality APE practicums.

Researchers have suggested that PETE programs provide teacher candidates with hands-on experiences teaching students with disabilities that resemble "real world" teaching

contexts (An, 2021; Block et al., 2020). Such experiences might help to prevent the “perceived mismatch” between preservice preparation and the realities of the K-12 teaching context, Dillon and colleagues (2020) described. This mismatch can lead to self-doubt among preservice physical educators regarding their abilities to teach in an inclusive setting. An example of this misalignment was seen in the current study, where participants described a lack of confidence in their ability to generalize their expertise in modifying equipment for a single participant to a situation with a larger group of students across the Autism Spectrum, more closely resembling the realities of school-based settings. This is consistent with Columna and colleagues, (2024) since perceived competency among adults to engage in physical activity settings with students with ASD is still a challenge that relates to different factors such as the lack of training and confidence.

Further, participants expressed the desire for additional mastery and vicarious opportunities through observations and experiences in inclusive GPE settings. While opportunities within realistic settings are an important consideration, such school-based experiences can be difficult to incorporate into the design and scope of an on-campus APE practicum. As such, future research is recommended to investigate how to best provide teacher candidates with quality school-based mastery and vicarious experiences in conjunction with on-campus practicum to create different opportunities to link lifelong experiences that are significant to students with ASD.

Limitations

While results from the current study are positive, they should be considered within the limitations of the study. One limitation is the setting of the clinical experience, which was very structured and involved a one-on-one learning environment between a teacher candidate completing a compulsory practicum experience and a student with ASD. While developmentally appropriate, this environment may not allow participants to transfer gains in self-efficacy to more traditional general physical education settings. Another limitation of the current study is the sample size, which included 29 participants across the study at one university. Palinkas and colleagues, (2015) describe the use of a purposeful sampling strategy in mixed methods implementation studies as a method to narrow the range of variation, which can allow for information that is both detailed and generalizable. Yet, future research should include a larger, more diverse sample across multiple institutions to allow for a more comprehensive understanding of practicum effectiveness. Third, while university participants completed weekly reflections on their experiences, these reflections were not included as data points in the present study. As with many studies relying on end-of-experience self-reporting, the results may be influenced by cognitive biases such as confirmation bias and the recency effect. While confirmation bias may have led participants to selectively recall or emphasize experiences that aligned with their expectations or perceived outcomes, a recency effect may have caused disproportionate weight to be given to the most recent events rather than the experience as a whole. The researchers are unable to determine the impact of these types of possible confounding effects. However, the authors acknowledge that future research could incorporate longitudinal data collection, including periodic reflections and observational measures throughout the experience, as well as triangulation with other data sources to support more robust and balanced interpretations. A final limitation of this study is the nature of the research design, which was not intended to explore causal relationships, but rather to integrate the data to deepen understanding of the results. Future research should explore how observing and quantifying teacher behaviors can help determine whether changes in self-efficacy leads to long-term pedagogical adjustments.

Perspectives

Practicum experiences are vital components within teacher preparation programs, as they provide initial socialization opportunities into the profession, as well as a reinforcement of foundational content covered in introductory APE courses (McNamara et al., 2021). The results of the current study can help inform these efforts by demonstrating the positive effects of a theoretically based practicum experience embedded within an associated APE course on preservice teacher candidates' self-efficacy. Findings suggest the need for longitudinal examination of an APE pre-practicum on in-service teachers' self-efficacy and ongoing development of teaching learners with ASD in physical education settings. Further, Bandura (1977) proposed that self-efficacy beliefs can generalize to other situations once established; therefore, it would be of interest to determine the extent to which the pedagogical skills and self-efficacy beliefs developed within APE practicum experiences generalize to school-based settings and across other populations.

Survey results indicated an overall increase in self-efficacy to work with children with autism in a physical education/activity setting. Interview data point to a variety of experiences that either helped in the development of higher levels of self-efficacy or experiences that were lacking in impact or needed to have a more intense focus to influence the development of self-efficacy working with children with autism.

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