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Article

Physical Disability School Performance Impact Model

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Abstract: *In this manuscript, we present a theoretical model of the impact factors that can affect school performance for students with physical disabilities. The model proposes that students' performance is affected by biological or inherent characteristics, home and community factors, and instructional factors. These factors are further impacted by systemic educational barriers. We provide a diagram and description of the overall model as well as an expanded diagram and description of each type of impact. Our purpose for presenting the model is to raise awareness for educational teams regarding the complex needs of students with physical disabilities in order to inform educational planning.*
Keywords: *classroom instruction, physical disabilities*

Physical Disability School Performance Impact Model

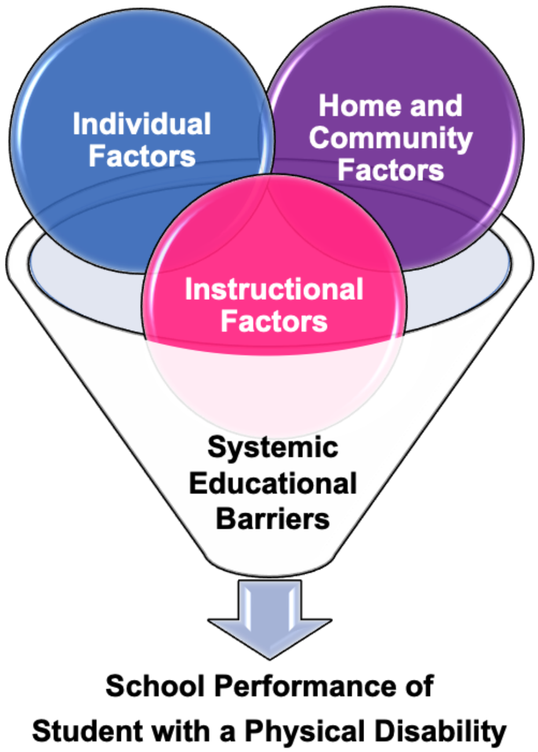
"Education is important for all children, of course, but for those with disabilities…it can mean the difference between a socially fulfilling, intellectually stimulating, and economically productive life and a future with few of these qualities" (Aron & Loprest, 2012, p. 2). We believe these words ring especially true for school-aged children with physical disabilities (defined here as having limitations in gross and/or fine motor skills). Students with physical disabilities substantial enough to affect school performance represent a small percentage of the school-aged population. These students often have unique learning needs not experienced by other students who receive services through special education (Heller et al., 2021). In this paper, we have reconceptualized an existing theoretical model to help professionals visualize and understand the complex factors that can impact school performance for students with physical disabilities. We hope that gaining insight into these factors can help educational teams improve planning and instruction for these students. We wish to begin this discussion emphasizing that we believe the impacts on school performance are not inherent in the students' disabilities; rather, limitations are imposed on students' learning through schools not adequately meeting students' rights to a free appropriate public education (Yell, 2018).

Overview of the Model

The model we propose outlines the complex needs affecting performance of children with physical disabilities in school settings. It is based on the *Physical and Health Disabilities Performance Model* (Heller & Coleman, 2009; Heller & Swinehart-Jones, 2003; Heller et al., 2021) that proposed educational outcomes are affected for students with physical and health impairments by the interaction between three factors: (a) disability type, (b) functional effects, and (c) psychosocial/environmental factors. The original model was depicted by a cube with the factors featured on three facing sides. We have refined and adapted this model for what we believe is a more realistic and expanded view of how physical disability can impact a student's school performance. We narrowed the focus to physical disabilities because the impacts are quite different for a student with limited mobility due to spina bifida or cerebral palsy than for a student who needs educational accommodations due to severe asthma or diabetes. Throughout this paper, we are defining "impairment" as presence of a medical condition that results in motor, speech, or language differences. We define "disability" as the loss of an ability due to the presence of an impairment (Coleman & Heller, 2009). Our assertions have been drawn from numerous areas of study (e.g., special education, occupational therapy, etc.) We acknowledge up front the paucity of literature related to education for students with physical disabilities.

Figure 1

Physical Disability School Performance Impact Model



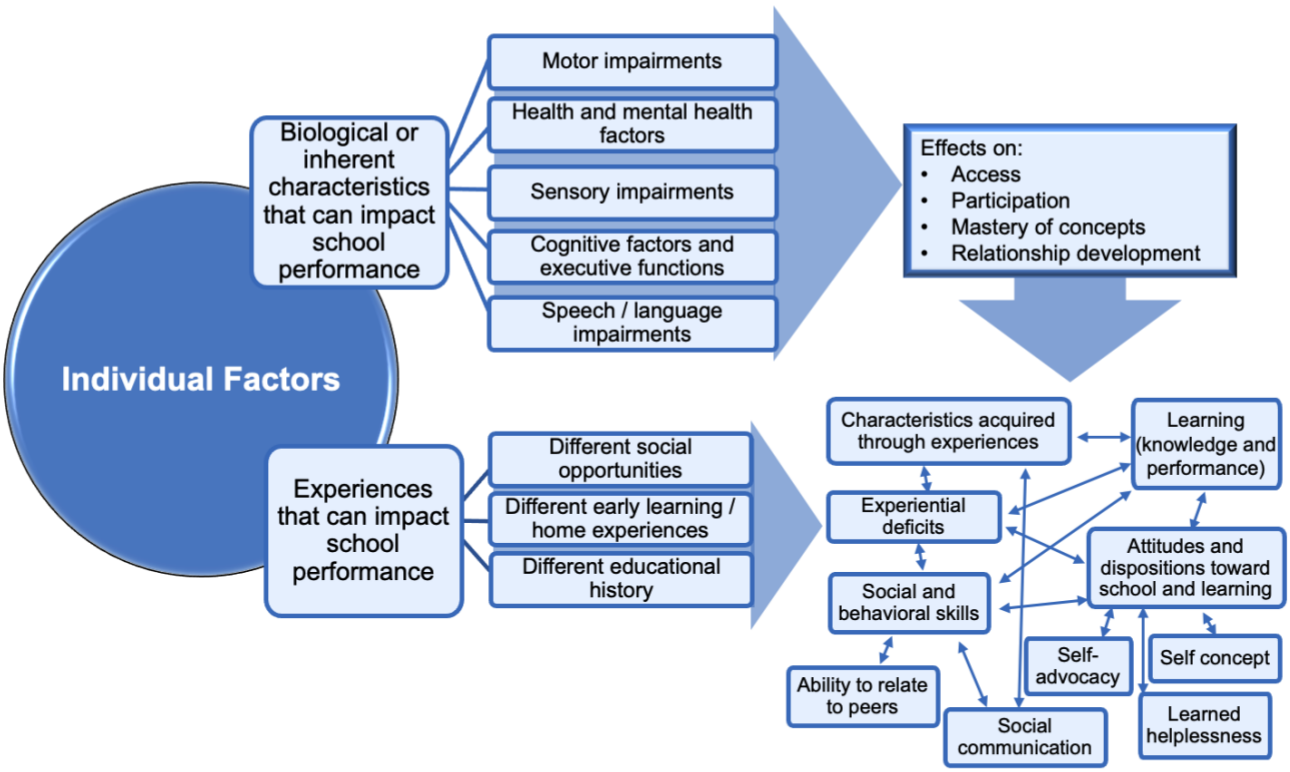
Our *Physical Disability School Performance Impact Model* (Figure 1) depicts a student's individual factors, home and community factors, and instructional factors flowing through a funnel representing systemic educational barriers. We propose that the student's factors are melded together and funneled through the systemic constraints that exist in school settings resulting in the school performance of a student with a physical disability. We assert that the interaction of internal (biological/ medical/ pathological) characteristics and external factors (structural/ institutional barriers) is a dynamic relationship. Existence of an impairment may not lead to diminished school outcomes within a system arranged to preclude external disablement. We present this model in hope of shedding insight into how school performance may be impacted positively through enhanced teacher knowledge, promotion of holistic instructional adaptations, and elimination of educational barriers. Below, we provide an expanded view of the model with an explanation of each type of factor as well as an explanation of the most impactful systemic barriers.

Individual Factors

In the expanded view of individual factors (Figure 2), we represented biological or inherent characteristics and experiences shaped by the presence of a disability that can impact school performance by creating barriers to learning. These factors can impede the development of academic concepts and relationships with adults and peers when school systems do not provide the right accommodations and supports. In turn, school performance is negatively impacted. In our model, the layout of the individual factors is depicted somewhat linearly; however, these factors may occur in different configurations based on the individual's inherent characteristics and personal experiences. This also applies to the home and community factors and instructional factors that we will discuss later in this paper. In the previous model, the type of disability was represented across the top of the cube including neuromotor impairments, orthopedic and musculoskeletal impairments, and degenerative and life-limiting conditions (Heller & Swinehart-Jones, 2003; Heller et al., 2021). In our view, characteristics that impact learning are more important than the diagnosis. However, we always recommend that educational teams learn about a student's diagnosis and use that information, when relevant, for instructional planning.

Figure 2

Expanded View of Individual Factors



Biological or Inherent Characteristics. The biological or inherent characteristics that can impact school performance for a student with a physical disability include motor impairments, health and mental health factors, sensory impairments, cognitive factors and executive functions, and speech/language impairments (Batshaw et al., 2019). These are not the only factors that can impact performance, but these are the most common for school-aged children with physical disabilities. We propose that these inherent characteristics have a direct impact on education by limiting access, participation, concept mastery, and relationship development that are crucial to school performance when school settings are not designed to meet all student needs. We have described the most common biological or inherent characteristics below.

Motor impairments. A student's motor impairment, defined as the presence of a medical condition that limits use of motor skills, may impact school performance in several ways. The most apparent impact is the ability to access school facilities and curriculum materials. Students who use wheelchairs may experience difficulties accessing instructional areas of a school such as science labs or media centers (Brind'Amour, 2010; Neely, 2007). Classrooms may not be arranged to allow students using wheelchairs or other mobility devices to access all areas or materials. Students with fine motor limitations may not be able to manipulate books or instructional materials (e.g., math counters or fraction circles) without adaptations. Providing accessibility of school environments and learning materials is the bare minimum is in provision of a student's federally protected rights (i.e., Free Appropriate Public Education; FAPE) under the Individuals with Disabilities Education Act (2004). Creating environments that are fully accessible is essential and teams must think about everything from visibility of wall art for a student who is seated in a wheelchair to availability of electronic worksheets for a student who needs fine motor accommodations . Most conditions that cause motor limitations in children are stable; however, teams must pay particular attention to motor needs when a child has a degenerative condition (e.g., muscular dystrophy, spinal muscular atrophy). Motor skills should be monitored frequently so that adaptations can be added to meet the student's changing needs.

One factor that is often overlooked is how a motor impairment can impact physical stamina (Houston et al., 2018; McPhee et al., 2017). Having to work harder physically to complete tasks can result in fatigue and limit a student's ability to participate in instructional activities for the same duration as peers. The student's team must design the school day to reduce the impact fatigue may have on learning. This may involve planning cognitively heavy activities early in the morning or after a rest period to maximize the student's participation.

Further, motor impairments may result in missed instructional time due to physical care (e.g., toileting, feeding) or for medical appointments related to the physical disability (e.g., appointments with additional specialists such as neurologists, wheelchair vendors, orthotists, etc.) Teams must develop systems to provide the student access to missed instruction.

Health and mental health. Having a physical disability does not mean that a student will have health and/or mental health conditions; however, the presence of additional health or mental health factors can exacerbate school performance impacts as it would for any student. Some health conditions, such as seizure disorder, respiratory illnesses, and gastrointestinal disorders, are more prevalent for people with physical disabilities (Hanci et al., 2020; Karakas et al., 2022; Marpole et al., 2020; Pavone et al., 2020). Individuals with physical disabilities may have higher risk factors that would require adaptations to support for mental health (Kohleis et al., 2019; Turner et al., 2006; Whitney, Warschausky et al., 2019). Health and mental health impacts can lead to decreased ability to attend during instruction and more frequent absences from school. Because health and mental health conditions may not be as visible as a student's physical limitations, school personnel must be diligent about monitoring students for symptoms and the need for adaptations for those conditions in addition to meeting the student's physical needs. Involving a school counselor or social worker on the student's team may be beneficial. If the student has a life-limiting condition (e.g., Duchenne muscular dystrophy, mitochondrial disorder), the team may need to explore resources beyond the school building (e.g., family involves Hospice in student's team when available, individual team members may need to seek counseling).

Cognitive factors and executive functions. The first crucial point we must make here is that cognitive impairments and physical disabilities are separate conditions. We believe that spread, or overgeneralization of disability-related beliefs (Silverman, 2020) occurs very frequently for people with physical disabilities. Uninformed individuals may see a physical impairment and automatically assume that the individual's cognition and learning abilities are impacted (CDC, 2022). This type of misinformation must be addressed by teachers who work with students who have physical disabilities. Professionals and peers, when appropriate, must be educated to never make assumptions about cognition based on the visibility of physical differences. Having said that, students with physical disabilities sometimes have cognitive impacts. For example, when a physical disability is related to a neurological impairment, there is a higher incidence rate of intellectual disability, learning difficulties, and executive function disorders (e.g., impacts on attention, organization, self-regulation) than for individuals without neurological impairment (Burmeister et al., 2005; Dennis & Barnes, 2010; Mammarella et al., 2003 Reid et al., 2018; Wiedenbauer & Jansen, 2006). Educational planning must address a student's needs based on cognition and executive functions. We will address this later related to curriculum access.

Sensory impairments. It is not uncommon for students with physical disabilities to have concomitant visual or hearing loss. For example, children with cerebral palsy may have vision loss if the brain also sustains injury to the areas that control vision. Cortical visual impairment, common for students with cerebral palsy, causes fluctuating vision and requires educational planning with flexible adaptations to meet the student's needs (Philip et al., 2014). Sensorineural hearing loss also occurs at a higher rate for children with cerebral palsy than for children without disabilities (Weir et al., 2018). Children who receive shunts due to hydrocephalus, a common treatment for children with spina bifida, also have an increased risk of visual or hearing difficulties (Sobana et al., 2021). These are just a few examples; there are many other causes of vision or hearing loss for children with physical disabilities. Because of the amount of information learned through vision and hearing, a loss of either or both may have a tremendous impact on learning, including missing background experiences that peers acquire through interacting with visual and auditory information within the environment (Tobin & Hill, 2012; Irwin et al., 2015). Educational teams must plan adaptations that meet sensory needs on top of the adaptations for physical access. Involving vision and/or hearing specialists will be important to make sure that a comprehensive combination of accommodations promotes sensory and physical access to learning.

Speech and language impairments. Some physical disabilities impact verbal speech and/or language abilities. For example, some students with cerebral palsy may have dysarthria (motor-impaired speech) that results in the inability to make all speech sounds clearly. Some students with spina bifida may have semantic or pragmatic language deficits (Holck et al., 2010; Ris et al., 2007; Russel, 2004). When speech and/or language impairments are added to motor impairments, learning can become more challenging in a multitude of ways. One of these specific challenges is the assessment of student knowledge. It is especially difficult for young children with concomitant physical and speech impairments who have not developed writing proficiency to express their understanding of learned concepts. Having speech that is difficult to understand or not having the ability to use verbal speech can impact a student's ability to participate in class discussions and small-group activities. Speech and language impairments also can impact a student's ability to develop relationships with school personnel and peers. This makes it even more critical to develop a functional communication system as early as possible for the student and to implement the system consistently throughout the student's school day. Communication should be prioritized and teams should not wait for some arbitrary communication readiness indicators before getting a communication system in place (Light & McNaughton, 2014).

Individual Experiences that Can Impact School Performance. The second area of individual factors we propose that can affect school performance is the individual's experiences. Each student arrives in a classroom with a set of experiences that can shape future learning. However, the presence of a physical disability can create unique circumstances that impact a child's school performance. Missing out on early learning experiences can lead to experiential deficits (Heller & Coleman, 2009). This occurs when an individual with a physical disability does not participate in the same experiences typically encountered by peers. Missing or different experiences can impact concept development and comprehension. Some experiential differences that can impact school performance include differences in social opportunities, early learning/home experiences, and educational history. Young children with physical disabilities may have different experiences because it is harder for their parents to transport them or to facilitate play experiences because of motor or speech impairments. The different experiences can further impact learning. Some students may not have the same social and behavioral skills as peers because they have not been given sufficient opportunities to participate in social and educational settings. They may lack self-advocacy (belief in one's ability to achieve a goal or complete a task) and motivation to learn (Mouzakitis et al., 2015). One issue that particularly impacts students with physical disabilities is learned helplessness (Conn et al., 2015; Sorrenti et al., 2018). This is when tasks have been performed or decisions have been made for the child without the child having any control or input in the situation. The child learns that she is helpless in the situation and does not attempt to change the situation in the future. Although there are multiple ways that experiences can shape school performance, we have focused on social opportunities, early home and learning experiences, and educational history as key factors in our model.

Social opportunities. Many children with physical disabilities have different, often more limited, social experiences than their peers (Voyer et al., 2017; Whitney, Peterson, et al., 2019). This is particularly true if the student uses a wheelchair (Bushby et al., 2010; Lund & Seekins, 2014; Parkes et al., 2010) and even more so if the student has limited verbal speech (Chung & Carter, 2013). Students with physical disabilities can have difficulty relating to peers, decreased self-concept, and different social communication skills (Devine et al., 2012). This could be in part due to decreased social opportunities. Because of their medical diagnoses and motor limitations, children with physical disabilities generally spend a lot of time around adults who are not members of their family or community. They often see multiple medical specialists including neurologists, orthopedists, early interventionists, physical therapists, occupational therapists, speech-language pathologists, wheelchair vendors, orthotists, etc. They may spend less time in play groups, preschool classrooms, and parks/ recreational settings and activities. Even within a preschool setting, for a child to play with peers in the kitchen area, an adult may be needed to help with positioning, adjustments to materials, and assistance with a communication device. Sometimes this can lead to the development of stronger skills relating to adults than to peers. Because young children learn through social interactions and play, children with physical disabilities also may miss out on learning important social skills and even pre-academic concepts due to having different social opportunities than their peers. Educational teams need to prioritize relationship development and provision of social experiences for students with physical disabilities because these opportunities can shape all aspects of school performance including development of background knowledge for academic concept development and the ability to participate in group learning activities.

Early home and learning experiences. Young children learn through interacting with the world around them. They use gross and fine motor skills to explore their surroundings. Young children point to objects in their environment and ask lots of questions to gain new knowledge. When a child does not have the motor skills to engage with environmental stimuli, they may miss out on crucial concept development (Batshaw et al., 2019). This is exacerbated if the child also has verbal speech that is difficult to understand or is not able to communicate verbally. As stated earlier, experiential deficits can create barriers to concept development. For example, students with physical disabilities who never have played in the mud may not understand concepts such as “mucky” or “roly-polies” (i.e., pill bugs) because they have missed experiences through which children without physical limitations learned those concepts. For example, one mother told the third author, “[My daughter] doesn’t know what a bank teller is from an inside the bank perspective. We always go through the drive through as it’s easier than getting her wheelchair in and out of the car” (Author, personal communication). Children’s books and textbooks often contain material based on the assumption of some common experiences and knowledge gained through those experiences. Thus, someone who has missed out on early experiences can be at a disadvantage for comprehension of key concepts. Experiential deficits can occur for reasons other than physical disabilities; however, having diminished motor skills can create unique deficits in background knowledge that require additional instruction and adaptations that need to be considered during educational planning.

Educational history. Early educational experiences can be quite different for a child with a physical disability. Some studies report fewer opportunities to learn (i.e., less instructional time) for students who receive special education services (Kurz et al., 2014). Children with physical disabilities have physical needs that must be met during the school day (Pashmdarfard et al., 2021). This time can interfere with the amount of instructional time received. Despite the requirement of a continuum of services in schools (IDEA, 2004), many children with physical disabilities are placed in classrooms where their physical needs can be met because of a higher staff ratio and staff trained to meet physical needs. These classrooms may not be cognitively challenging enough for the student with a physical disability who has stronger cognitive skills than other students in the setting. This may lead to diminished educational outcomes over time (Agran et al., 2019; Kurth & Mastergeorge, 2010). We propose that academic instruction is the most functional curriculum for students with motor limitations and should be prioritized, especially during early school years.

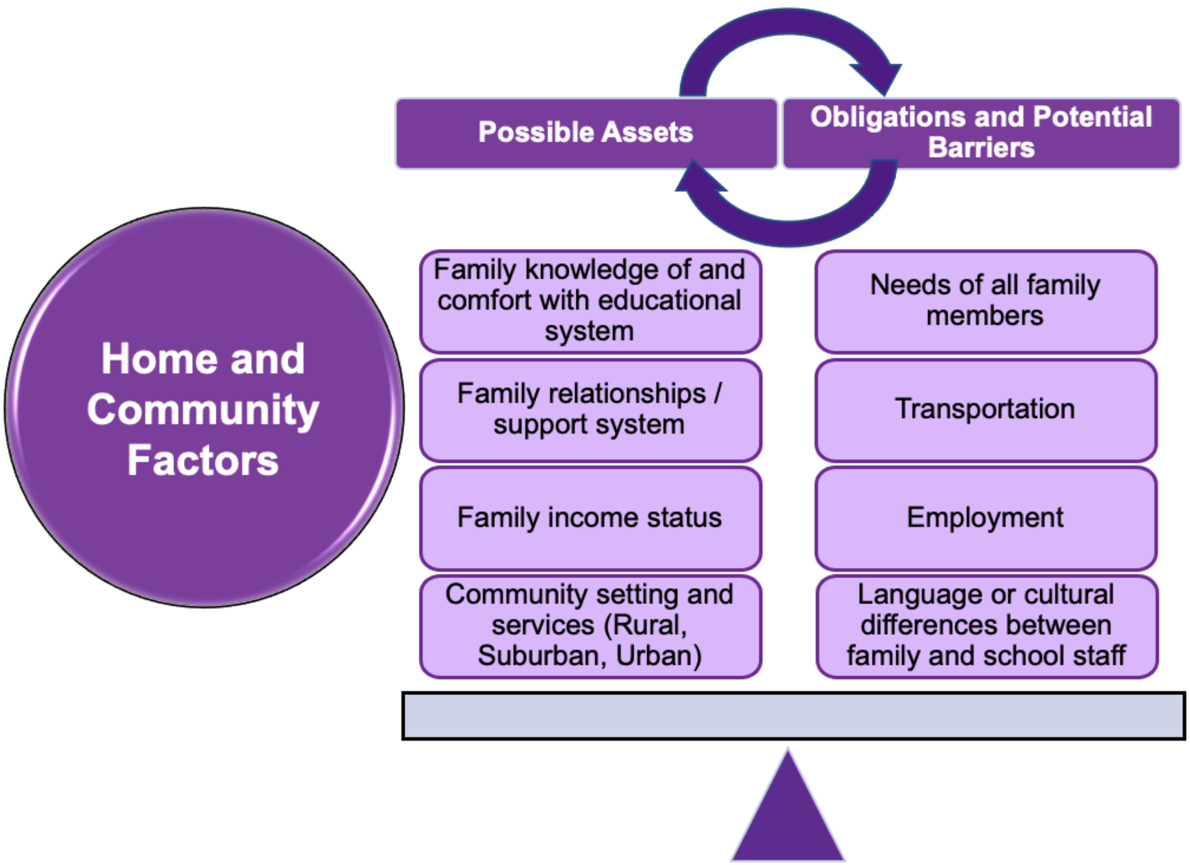
In the individual factors portion of the model, we propose that a student’s biological / inherent characteristics and unique array of experiences can shape learning in multiple ways. These individual factors also can include impacts on social and behavioral skills, attitudes and dispositions toward school and learning, self-advocacy, self-concept, and social communication skills which, in turn, can impact learning. It is important for educational teams to develop relationships with students and their families and to gain knowledge of each student's circumstances in order to plan for instruction and develop a range of adaptations based on these individual factors.

Home and Community Factors

In the expanded view of home and community factors (Figure 3), we depicted the home and community factors as a scale. We believe these factors can be assets or barriers depending on the specific family and community situation. You can see by the diagram that the support and resources within the family and community can positively or negatively impact school performance. This diagram does not show an exhaustive list of potential assets, obligations, and barriers so teams should consider all others that may impact a student. The potential assets we have listed include: (a) family knowledge of and comfort with the educational system (Murray et al., 2013), (b) family relationships and support system (Park & Chung, 2015; Smith & Wallace, 2011), (c) family income status (Mawene & Bal, 2018; Roddy, 2021), and (d) availability of community services (Dodds et al., 2018). Potential obligations and barriers include: (a) needs of all family members, (b) transportation, (c) employment, and (d) language or cultural differences between family and school staff (Dodds et al., 2018). These factors can be positive or negative depending on the family and community. For example, a parent's employment may bring in needed income, but it could require working excessive hours that are taken away from family time. Often, siblings of children with physical disabilities play some role in the caregiving process. This can build the relationship between siblings, but it also can have some negative impact on the relationship (Orm et al., 2021; Wakimizu et al., 2020). These are just a couple of examples of factors that can be assets or barriers that may impact school performance. Even though home and community factors are beyond the control of school personnel, they must be considered in the scheme of the student's educational performance.

Figure 3

Expanded View of Home and Community Factors



Instructional Factors

The instructional factors we listed are not student specific. Rather, these are key knowledge and skills identified in the revised *Initial Specialty Set: Physical, Health, and Multiple Disabilities* (Council for Exceptional Children, 2020). This is a set of teaching standards that supplements the Council for Exceptional Children's National standards recommended for all special education teachers. The Specialty Set provides additional standards teachers need for working with students who have physical and health impairments.

All preservice special educators should acquire knowledge and skills that are specialized for teaching children with a wide range of needs. Because students with physical disabilities may receive services in settings ranging from general education with consultation to specialized, residential schools or home-placement services, almost all special education teachers will work with students who have physical disabilities at some point in their career. In the expanded view of instructional factors, we listed the critical knowledge and skills practitioners must have in order to meet the needs of students with physical disabilities including understanding the learner's impact factors (e.g., this proposed model) and environmental arrangement, implementing instructional practices that address the learner holistically, being able to conduct assessment that results in an accurate understanding of the learner's abilities, and having dispositions and collaboration skills that encourage learner growth. If professionals do not have these knowledge and skills, their students' learning will be affected.

Knowledge of the Learner and Learning Environments. Part of our purpose for revising the model is to present a concrete way for school personnel to understand the multiple factors that impact learning for students with physical disabilities. Teachers of students with physical disabilities need to understand these factors and use that knowledge to develop comprehensive adaptations for each student. Additional student-related knowledge that is needed includes understanding how to monitor and meet a student's physical and health needs. Teachers also need to understand experiential deficits and how to bring in materials and/or media to help build a student's background knowledge.

Related to the learning environment, teachers of students with physical disabilities need to be familiar with positioning equipment, safe techniques for helping the student to the restroom, different seating arrangements, and types of technology in the classroom. Access and participation in instruction are fostered by the teacher's understanding of how to adapt the environment for a student who has decreased mobility or fine motor skills. Finally, teachers need to understand how to schedule instruction around a student's peak learning window (e.g., morning before the student gets fatigued) and needed physical care (e.g., restroom assistance, instruction in using adapted eating utensils) to increase instructional efficiency and minimize missed instructional time. Students with physical disabilities may need a little bit of "down time" if they get fatigued easily, but down time is lost instructional time. Teachers can strategically plan periods of less intensive activities (e.g., oral phonemic awareness activities or listening comprehension) throughout the day to give the student time to physically rest while still being actively engaged in meaningful instruction. These are some examples of how knowing the learner's needs and adapting the learning environment may facilitate instruction for students with physical disabilities.

Instructional Practices Related to Teaching. We recognize that all students who receive special education services need individualized instruction. There are, however, additional unique instructional needs that must be met for students with physical disabilities. This is especially true if they also have complex communication needs or sensory impairments. One area we want to address specifically is understanding and implementing curriculum options that maximize independence and realistic post-school outcomes. The presence of a physical disability does not indicate that a student has less academic potential than peers. This is true even if the student has very limited physical control or limited verbal speech. Based on anecdotal observations we assert that many students with physical disabilities are placed in classrooms based on where their physical needs can be met rather than considering the most functional curriculum options for post-school outcomes.

The most "functional" curriculum for students with motor limitations is instruction in traditional, age and grade appropriate academics with an emphasis on technology access. Technology skills are critical for participating in learning and often for communication. Teachers need to understand how to provide technology access, teach students to use their technology, and adapt academic instruction to give students the highest possible educational, vocational, and social opportunities in the future. The educational planning team must strike a balance between academic instruction with additional instruction in communication, self-care, self-advocacy, and other skills that will be important for the student when reaching adulthood. Thus, students with physical disabilities need a personally relevant curriculum (Trela & Jimenez, 2013).

Given the complexity of needs for many students with physical disabilities, teachers must have a firm understanding of how to implement intensive, goal-focused instruction combined with multiple curricular adaptations, including assistive technology solutions, to ensure that students can access academic instruction and fully participate in instructional activities. One area of specific knowledge is in the use of adaptive devices for computer or tablet access. This would include options for fine motor input (e.g., joysticks, trackballs, trackpads) as well as options for input through other modes (e.g., head-controlled mouse emulation, eye gaze). All avenues must be explored to give early, consistent technology access to the student. School personnel must be trained in assistive technology and have access to an array of devices to meet the needs of their students. Additional training is needed for teachers to understand how to implement a variety of accommodations, including those for academic assessment.

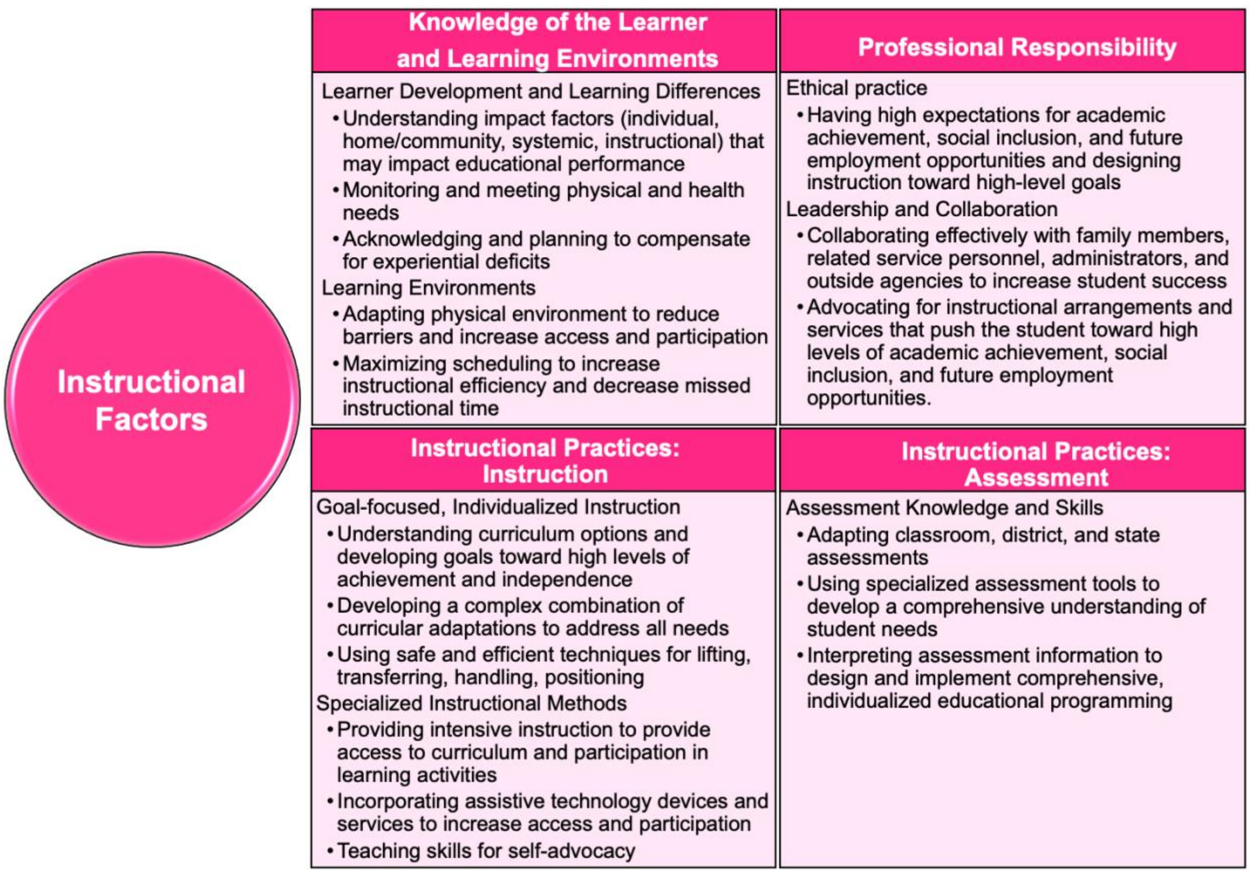
Instructional Practices Related to Assessment. All special educators must understand how to make data-driven instructional decisions based on information from student assessments. When students have physical disabilities that limit the ability to write, keyboard, or point, accurately assessing their knowledge becomes more challenging. Teachers of students with physical disabilities must understand how to assess student performance in adapted ways and understand that assessment information may not be valid until the students have consistent and reliable ways to demonstrate what they know. Students need to have adapted ways to engage in instructional activities and practices responding independently during the process of acquiring new knowledge and skills. We believe many students with physical disabilities who have complex communication needs have been underestimated, undereducated, and undervalued by the education system. Understanding how to assess students with complex needs is essential. Assessment adaptations must be generalized from classroom implementation to district-wide and state-wide assessments. Further, teachers must understand how to interpret many types of assessment information to customize instruction for a student.

Professional Responsibility. Understanding how to collaborate with other professionals is essential for teachers because students with physical disabilities may receive services such as physical therapy, speech therapy, occupational therapy, assistive technology services, and nursing services. Providing accessible environments and technologies to increase access can require advocating for the student with system administrators or coordinating with outside agencies. One type of barrier that falls within the systemic barriers discussed later in this paper is an attitudinal barrier. This is when school personnel do not have high expectations for the student or the willingness to provide needed supports for students with physical disabilities. In this situation, the student is hindered from succeeding because they are not given a full opportunity to participate in learning to the full potential. We are including this discussion here because teachers and other school personnel must understand this barrier and often must help colleagues broaden their knowledge and skills to create a holistic array of instructional, assessment, and other adaptations for students with physical disabilities. Sometimes this involves moving professionals out of their comfort zones to ensure that the student is challenged academically and is included socially. All members of a student's educational team must have expectations for achievement and success and should plan and instruct accordingly.

Certainly, we have provided a very abbreviated glimpse of what teachers and other school personnel must know to provide quality instruction for students with physical disabilities. Our purpose for including Instructional Factors (Figure 4) in the model is to raise awareness of the complexity, breadth, and depth of knowledge, skills, and attitudes necessary to ensure student success, particularly when the student has complex needs. We believe every special educator preparation program must have some training specific to working with students who have physical disabilities. Emphasizing the need for students with physical disabilities to participate in traditional academic instruction must be a priority in teacher preparation programs.

Figure 4

Expanded View of Instructional Factors.



Systemic Educational Barriers

In the model, we have listed some of the existing systemic barriers that diminish educational outcomes for students with physical disabilities. This is not an exhaustive list, so please consider all barriers when thinking about a student's school performance. We broke systemic barriers down into three categories: (a) societal attitudes toward people with disabilities, (b) education system structure, and (c) lack of funding (Ahmed & Shaw, 2020; Fuchs, 2021; Harutyunyan & Sadlo, 2019; Koller & Stoddart, 2021). Although there are additional barriers, we feel these are the three categories that most directly impact students with physical disabilities.

Societal Attitudes Toward People with Disabilities. Over 30 years after the passage of the Americans with Disabilities Act (ADA; 1990), the general public continues to have a deficient understanding of disability (Centers for Disease Control, 2021). A complete discussion of ableism, defined by the Center for Disability Rights (2023), is "a set of beliefs or practices that devalue and discriminate against people with physical, intellectual, or psychiatric disabilities and often rests on the assumption that disabled people need to be 'fixed' in one form or the other" (para 1), is beyond the scope of this paper. However, ableist beliefs need to be addressed by training people without disabilities on a large scale. In a school system, ableist thinking can lead to diminished expectations for achievement for students with physical disabilities as we addressed above related to instructional factors. Diminished attitudes can negatively impact educational opportunities in multiple ways, including the acquisition of funding. One result of problematic attitudes is that inclusion may not be prioritized so students with disabilities are not given the same educational opportunities as peers (Kurz et al., 2014). This is especially problematic for students with physical disabilities who do not have intellectual or learning disabilities. We wish there were an easy way to overcome this barrier but recognize that there is no easy fix and education professionals must continue advocating for and with their students.

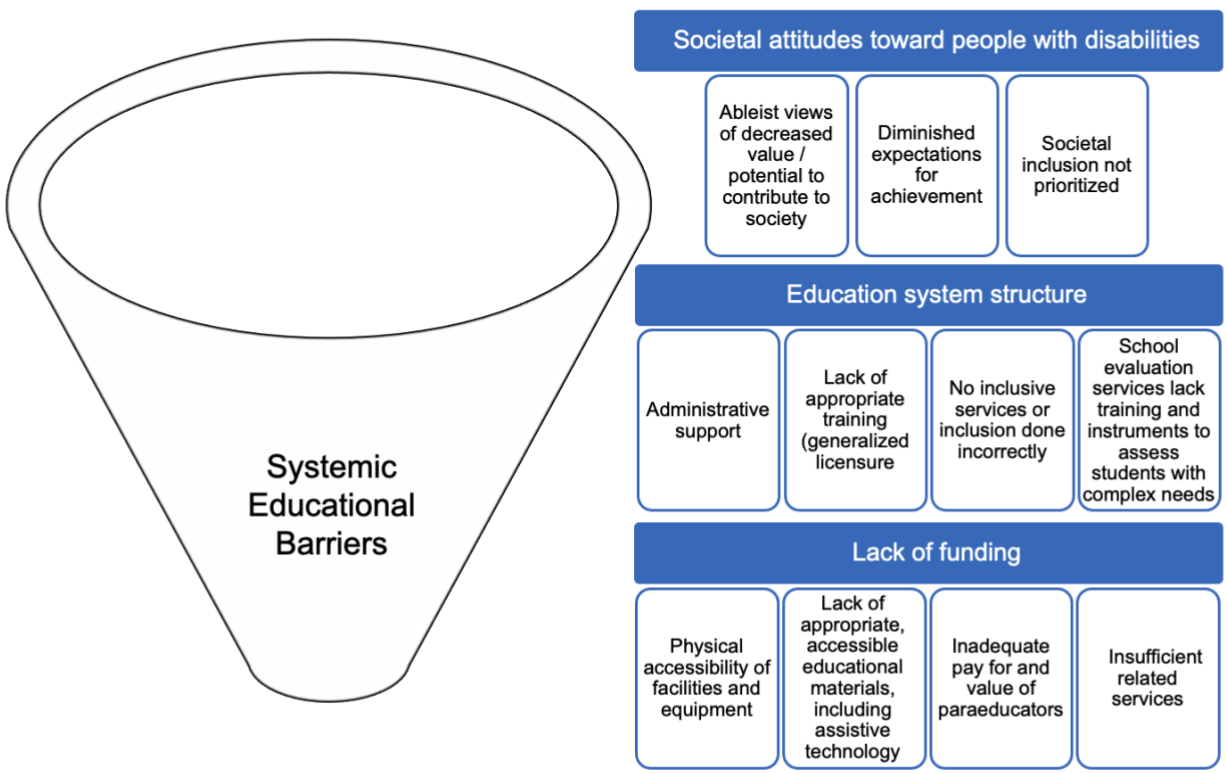
Education System Structure. Within the education system structure, we have listed a few barriers that may impact outcomes for students with physical disabilities. One issue we have personally witnessed is that school evaluation services are not adequate for students who cannot be assessed in the same way as children without disabilities. Intelligence tests, for example, require pointing to or manipulating objects or using verbal speech; thus, students with physical limitations may not be able to perform all required tasks and their intelligence can be underestimated (Reid et al., 2018). When psychologists are not trained specifically to work with students who have these limitations, skill levels can be underestimated, and students are not given the educational opportunities to succeed that they should have. Another factor is generalized special education licensure. As discussed above, teachers and other school personnel need training in specific knowledge and skills in order to address the complex combination of needs of their students with physical disabilities. This specific training often does not happen when the state does not have a separate credential for teachers in the area of physical and health impairments (Heller & Swinehart-Jones, 2003). Other factors include lack of staff training for addressing a student's complex combination of needs and a lack of inclusion that is implemented in a way that maximizes instructional benefit for students with disabilities.

Funding. The final systemic barrier we have recognized is lack of funding. Students receiving special education services under some disability categories (e.g., Multiple Disabilities) can be viewed as "high cost" (i.e., higher expenditure per student) compared to other students in the district because they require equipment and facilities that make learning accessible. They may require additional staff to help meet physical needs and additional related services for speech, occupational, and physical therapies (Aron & Loprest, 2012). Although IDEA (2004) mandates provision of services to fulfill a student's free, appropriate public education (FAPE), funding is not always allocated in a way that results in all the student's needs being met. Funding can affect a student's education in a number of ways including (but not limited to) inaccessible learning environments, lack of adequate instructional materials (including assistive technology), reduced inclusion in general education settings, and minimal provision of related services. All of this can, in turn, diminish educational outcomes for students with physical disabilities.

These are just some of the examples of systemic barriers that exist in our educational system that can impact learning for a student with a physical disability. These structures will take years of work to change. School personnel have the ability to reduce systemic barriers and increase educational equality for students with physical disabilities.

Figure 5.

Expanded View of Systemic Educational Barriers



Summary

Our purpose for re-envisioning the *Physical and Health Disabilities Performance Model* (Heller & Coleman, 2009; Heller & Swinehart-Jones, 2003) was to broaden the way that professionals conceptualize the many ways school performance can be impacted when a student has a physical disability. We propose this model as a comprehensive, but not all-encompassing, view of the factors that must be considered when a team is conducting educational planning for a student with a physical disability. We believe that this model can be used as a tool for professionals to gain insight into the complexity of needs that should be addressed for a student with a physical disability to participate and succeed in the school environment. Of course, every student with a physical disability will enter school with a unique combination of individual factors and home and community circumstances. Students are further impacted by the instructional factors that exist within classroom and school settings. Education professionals must have specific knowledge and skills to be able to provide the cadre of services and instructional adaptations needed to ensure student success. All these factors are situated within systemic structures that are not necessarily designed to benefit students with especially unique needs. We hope that this model can enlighten school personnel and encourage them to develop and implement a variety of solutions that can improve educational outcomes for students with physical disabilities.

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