

# Intellectual and Developmental Disabilities

## Physical Educators' Training and Confidence in Implementing Evidence-Based Practices for Students with ASD

--Manuscript Draft--

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<b>Abstract:</b>	<p>Educators working with students with autism spectrum disorder (ASD) should be utilizing evidence-based practices (EBPs) that have been identified for this group of students to promote better outcomes. Physical education (PE) teachers are highly likely to work with students with ASD in educational settings, yet little is known about their level of training and confidence in implementing EBPs for students with ASD. This study used survey methodology to ask PE teachers about their training in EBPs and their perceived confidence in implementing such practices. The results indicate that while there was little reported training on individual EBPs specific to students with ASD, PE teachers reported feeling relatively confident in supporting students with ASD. Further findings and implications are discussed.</p>

IDD Revision

MS: IDD-D-23-00034

Physical Educators' Training and Confidence in Implementing Evidence-Based Practices for Students with ASD

Thank you for the opportunity to revise our manuscript. Please see the summary of the reviewers' comments and our responses in the table below.

Reviewer 1	
I was hoping to read more about the identification of these EBPs and their application to the target population of PE teachers surveyed. The background section on the identification of the 28 EBPs needs to be expanded. Is the Steinbrenner et al, 2020 article the only reference on EBP for students with ASD? Is there literature typing these practices specific to physical education or other areas of education? The practices themselves are unclear until the results section lists examples of the types of practices. This section should be written from the lens that the reader is unfamiliar with EBPs and since the EBP from the article were used in the survey methods, more expansion on the nature of these is needed. Does any additional supportive evidence or literature exist? And what are the qualifications for EBP to be considered as such?	<i>Thank you for your comment. We expanded the section in the literature review on Evidence-Based Practices for ASD to discuss the different reviews that have led to identifying EBPs. While Steinbrenner et al. (2020) is not the only review, it is the most recent and comprehensive that is focused on identifying EBPs for individuals with ASD. We also moved the list of EBPs from the results section to the literature review section. The criteria for being considered an EBP was identified in the Steinbrenner et al. (2020) report and is discussed in the literature review as well.</i>
In the methods section, please expand on how the survey was adapted from librarians to physical educators.	<i>Thank you for your questions. We have added information to the first paragraph under <b>Measures</b>. The main adaptation to the survey was substituting school librarian with PE teacher.</i>
This section. . . "Unfortunately, an average of 51.5% (range 28.2%-80.8%) reported no training in the identified EBPs. This aligns with previous more general findings from Anderson and Layden (2021), Hendricks (2011), and Layden et al. (2022). However, PE teachers did, on average, report more training in the EBPs than school librarians (Anderson & Layden, 2021). One potential reason for this insufficient training may be a	<i>Thank you for your recommendation. We have reorganized these sentences to have a better flow.</i>

lack of PE-specific research exploring the utility of these EBPs" . . . needs reorganization as the point that librarians receive less training mentioned in the middle disrupted the flow and sounds confusing.	
This article overall makes a sound call to action for focusing on EBP training to support PE teachers successfully and meaningfully engaging students with ASD in their classrooms. However the conclusion is only two sentences and should be written in stronger tone and as if someone who only skimmed the article and went straight to the conclusion could still take away the main points.	<i>Thank you for your suggestion. We have added to the conclusion to strengthen it.</i>
<b>Reviewer 2</b>	
This is a well-conceived study on an important topic that will provide a significant contribution to the field of school-based inclusive activity, an area in which I have expertise.	<i>Thank you for your comment! We appreciate your insight.</i>
Recommend reframing the introduction section to support a biopsychosocial model and human rights model of disability rather than using language that reflect a medical model understanding of disability. The autistic community rejects the medical model of disability and claims autism as a demographic and cultural identity and part of the normal neurodiversity of human life and not a negative health outcome. The use of the term "impairment" when referring to autism invokes the medical model of disability and presumes autism and a negative health outcome rather than an aspect of neurodiversity. So recommend removing any biased language and assumptions about this population throughout the manuscript. So specifically please revise in the first sentence the term "impairment" to "diagnosis" which is a neutral term.	<i>Thank you for your recommendation. We have rephrased sentences in the first paragraph to remove impairment and diagnosis related to autism. We also attempted to modify language about disability category, in an effort to move away from medical categorization.</i>

<p>Also recommend clarifying on page 5 that students with disabilities may be implicitly learning incorrectly that they are incapable of engaging in physical activity, to just emphasize that these students are capable and this is an incorrectly implicit message they are getting from PE class.</p>	<p><i>Thank you for the suggestion. We have added a sentence in the first paragraph under the heading <b>Physical Education Teachers</b>.</i></p>
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# **Physical Educators' Training and Confidence in Implementing Evidence-Based Practices for Students with ASD**

## **Declarations**

We have no known conflict of interest to disclose. There was no funding for this study.

### **Abstract**

Educators working with students with autism spectrum disorder (ASD) should be utilizing evidence-based practices (EBPs) that have been identified for this group of students to promote better outcomes. Physical education (PE) teachers are highly likely to work with students with ASD in educational settings, yet little is known about their level of training and confidence in implementing EBPs for students with ASD. This study used survey methodology to ask PE teachers about their training in EBPs and their perceived confidence in implementing such practices. The results indicate that while there was little reported training on individual EBPs specific to students with ASD, PE teachers reported feeling relatively confident in supporting students with ASD. Further findings and implications are discussed.

*Keywords:* autism spectrum disorder, physical education teachers, training in autism, evidence-based practices

### **Physical Educators' Training and Confidence in Implementing Evidence-Based Practices for Students with ASD**

Since the early 2000s, autism spectrum disorder (ASD) has gained a great amount of attention in educational contexts (ASD; Maher & Haegele, 2022). This attention is at least partially attributed to the high and increasing prevalence of ASD and, relatedly, students with ASD being educated within public schools. Highlighting this, the current prevalence of ASD is 1 in 44 (Maenner et al., 2021), and the number of students receiving special education services in the United States during the 2020-2021 school year was 7.2 million with 12% of those students having autism (National Center for Education Statistics [NCES], 2022). Given the prevalence rate of students with ASD in public schools, it is imperative that the teachers who support them are equipped to provide quality educational services to meet the needs of these students.

#### **Evidence-Based Practices for ASD**

Evidence-based practices (EBPs) are those practices that are deemed effective “on the basis of multiple, high-quality studies that use experimental research designs and demonstrate robust effects on student outcomes” (Cook et al., 2015, p. 220). There have been a handful of extensive systematic reviews looking specifically at EBPs for children with ASD reviewing literature from as early as 1957 (e.g., National Autism Center, 2009; National Autism Center, 2015; Steinbrenner et al., 2020; Wong et al., 2014). Most recently, in 2015, The National Autism Center reviewed 389 studies resulting in 14 EBPs. However, some of these identified EBPs incorporated several individual practices. For example, the National Autism Center identified Behavioral Interventions which included antecedent modification, chaining, imitation training, and function-based intervention, for example (National Autism Center, 2015). Through their review of 456 studies, Wong et al. (2014) identified 27 specific practices considered to be

evidence-based. In 2020, Steinbrenner expanded upon the work of Wong et al. (2014) to include updated literature extending from 2011 (Wong et al., 2014) to 2017 (Steinbrenner et al., 2020), which resulted in the identification of 28 EBPs for children and youth with ASD (Steinbrenner et al., 2020). Articles included in the Steinbrenner et al. (2020) review spanned from 1990-2017 with the criteria that studies specifically focused on interventions for individuals with ASD between the ages of birth-22 years. Additionally, studies had to be capable of being implemented in the educational, home, clinic, or community settings and concentrate on behavioral, clinical, developmental, and/or educational practices (Steinbrenner et al., 2020). After screening and reviewing articles, 634 articles were included that led to the identification of 28 EBPs (Steinbrenner et al., 2020). A list of the 28 EBPs and their acronyms can be found in Table 1.

<INSERT TABLE 1 ABOUT HERE>

Despite the identification of EBPs for this population of students, many educators struggle with implementing EBPs effectively. For example, Layden et al. (2022) conducted a national survey and found that educators reported low levels of training in EBPs with approximately three quarters of responses indicating less than 6 hours of training on the EBPs and one third indicating no training on EBPs for those with ASD. Additionally, infrequent implementation of EBPs was reported, with only 22.7% of the respondents indicating implementing any of the identified EBPs at least once per week over the previous six months (Layden et al., 2022). This aligns with previous findings of teachers reporting inadequate preparation to implement EBPs with students with ASD (e.g., Hendricks, 2011) and are likely not receiving enough training in EBPs to apply them to their own classrooms (Marder & deBettencourt, 2015; Stansberry-Brusnahan & Collet-Klingenberg, 2010).

While research has begun to examine EBP training and implementation among special



educators, less is known about other educators within the school system who also instruct or interact with students with ASD throughout the school day. According to Marder and deBettencourt (2015), it is critical for all personnel supporting students in school to be trained to implement EBPs when working with students with ASD, particularly as the prevalence of children with ASD within schools increases. To date, some research has explored the training that school librarians receive when working with students with ASD, which has identified that most report no coursework and little to no additional training specific to supporting these students (Anderson & Layden, 2021). That is, when asked about training in individual EBPs for students with ASD, on average, 82.5% (range 67.7%-94.4%) of school librarians reported receiving no training on EBPs for students with ASD (Anderson & Layden, 2021).

### **Physical Education Teachers**

Physical education (PE) classes have been identified as being among the first subjects within the school day where students with disabilities, including those with ASD, are integrated into general education classes with their nondisabled peers (Maher & Haegele, 2022). Supporting this assertion, scholars internationally assert that more students with disabilities are currently enrolled in general PE classes than ever before (Heck & Block, 2019). As such, it is clear that PE teachers are more likely have students with ASD in their classes than ever before (Gordon & Pennington, 2022). Additionally, students with ASD have been found to have low participation when it comes to physical activity (Healy et al., 2017; 2019). Though individuals may vary, students with ASD, as a whole, are capable of engaging in physical activity and exercise is an identified EBP for students with ASD (Steinbrenner et al., 2020). As such, it is clear that physical educators, like special educators and school librarians, are critical adult stakeholders within the school day that teach students with ASD often, and therefore should be trained in

implementing EBPs within their classes.

Despite the clear need for training in and the implementation of EBPs for students with ASD in PE, little is known about physical educators' experiences with these practices. What is known, though, is that many physical educators tend to report concerns about and hold negative attitudes and self-efficacy toward teaching students with ASD in their classes (Li et al., 2019; Nowland & Haegele, 2023; Wilhelmsen & Sorensen, 2017) which may influence how physical educators teach and treat students with ASD within their classes (Block & Obrusnikova, 2007; Li et al., 2019). This is exemplified in research that has sought the opinions of students with ASD about experiences within PE, where youth with ASD have reported experiencing a variety of challenging or discriminatory instances that may be attributed to the behaviors of their teachers (Haegele & Maher, 2021, 2022; Healy et al., 2013; Lamb et al., 2016). For example, students with ASD have reported (a) being excluded from activities by their teacher because of a perceived lack of ability or because the teacher is uncomfortable participating, (b) losing opportunities for meaningful peer relationships because of a hypermasculine culture constructed and support by physical educators, and (c) feelings of worry or trepidation entering spaces that aren't designed with their needs in mind (Haegele & Maher, 2021; Healy et al., 2013; Lamb et al., 2016). As a result of these challenging experiences, students with ASD may be implicitly learning that they are incapable of engaging in physical activity because of behaviors of their PE teachers, therefore further contributing to inactivity levels among this population (Healy et al., 2019).

The increasing prevalence of ASD diagnoses, the high likelihood of students with ASD being integrated into general PE classes, and current practices within PE classes that lead to unfavorable or challenging experiences each support the need for training physical educators to

implement EBPs within their classes. However, little is known about the training they receive to effectively implement EBPs for these students. Thus, in the current study we focused on the following research questions:

**Research Question 1:** To what extent are PE teachers receiving training on EBPs for students with ASD?

**Research Question 2:** To what extent do PE teachers feel confident in supporting students with ASD based on the types of training they have received?

**Research Question 3:** Does the level of training received influence PE teachers' beliefs about inclusion in PE classes?

### **Methods**

To address the research questions, this study adopted a cross-sectional survey design. Our survey was based on and adapted from prior work by Anderson and Layden (2021), which focused on school librarians, for physical educators. The research project was found to be exempt by the University's human subjects committee.

### **Participants**

Participants in this study had to be at least 18 years old and currently employed by a public school system as a PE teacher in the United States. All responses were voluntary and anonymous, and participants could skip any question they did not wish to answer or discontinue the survey at any time. For completing the survey, participants were entered into a drawing for a gift card, for which data were collected using a link that collected separate data in Qualtrics so that responses could not be connected to an individual. Participants were recruited via social media and direct emails to personal contacts of the research team. Snowball sampling techniques were utilized (Rea & Parker, 2014), where personal contacts were asked to distribute the survey

to other potentially interested participants.

### **Measures**

The survey was adapted based on work by Anderson and Layden (2021) which focused on school librarians in their sample. Specifically, the survey questions from Anderson and Layden (2021) were used but instead of asking about school librarians, school librarian was substituted with PE teacher and library was substituted with PE. PE teachers teach different content and in a different context within the school. Yet, like school librarians, PE teachers are generally not the primary teacher for students with ASD. Additionally, PE is a direct service within the school, where they are the direct content provider for their area, namely PE. There were questions changed in the demographics section that asked whether PE teachers were a certified adapted physical educator (CAPE) and if the participants had completed any courses in adapted physical education (APE).

Focused on training efforts related to evidence-based practices for students with ASD, the survey included two parts. The first part included 37-items exploring the training and implementation of EBPs among PE teachers, and the second part included a 9-item demographic survey. The demographic survey included questions about participants' education level, ASD-specific education, APE-specific education, numbers of students with ASD participants have worked with, years working as a PE teacher, level of teaching (e.g., elementary, middle, high school), and state. The full survey was created in Qualtrics, which is a secure, online survey development software that allows for anonymous submissions by participants.

The first part of the survey included several sections of questions. The first six questions asked participants to indicate how much training they had received to prepare them to work with students with ASD in their teacher preparation program, how much additional training they had

received outside their teacher preparation program, and if related professional development had been provided by their school district. Following, participants were asked to indicate if they felt they'd received adequate training to support students with ASD, how confident they felt supporting these students, and a general question about their feelings of students with ASD. Finally, participants were asked about specific EBPs. The questions about EBPs were derived from the NPDC list of 28 EBPs reported by Steinbrenner et al. (2020). Participants were given a Likert-scale ranging from 1 to 5. The participants were given the following criteria for each ranking: 1 – *I have received no training on this EBP*; 2 – *I have received 1 hour or less on this EBP*; 3 – *I have received more than 1 hour but less than 3 hours of training on this EBP*; 4 – *I have received more than 3 hours but less than 6 hours of training on this EBP*; and 5 – *I have received more than 6 hours of training on this EBP*. Participants were then asked to rate their level of training for each of the 28 practices identified by Steinbrenner et al. (2020).

### **Data Analysis**

Descriptive statistics were run to analyze and provide frequencies and simple summaries of the participants data. Fisher's exact test, in which two variables are compared to determine associations between variables on a small sample size, were conducted. All tests were conducted using IBM SPSS Statistics software, version 28.

### **Results**

One hundred-one physical educators entered and submitted our survey. Of those, 78 submitted complete and useable surveys and were included in our analyses. Among our participants, 66.7% reported teaching at the elementary level (i.e., grades K-5), 12.8% at the middle school level (i.e., grades 6-8), and 14.1% at the high school level (i.e., grades 9-12). The majority of participants indicated having completed a master's degree as their highest level of

education, with 32.1% of those in adapted PE (e.g., M.Ed., MS.Ed., MAT) and another 32.1% in PE (not APE). Additionally, 21.8% indicated a bachelor's degree and other participants (7.7%) indicated a specialist degree beyond master's degree (e.g., Ed.S.). The remaining 6.4% did not report their level of education. While 67.9% reported taking at least one APE undergraduate course, more than half (60.3%) of the participants indicated not taking any higher education courses specific to ASD.

Participants reported experience as a physical educator from less than one year to 15 years or more, with the most reporting 15 years or more (37.2%). Specific data on gender, age, and race was not collected, however participants did represent 24 states throughout the United States. While the number of students with ASD varied across participants, approximately one quarter indicated 21-50 students (26.9%) and more than 50 students with ASD (34.6%). Only 1 participant indicated never working with a child with ASD and 1 indicated only working with 1-2 students with ASD. In addition, participants were asked if they are CAPE certified, of which most answered *no* (61.5%). Participants were also asked if they are invited to students individualized education program (IEP) meetings; of those 25.6% reported they are *always* invited.

### **Disability Groups Supported**

Participants were asked to rank the top three groups of students with disabilities they are asked to support in their PE classes. Each of our 78 participants were permitted to select up to three groups each, with one representing the group they are asked to support the most. In total, 233 responses were tallied. Of the groups given, 61 participants (78%) selected ASD, which was the most frequent category selected. Other frequently selected disabilities included learning disability (n = 36; 46%) and emotional disability (n = 35; 45%). Of all categories presented and

out of all three rankings, only one participant selected visual impairment as their second most commonly supported disability group. Full results can be seen in Figure 1.

<PLACE FIGURE 1 ABOUT HERE>

### **ASD-Related Training**

Of the 78 PE teachers who responded to the question *how much training did you receive on ASD in your teacher preparation program?* the most commonly reported answer was *I had one required course that addressed ASD for at least part of the course, but not all of it* (30.8%). The next most common responses were in juxtaposition with 25.6% reporting having *multiple required courses addressing ASD intertwined within the curriculum*, while 24.4% had *no courses* that addressed ASD. 10.3% had *multiple required courses*, while 5.1% had *one required course* specific to ASD. Only 3.8% of participants took an elective course that addressed ASD.

Beyond their pre-service training program, participants were asked if they received any additional training specific to ASD and if so, how much. Training included workshops, conference sessions, or online webcasts or webinars, as defined by the researchers. Of the 78 responses, the most common answer was *no additional training specific to ASD* (28.2%).

Interestingly, the next most common answer was the most amount of training possible, 10 or more hours (25.6%). The third most common answer was 1-2 hours of training specific to ASD (21.8%). 12.8% reported 6-9 hours of training and 11.5% received 3-5 hours of training specific on ASD. Additionally, participants were asked if their school district provides professional development specific to supporting students with ASD in PE. This question included broader professional development sessions about students with disabilities. Almost three quarters of the 78 participants (71.8%) reported *no* to ever having a workshop or in-service about supporting students with ASD. 17.9% responded that *yes, we've had one workshop or in-*

*service about supporting students with ASD*, and 10.3% responded that they have had *multiple workshops or in-services about supporting students with ASD*. Seventy-eight physical educators also responded to the question *do you feel you have received adequate training in the area of ASD to support students with ASD in PE?* Of the 78 participants, 46.2% answered *yes*, while 42.3% responded with *no*. The remaining participants (11.5%) said that they were *unsure*.

Finally, a list of 28 EBPs from the NPDC (Steinbrenner et al., 2020) for working with individuals with ASD was presented to the participants. All 78 physical educators rated the amount of training they've received for each practice. Among all 28 EBPs presented, the majority of participants reported receiving *no training on this EBP* on each of the categories. The most commonly reported EBPs where participants responded with six hours or more of training were Direct Instruction (25.6%), Exercise and Movement (20.5%), Reinforcement (20.5%), and Visual Supports (20.5%). These results, including a list of EBPs and associated acronyms are displayed in Table 1.

### **Areas of Support for Students with ASD in PE**

Physical educators were asked to rank the order of areas in which they most often provide support services to students with ASD in PE. Participants were presented with 13 categories that included common areas of support for students with ASD as well as a *none of the above* option as the category may not be applicable to all PE settings. See table 2 for a full list of the 13 areas of support included in this study. Participants were instructed to select up to three categories, with number one representing their top area of support for students with ASD in PE. Data were analyzed based on the rank given by participants for each area. The most common area of support selected by participants was behavior, with a total of 36 selections across all three rankings of support, 19 of which selected it as their number one area of support. Social skills



were the next most commonly selected area of support for our participants ( $n = 33$ ), which was reported the most as their number two area of support ( $n = 14$ ). Following social skills came communication with a total of 22 rankings, however the majority of that total came from participants third area of support ( $n = 12$ ). While leisure skills were the second most commonly ranked number one area of support for our participants ( $n = 14$ ), it was the fourth most ranked area overall ( $n = 20$ ). No participants indicated college readiness, community access, information seeking, or vocational skills as an area of support provided to students with ASD in PE.

<INSERT TABLE 2 ABOUT HERE>

### **Relationships between Training, Support, and Services**

PE teachers were asked *how confident do you feel supporting students with ASD in PE?* Of the 78 participants, the most common answer was *somewhat confident* (43.6%), and another 37.2% reported *very confident*. Fewer chose other options including 10.3% who said, *neither confident or not confident*, 5.1% who said *somewhat not confident*, and 3.8% reported they felt *not confident*.

The overall results of participants reported confidence were then compared to how much training on ASD they reported having in their teacher preparation program (Table 3). Of those who reported taking multiple required courses about ASD, 65% reported feeling *very confident* and another 35% reported feeling *somewhat confident*. However, there was no relationship found between graduate program training about ASD and confidence in supporting students with ASD in PE through Fisher's exact test ( $p = .068$ ). Participants confidence was also compared with the amount of additional training outside of their graduate coursework that respondents reported receiving (Table 4). Of those who reported the most additional training specific to ASD (at least 10 hours), 80.0% felt *very confident*, while the remaining 20% felt *somewhat confident*. A

Fisher's exact test suggested a significant relationship between training outside of graduate coursework and confidence in supporting students with ASD in PE ( $p < .001$ ).

<INSERT TABLES 3 AND 4 ABOUT HERE>

Additionally, confidence was compared with whether participants school districts provide professional development for supporting students with ASD (Table 5). Similar to the findings above, of those who reported receiving multiple professional development opportunities about ASD, 62.5% felt *very confident*, and another 37.5% said they felt *somewhat confident*. However, no relationship was found between professional development opportunities about ASD and confidence to support students with ASD in PE ( $p = .688$ ). Lastly, we compared confidence to if participants felt like they've received adequate training to support students with ASD (Table 6).

Participants who reported yes, they had received adequate training, 58.3% said they felt *very confident* and another 38.9% felt *somewhat confident* about supporting students with ASD in PE. Here, the Fisher's exact test revealed a significant relationship between how participants felt about their level of training and their confidence in supporting students with ASD ( $p < .001$ ).

<INSERT TABLES 5 AND 6 ABOUT HERE>

### **Relationships between Training and Student Participation**

Physical educators were asked how they felt about students with ASD participating in PE. Of the 78 respondents, 57.7% agreed that *I feel like students with ASD should be able to access PE like all the other students regardless of how much support they need to do so*, 28.2% felt that *students with ASD should be able to access some components of PE but may not be appropriate to be in PE without designated staff support*, and 2.6% felt that *students with ASD should receive special programming to meet their needs separate from other students*. While no participants responded that *students with ASD should not be allowed to access PE unless they can show they*

*are capable of using it like other students*, 11.5% felt that *students with ASD should be able to access PE like all other students assuming they do not engage in behaviors that can interrupt the class*.

The same procedures as above were then taken to compare these results with the amount of training experience participants reported receiving during their graduate program (Table 7), outside of their graduate program (Table 8), and through professional development (Table 9). Of the 20 participants that reported having multiple required courses that addressed ASD intertwined within the curriculum, 75% agreed that *students with ASD should be able to access PE like all the other students regardless of how much support they need to do so*, and the remaining 25% felt that *students with ASD should be able to access some components of PE but may not be appropriate to be in PE without designated staff support*. However, a Fisher's exact test revealed no significant relationship between graduate program training and feelings about students with ASD participating in PE ( $p = .191$ ).

When compared to additional training outside of graduate coursework, 55% of the participants that reported receiving at least 10 hours of training specific to ASD agreed that *students with ASD should be able to access PE like all the other students regardless of how much support they need to do so* (Table 8). Interestingly though, almost all participants that received between 6-9 hours of additional training specific to ASD (90%) felt like *students with ASD should be able to access PE like all the other students regardless of how much support they need to do so*. Again, though, there was no significant relationship found between the amount of additional training and feelings about students with ASD participating in PE through Fisher's exact test ( $p = .259$ ).

<INSERT TABLES 7 AND 8 ABOUT HERE>

Of the participants whose school district has provided multiple workshops or in-services about supporting students with ASD, 62.5% agreed with the statement that *students with ASD should be able to access PE like all the other students regardless of how much support they need to do so* (Table 9). Furthermore, fisher's exact test revealed no significant relationship between professional development about ASD and feelings towards the participation of students with ASD in PE ( $p = .224$ ). Finally, participants feelings about students with ASD participating in PE were compared to if they felt they've received adequate training on ASD to support student with ASD in PE. Of those that stated yes, 61.1% felt *like students with ASD should be able to access PE like all the other students regardless of how much support they need to do so* (Table 10). Yet again, no relationship was found between variables through fisher's exact test ( $p = .857$ ).

<INSERT TABLES 9 AND 10 ABOUT HERE>

Although the results show that physical educators who received the most training in all three categories and felt that they received adequate training most often felt that *students with ASD should be able to access PE like all other students, regardless of how much support they need to do so*, there was no statistical significance found between any of these categories.

### **Discussion**

The current study surveyed PE teachers throughout the United States on the level of training they've received on EBPs for students with ASD. Importantly, our participants identified students with ASD as being supported most often within their PE classes. This finding may not be surprising, given that only three groups of students with disabilities are more common within schools (i.e., specific learning disabilities, speech language impairment, and other health impairment; NCES, 2022), those of which may not need considerable accommodations or modifications within PE contexts to be successful. As such, it is not surprising that ASD is the

highest category reported here. However, this finding is important, as it helps to support the considerable attention for ASD in research and practice within schools, including in PE (Maher & Haegele, 2022), as well as the need for teachers to understand EBPs for teaching students with ASD within PE.

Despite the clear need for PE teachers to have a sound understanding of how to teach students with ASD in their classes, most reported limited training on teaching students with disabilities, including specific training on EBPs. More specifically, nearly one quarter of the participants reported receiving no training during their pre-service coursework focused on teaching students with ASD, whereas about 30% reported this training as part of just one course. Furthermore, most participants reported no district supported training, and many (about 30%) reported no elective training outside on teaching students with ASD. These trends are problematic, as many of our participants, and perhaps PE teachers more generally, have not been exposed to pre-service or in-service training that can help to enhance teachers' attitudes, self-efficacy, and knowledge about teaching students with disabilities, including those with ASD (Piletic & Davis, 2010; Vogler, 2020). This lack of training may be the primary culprit for the negative or challenging experiences that are reported throughout literature discussing PE classes with students with ASD (Haegele & Maher, 2021; 2022; Lamb et al., 2016), given that teachers' behaviors are generally central to these experiences.

In considering the training of our participants, we were specifically interested in exploring the amount of training they received on a list of 28 EBPs specifically designed for students with ASD (Steinbrenner et al., 2020). According to Steinbrenner and colleagues (2020), these EBPs have been deemed effective and useful across various educational, home, clinical, and community contexts. Despite this utility, only an average of 11.4% (range 1.3%-25.6%) of

participants reported receiving 6 or more hours of training in the identified EBPs. Unfortunately, an average of 51.5% (range 28.2%-80.8%) of participants reported no training in the identified EBPs. However, PE teachers did, on average, report more training in the EBPs than school librarians reported in Anderson and Layden's (2021) study. This overall lack of training in EBPs for PE teachers aligns with previous findings on lack of training for other educators including teachers, administrators, and school librarians (Anderson & Layden, 2021; Hendricks, 2011; and Layden et al., 2022).

One potential reason for this insufficient training may be a lack of PE-specific research exploring the utility of these EBPs. That is, PE is noted as a unique educational context that is open and dynamic in comparison to classroom-based courses, and therefore may require research to be conducted within this context prior to generalizing EBPs to PE (Maher & Haegele, 2022). Supporting this assertion, Maher and Haegele (2022), in a recent text exploring pedagogical practices within PE, noted a considerable lack of research exploring the efficacy of EBPs within PE and for students with ASD. This is corroborated by Hutzler (2020), who noted few EBPs generally have support within PE contexts for students with disabilities. As such, in addition to considering further training in EBPs for PE teachers, scholars must also explore the utility and appropriateness of these EBPs within this unique educational context.

Despite the lack of training in ASD and EBPs, many of our participants were at least somewhat confident in teaching students with ASD in their classroom. This is surprising, as some prior work has demonstrated that physical educators tend to have concerns about their abilities to teach students with ASD within their classrooms (Li et al., 2019). When examining levels of confidence related to training, a significant relationship was found with training outside of graduate coursework but not with graduate training programs or professional development

opportunities about ASD. While it is outside the scope of this study as to what those specific trainings covered, it is probable that training outside of graduate programs may have been training that the PE teachers sought themselves. This is important as having autonomy in what we learn as well as need-based learning are important components of adult learning theory (Schmitt, 2018). It is also possible that by having a choice in trainings may have led to sessions that were more readily applied to the PE setting, which is another important component of adult learning (Dunst et al., 2010; Schmitt, 2018), rather than general sessions on ASD that may be more geared to special education or general education classroom teachers. When asked about students with ASD and the PE teachers' beliefs about being included in the PE setting, over half of participants agreed students with ASD should be able to access PE regardless of how much support they need. Another 28.2% agreed students with ASD should participate in at least some of PE but may need further supports. These findings are encouraging as, even though there may not be enough training on specific EBPs, PE teachers, in general, feel students with ASD should access PE classes, even if they need support. However, behavioral challenges that can be displayed by some students with ASD did seem to be a barrier for some participants (11.5%). Perhaps with greater training in EBPs to manage behavioral challenges, these participants would be more comfortable with having students with ASD access their PE classes.

### **Limitations**

The findings from this study should be viewed with the following limitations in mind. First, the results are based on self-reported data. While this type of data collection method does make sense for the questions asked, self-reported data can be less reliable. Second, the sample size is relatively small. However, the sample does represent people from approximately half of the states in the United States but with a small sample size, caution should be taken when

generalizing.

### **Conclusion**

PE teachers report an overall lack of training in EBPs for working with students with ASD, despite a greater prevalence of these individuals and the increasing inclusion of students with ASD in their classes (Gordon & Pennington, 2022). Overall, the PE teachers who completed this survey appear to be willing to work with students with ASD in their classes and even report feeling confident about their abilities to support this population of students. However, a lack of training in EBPs for students with ASD was found, which could impact the quality of instruction students with ASD receive while in PE class. PE teachers need to be included in training related to students with ASD both in their pre-service preparation and their in-service professional development opportunities. Both institutes of higher education and school districts need to consider how they support PE teachers to be prepared and effective in their teaching practices for students with ASD and provide opportunities for growth for these professionals to ensure students with ASD receive effective and equitable education, including in their PE classes.



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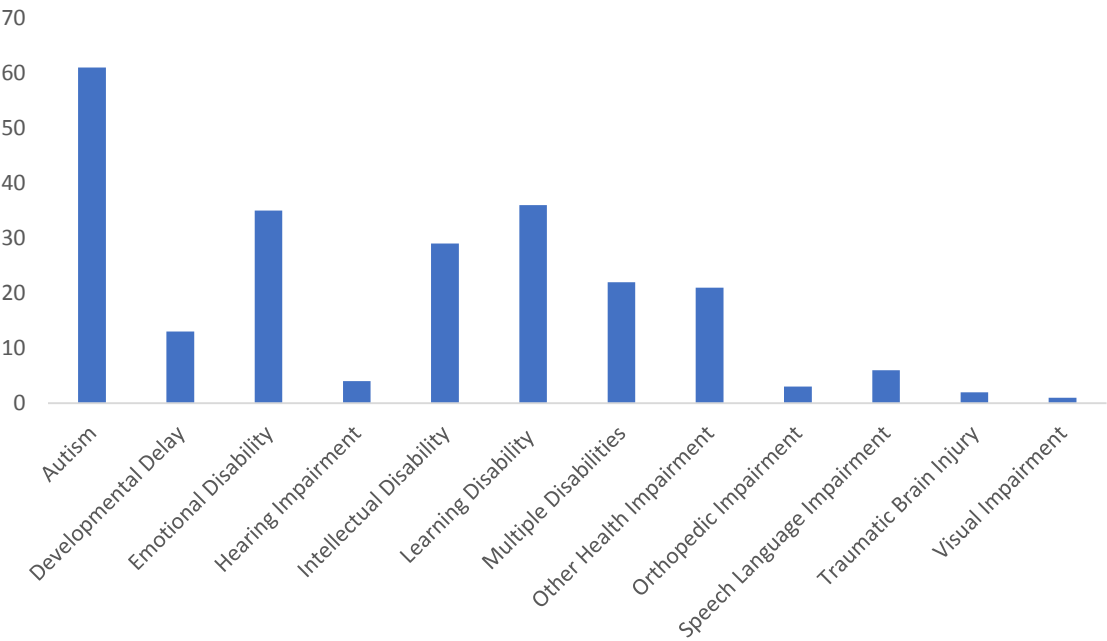
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**Figure 1.** *Disability Categories Supported*



**Table 1.** *Level of Training on Evidence-Based Practices*

<b>Evidence-Based Practice</b>	<b>No Training</b>	<b>1 hour or less</b>	<b>More than 1 hour but less than 3 hours</b>	<b>More than 3 hours but less than 6 hours</b>	<b>More than 6 hours</b>
Antecedent-Based Intervention (ABI)*	56.4%	10.3%	17.9%	6.4%	7.7%
Augmentative and Alternative Communication (AAC)	51.3%	17.9%	15.4%	6.4%	9%
Behavioral Momentum (BM)	64.1%	7.7%	7.7%	12.8%	7.7%
Cognitive Behavioral/Instructional Strategies (CBIS)	42.3%	17.9%	19.2%	7.7%	12.8%
Differential Reinforcement for Alternative, Incompatible, or Other Behavior (DRA/I/O)	53.8%	12.8%	11.5%	7.7%	14.1%
Direct Instruction (DI)*	30.8%	15.4%	20.5%	6.4%	25.6%
Discrete Trial Training (DTT)	71.8%	7.7%	9%	2.6%	9%
Exercise and Movement (EXM)*	42.3%	9%	16.7%	10.3%	20.5%
Extinction (EXT)	64.1%	9%	16.7%	5.1%	5.1%
Functional Behavioral Assessment (FBA)	38.5%	20.5%	15.4%	6.4%	19.2%
Functional Communication Training (FCT)	61.5%	14.1%	11.5%	9%	3.8%
Modeling (MD)*	25.6%	20.5%	17.9%	15.4%	19.2%
Music-Mediated Intervention (MMI)	80.8%	6.4%	5.1%	3.8%	3.8%
Naturalistic Intervention (NI)	76.9%	11.5%	6.4%	2.6%	2.6%
Parent-Implemented Intervention (PII)	78.2%	9%	7.7%	3.8%	1.3%
Peer-Based Instruction and Intervention (PBII)*	46.2%	16.7%	16.7%	11.5%	7.7%
Prompting (PP)	37.2%	21.8%	14.1%	11.5%	15.4%
Reinforcement (R)	28.2%	23.1%	17.9%	10.3%	20.5%
Response Interruption/Redirection (RIR)	46.2%	17.9%	16.7%	10.3%	9%
Self-Management (SM)**	52.6%	15.4%	11.5%	6.4%	10.3%
Sensory Integration (SI)	44.9%	21.8%	9%	7.7%	16.7%
Social Narratives (SN)	44.9%	21.8%	10.3%	11.5%	11.5%
Social Skills Training (SST)	47.4%	23.1%	9%	12.8%	7.7%
Task Analysis (TA)	47.4%	14.1%	10.3%	12.8%	15.4%
Technology-Aided Instruction and Intervention (TAII)	53.8%	19.2%	11.5%	9%	6.4%
Time Delay (TD)	62.8%	19.2%	7.7%	3.8%	6.4%
Video Modeling (VM)	57.7%	15.4%	9%	5.1%	12.8%
Visual Supports (VS)*	33.3%	20.5%	14.1%	10.3%	20.5%

*Note.* \* One missing item; \*\* three missing items

**Table 2.** *Participant Rankings of Top Areas of Support*

<b>Areas of Support</b>	<b>Number of Participants</b>
Academics	5
Adaptive Skills	11
Assistive Technology	1
Behavior	36
College Readiness	0
Communication	22
Community Access	0
Information Seeking	0
Learning Environment	13
Leisure Skills	20
Sensory Concerns	11
Social Skills	33
Vocational Skills	0
None of the above	9

*Note.* Numbers indicate how many participants ranked each category; participants selected three categories unless their first selection was ‘none of the above.’

**Table 3.** *Confidence in Supporting Students with ASD and Training in Graduate Coursework*

<b>How confident do you feel supporting students with ASD in Physical Education?</b>					
	Very confident	Somewhat confident	Neither confident or not confident	Somewhat not confident	Not confident at all
Total for all participants	37.2%	43.6%	10.3%	5.1%	3.8%
<b>How much training did you receive on ASD in your teacher preparation program?</b>					
I had multiple required courses that addressed ASD intertwined within the curriculum	65.0%	35.0%	0.0%	0.0%	0.0%
I had multiple required courses specific to addressing ASD	25.0%	62.5%	12.5%	0.0%	0.0%
I had one required course specific to addressing ASD	50.0%	50.0%	0.0%	0.0%	0.0%
I had one required course that addressed ASD for at least part of the course	25.0%	54.2%	8.3%	4.2%	8.3%
I took at least one elective course that addressed ASD	66.7%	0.0%	0.0%	33.3%	0.0%
I had no courses in my teacher preparation program that addressed ASD	21.1%	36.8%	26.3%	10.5%	5.3%



**Table 4.** *Confidence in Supporting with ASD and Training Outside of Graduate Coursework*

<b>How confident do you feel supporting students with ASD in Physical Education?</b>					
	Very confident	Somewhat confident	Neither confident or not confident	Somewhat not confident	Not confident at all
Total for all participants	37.2%	43.6%	10.3%	5.1%	3.8%
<b>Have you received any additional training, outside of your graduate coursework?</b>					
I have received at least					
10 hours of training	80.0%	20.0%	0.0%	0.0%	0.0%
specific to ASD					
I have received between					
6-9 hours of training	50.0%	50.0%	0.0%	0.0%	0.0%
specific to ASD					
I have received between					
3-5 hours of training	11.1%	88.9%	0.0%	0.0%	0.0%
specific to ASD					
I have received 1-2 hours					
of training specific to	29.4%	35.3%	11.8%	17.6%	5.9%
ASD					
I have received no					
additional training	9.1%	50.0%	27.3%	4.5%	9.1%
specific to ASD					

**Table 5.** *Confidence in Supporting Students with ASD and Training Through School District*

<b>How confident do you feel supporting students with ASD in Physical Education?</b>					
	Very confident	Somewhat confident	Neither confident or not confident	Somewhat not confident	Not confident at all
Total for all participants	37.2%	43.6%	10.3%	5.1%	3.8%
<b>Does your school district provide professional development specific to PE teachers regarding supporting students with ASD?</b>					
Yes, we've had multiple workshops or in-services about supporting students with ASD.	62.5%	37.5%	0.0%	0.0%	0.0%
Yes, we've had one workshop or in-service about supporting students with ASD.	35.7%	57.1%	0.0%	7.1%	0.0%
No, we've never had a workshop or in-service about supporting students with ASD.	33.9%	41.1%	14.3%	5.4%	5.4%

**Table 6.** *Confidence in Supporting Students with ASD and Feelings of Adequate Training*

<b>How confident do you feel supporting students with ASD in Physical Education?</b>					
	Very confident	Somewhat confident	Neither confident or not confident	Somewhat not confident	Not confident at all
Total for all participants	37.2%	43.6%	10.3%	5.1%	3.8%
<b>Do you feel you have received adequate training in the area of ASD to support students with ASD in PE?</b>					
Yes	58.3%	38.9%	2.8%	0.0%	0.0%
No	21.2%	39.4%	18.2%	12.1%	9.1%
Unsure	11.1%	77.8%	11.1%	0.0%	0.0%

**Table 7.** *Feelings about Students with ASD Participating in PE and Training in Graduate Coursework*

<b>Which of the following best describes how you feel about students with ASD participating in PE?</b>					
	I feel like students with ASD should:				
	be able to access PE like all the other students regardless of how much support they need to do so.	be able to access PE like all other students assuming they do not engage in behaviors that can interrupt the class.	be able to access some components of PE but may not be appropriate to be in PE without designated staff support.	receive special programing to meet their needs separate from other students.	not be allowed to access PE unless they can show they are capable of using it like other students.
Total for all participants	57.7%	11.5%	28.2%	2.6%	0.0%
<b>How much training did you receive on ASD in your teacher preparation program?</b>					
I had multiple required courses that addressed ASD intertwined within the curriculum	75.0%	0.0%	25.0%	0.0%	0.0%
I had multiple required courses specific to addressing ASD	75.0%	12.5%	12.5%	0.0%	0.0%
I had one required course specific to addressing ASD	25.0%	0.0%	75.0%	0.0%	0.0%
I had one required course that addressed ASD for at least part of the course	50.0%	25.0%	25.0%	0.0%	0.0%
I took at least one elective course that addressed ASD	66.7%	0.0%	33.3%	0.0%	0.0%
I had no courses in my teacher preparation program that addressed ASD	47.4%	10.5%	31.6%	10.5%	0.0%

**Table 8.** *Feelings about Students with ASD Participating in PE and Training Outside of Graduate Coursework*

<b>Which of the following best describes how you feel about students with ASD participating in PE?</b>					
	I feel like students with ASD should:				
	be able to access PE like all the other students regardless of how much support they need to do so.	be able to access PE like all other students assuming they do not engage in behaviors that can interrupt the class.	be able to access some components of PE but may not be appropriate to be in PE without designated staff support.	receive special programing to meet their needs separate from other students.	not be allowed to access PE unless they can show they are capable of using it like other students.
Total for all participants	57.7%	11.5%	28.2%	2.6%	0.0%
<b>Have you received any additional training, outside of your graduate coursework?</b>					
I have received at least 10 hours of training specific to ASD	55.0%	25.0%	20.0%	0.0%	0.0%
I have received between 6-9 hours of training specific to ASD	90.0%	0.0%	10.0%	0.0%	0.0%
I have received between 3-5 hours of training specific to ASD	44.4%	11.1%	44.4%	0.0%	0.0%
I have received 1-2 hours of training specific to ASD	47.1%	11.8%	41.2%	0.0%	0.0%
I have received no additional training specific to ASD	59.1%	4.5%	27.3%	9.1%	0.0%

**Table 9.** *Feelings about Students with ASD Participating in PE and Training Through School District*

<b>Which of the following best describes how you feel about students with ASD participating in PE?</b>					
	I feel like students with ASD should:				
	be able to access PE like all the other students regardless of how much support they need to do so.	be able to access PE like all other students assuming they do not engage in behaviors that can interrupt the class.	be able to access some components of PE but may not be appropriate to be in PE without designated staff support.	receive special programing to meet their needs separate from other students.	not be allowed to access PE unless they can show they are capable of using it like other students.
Total for all participants	57.7%	11.5%	28.2%	2.6%	0.0%
<b>Does your school district provide professional development specific to PE teachers regarding supporting students with ASD?</b>					
Yes, we've had multiple workshops or in-services about supporting students with ASD.	62.5%	37.5%	0.0%	0.0%	0.0%
Yes, we've had one workshop or in-service about supporting students with ASD.	57.1%	7.1%	35.1%	0.0%	0.0%
No, we've never had a workshop or in-service about supporting students with ASD.	57.1%	8.9%	30.4%	3.6%	0.0%

**Table 10.** *Feelings about Students with ASD Participating in PE and Feelings of Adequate Training*

<b>Which of the following best describes how you feel about students with ASD participating in PE?</b>					
	I feel like students with ASD should:				
	be able to access PE like all the other students regardless of how much support they need to do so.	be able to access PE like all other students assuming they do not engage in behaviors that can interrupt the class.	be able to access some components of PE but may not be appropriate to be in PE without designated staff support.	receive special programing to meet their needs separate from other students.	not be allowed to access PE unless they can show they are capable of using it like other students.
Total for all participants	57.7%	11.5%	28.2%	2.6%	0.0%
<b>Do you feel you have received adequate training in the area of ASD to support students with ASD in PE?</b>					
Yes	61.1%	11.1%	27.8%	0.0%	0.0%
No	51.1%	12.1%	30.3%	6.1%	0.0%
Unsure	66.7%	11.1%	22.2%	0.0%	0.0%