

## **Introducing political disability identity as a framework for studying disability in physics**

Liam G. E. McDermott

*Physics and Astronomy Department, Rutgers University, 136 Frelinghuysen Rd, Piscataway, NJ 08854*

Although social identity, as it relates to physics identity, is not a new area of research, disability identity is woefully understudied in physics. Disability is political, and ableism is real, ordinary, and pervasive in physics. Disabled people find themselves as the subject of sociopolitical violence both in and out of the classroom, simply for existing in their body. In a climate charged with politicality and identity discourse in the classroom, it is surprising that a framework for understanding disability and the transactional relationship disabled persons have with their environment in a political way has yet to be used in physics education. In this paper, I introduce Political Disability Identity[1] as a framework for studying disability identity in Physics Education Research. I outline the domains of Political Disability Identity, and the underlying themes which should guide research using this framework. Finally, I call for its use both in the physics classroom, and in Physics Education Research.

## I. INTRODUCTION

The poet Sonya Renee Taylor said: "the invocation of simply being seen in the body we have today is the chant, is the march, is the picket sign"[2]. Simply existing in a body deemed different from the "norm" is an act of resistance. That is to say, the act of being disabled is inherently a political one [3]. A disabled person experiences a world in which day-to-day objects, tools, rules, and even the ground they walk on is not necessarily designed for their use and participation. Scholars have noted that "disability identity can be considered on its own terms as a unique phenomenon that shapes a person's way of seeing themselves, their bodies, and their way of interacting with the world" [4]. In fact, even without conscious political activism and participation, disabled people still cite politics having a role in the problems they face [5]. Thus, a disabled person has a unique relationship with the fabric of society itself. By experiencing the world in a way markedly different from able-bodied people due to disability, disabled people form their identities differently, oftentimes focused on disability and its relation to marginalization. It is due to this marked difference and marginalization that disability identity formation warrants studying and understanding [6]. Accompanying this, the classroom is a remarkably political space, which warrants close attention to social justice issues faced by students from marginalized backgrounds [7]. It is because of this politicality of both disability and the classroom, that there exists an innate political relationship between disability and the classroom [8]. It is through understanding disability identity formation that scholars can further understand why certain disabled students struggle and why others succeed, and understand how disabled students develop their identity as scientists with respect to their disability [1].

Disabled people are a woefully understudied minoritized group in physics [9]. It is known that students who identify with minority groups experience the physics classroom differently than their peers who identify with majority groups, and thus develop their physics identity differently from their peers [10][11]. Physics identity research is a critical subset of Physics Education Research (PER), and it is important to understand the doing of physics with respect to the doing of social identity [12]. It has been found that there exist hidden barriers which are experienced by disabled students in STEM classes [13], so it stands to reason that identity formation would be affected as such. Yet, there remains a dearth of research describing how, specifically, disability identity interacts with physics identity formation. In fact, research on marginalized groups often benefits from more critical, appreciative frameworks and inquiry[38].

In recent decades, disability rights and inclusion in the United States have improved significantly. Though American relations with disability are beyond the scope of this article, ableism is incredibly prevalent in academia. The post-ADA disability rights movement has created an increased need for understanding disability identity formation [15], especially

with frameworks which reject current or out-dated models [14]. Many studies have been performed examining the ways students develop their physics identity with respect to their social identity [10][11][16][17][18] evidencing the effectiveness and importance of this research. It is because of this that I introduce the Political Disability Identity (PDI) framework as an important tool which, upon understanding, will help physicists engaged in diversity and equity research.

## II. POLITICAL DISABILITY IDENTITY

PDI [1], is an identity framework which aims to provide a coherent and precise way of understanding how disabled people form their identity socially and politically. It draws from Hahn's [19] **minority model of disability**, which aims to describe disability as a social and political construct. Hahn, approaches disability identity from a feminist standpoint. The three main assertions of Hahn's model [19] are:

- a) that the source of the major problems confronting disabled people can be attributed primarily to social attitudes;
- b) that almost every facet of the environment has been shaped or molded by public policy;
- and c) that, at least in a democratic society, policies are a reflection of pervasive attitudes and values.[19]

These assertions separate the minority model of disability, and thus PDI, from what is known as the functional limitations paradigm [19]. This functional limitations paradigm conflates disability with impairment, and asserts that disability is the direct effect of impairment. For example, under the functional limitations paradigm, if a person with muscular dystrophy can't reach their office on the second floor of an office building, it is because they do not have the required muscle mass to get up the stairs. Thus if their muscular dystrophy was cured, they could get to the second floor. The minority model instead takes a more progressive approach to disability, indicating that *disability* is a direct result of *social and political forces*, which may be caused by assumptions or neglecting the needs of those with *impairment*. In the same example, it is because the office building does not have an elevator or other accessible means of reaching the second floor that the person cannot get to their office. Thus if the owners of the building added an elevator, the person could reach the second floor. Where the functional limitations paradigm asserts that something is wrong with the person, and thus the person needs to change, the minority model asserts that the something is wrong with society, and thus the person need not change.

PDI expands on Hahn's model, drawing from empirical data on disability identity to propose domains and subdomains of disability identity. The **six PDI domains** are: *self-worth, discrimination, pride, common cause, policy alternatives, and political engagement*. Accompanying this, there

are **four PDI themes** to guide research: *social model*, *multidimensionality*, *variance in outcomes*, and *fluidity and inevitability*.

### A. Domains

The six domains can be divided into two groups: internal domains and external domains. I here classify the internal domains as those which are internalized beliefs about oneself and about disability, which are influenced by external factors, such as societal treatment of disabled people and personal experience with the disability community. I classify the external domains as those which are externalized and actionable, which are influenced by internal personal beliefs about disability.

In qualitative research, I see these domains being used to guide coding of narratives, interviews, etc., with researchers potentially assigning positive and negative subcodes to each domain. In quantitative research, I see these domains being used to define aspects of disability, with researchers potentially creating a Likert scale or quantitative survey based around PDI domains. In short, domains should guide the "what" that researchers are studying. Below, I provide definitions of each domain, and an example of what each domain would look like in a physics classroom.

#### 1. Internal Domains

*Self-worth* - A person's understanding that disabled individuals hold an equal, positive value in society. Self-worth can manifest in self-esteem development of disabled persons through internal and external factors of acceptance. Example: A disabled student indicating that they belong in physics.

*Discrimination* - A person's belief that disabled persons are viewed and treated negatively by society; and this negativity leads to discrimination against disabled persons. This negative feeling against disabled individuals could come from a range of different places; from the idea that disabled people unfairly use resources, which could be better allocated to abled people, without contributing to society, to a lack of interaction with disabled individuals. Example: A student in a wheelchair citing where community resources are located as the reason they haven't accessed them.

*Pride* - A person's sense of belonging to the disabled community, or the claiming of a disabled identity, or a euphoria found in identifying as disabled. Pride also involves the belief that "the socially devalued characteristics" (p. 191) of disability are important characteristics worth claiming as a disabled person. Example: An autistic student explaining their sensitivity to light and desire to be in solitude makes them a better astronomer.

#### 2. External Domains

*Common Cause* - A person's understanding that disabled persons share common positive and negative experiences, coupled with a person's desire to change the negative experiences. Example: A student with PTSD explaining to a professor with anxiety that they experience the same issues with noisy work environments.

*Policy Alternatives* - A person's understanding that disability comes from a social construction rather than a natural result of impairment, that there exist better alternatives to the current state of public policy for disabled people, and that these alternatives are wanted and achievable. Example: A student indicating that they could do as well as their peers on homework if they had extra time.

*Political Engagement* - A person's understanding of how policy alternatives can be actualized by political action, and how they engage with political action. Example: A student asking their professor for accommodations.

### B. Themes

During my examination of the seminal work of PDI [1], I isolated four main themes which form the philosophical foundation of PDI. These themes are useful for designing methodology for studies using PDI as a framework. Additionally, these themes are useful for providing a philosophical backbone for designing curricula and classroom structures using PDI. Similar to how PDI domains are used to guide the "what" of disability research, PDI themes should be used to guide the "how" of research, and the "what comes next?" aspect of concluding research.

*Social Model* - PDI situates itself in opposition to the functional limitations paradigm and the medical model of disability, two models which view disability as being a direct effect of impairment, and thus something to be cured. Instead, PDI (and research using PDI) uses the social model of disability. This model views disability as a direct result of public opinion, public policy, and other socio-political forces. Disability is not an inherently negative thing, nor is it something to be pitied. Importantly, disability is contextual. For instance, in the 19th century, being deaf in the town of Chilmark, MA (on Martha's Vineyard) was not a disability due to the integration of Martha's Vineyard Sign Language to everyday life in the town [20].

*Multidimensionality* - In addition to disability being one aspect of identity (which itself is multidimensional), disability is multidimensional within itself. This means a person can be disabled in multiple different ways (paraplegic, deaf, autistic etc). Each of these disabilities may have its own disabling barriers and culture. Similar to other theories such as Critical Race Theory, Queer Theory, or Crip Theory, any research done utilizing PDI in its framework must therefore be cognizant of the diversity within this identity, and acknowledge the varying privileges and marginalizations connected to that

diversity. To do this a researcher must not make generalizing claims about disability, nor search for a one-size-fits-all conclusion.

*Variance in Outcomes* - Because disability is internally multidimensional, it should be expected that the policy alternatives to help disabled persons would be multifaceted as well. An autistic person and a dyslexic person may have completely different perspectives on the disabling barriers present in society, and may have completely different perspectives on their disabled identities (Walker, 2021). Therefore any research using PDI should be cognizant of the fact desired outcomes will likely differ from disabled person to disabled person. To do this, it is important to center the voices of disabled people in research through listening and highlighting evidence and truths stated by disabled persons or prioritizing disabled author/co-authors of studies using PDI.

*Fluidity and inevitability* - In her seminal work, Putnam specifies that disability can "be thought of as substantively different than gender, race, ethnicity, or sexual orientation" (p. 8) due to its loose definitions, contextuality (see above reference to Martha's Vineyard), and the fact that abled people can become disabled randomly and without cause, and can become abled randomly and without cause. Moreover, disability is a unique identity considering how quite literally everyone will become disabled at some point in their lives due to aging, illness, or context shifts.

### III. APPLYING PDI TO RESEARCH

Combining both its themes and domains, PDI is an incredibly unique disability identity framework. A review of each of the 7 frameworks laid out by Forber-Pratt et al.[6] reveals some key differences between PDI and other disability identity models. To begin with, PDI is atemporal. In PER, this is very similar to Hyater-Adams's [11] use of an atemporal social identity framework as a scaffold for her Critical Physics Identity [37]. Unlike other models, PDI does not insinuate that disability identity must form in sequential phases such as a "coming out" phase, or an "acceptance" phase. Instead, the PDI domains are independent of time and can theoretically manifest in any order. Additionally, not all disability identity frameworks adopt a critical lens to disability. PDI emphasizes "variations in the identity of a person with disabilities that can be related to race, ethnicity, age, and other demographic characteristics; employment; social supports; religiosity; characteristics of the disability; and life experiences as a person with disabilities" [21]. This is especially useful considering what we know about how disability can intersect with other identity groups to affect a person's relationship both with disability identity and with the society they inhabit [1][22][23].

A review of 151 articles which cited Putnam [1] returned 9 studies which used elements of PDI in the creation of their conceptual framework. An overview of these studies and their use of PDI is contained in Table 1. Synthesizing how these studies used PDI reveals that PDI is an incredibly flexible

framework. Most studies did not use all 6 PDI constructs, and instead opted to focus on one specific domain, or focus on a class of domains (ie. internal domains or external domains). The use of domains and subdomains is critical to the use of PDI. Additionally, the use of the social model of disability and specific attention to the *multidimensionality* of disability is critical to the use of PDI.

No framework is above critique, and PDI is no exception. Critics of PDI cite a necessity of political engagement in the development of disability identity as reason to avoid using PDI as a conceptual framework [24]. However, as previously mentioned, disability and existence as a disabled person, is inherently political due to the marginalization that disabled people face due to perceived or real internal or external stigma.

Other critics [25][26] claim that PDI focuses too heavily on visible disabilities to be warranted for use with invisible disabilities. It follows then, that PDI would not be useful for studying a large percentage of the disabled population in physics [13]. However, other scholars who have examined PDI as a framework have stated that PDI is generalizable, and can be used for both visible and invisible disabilities [27]. Others suggest that a PDI could provide support to those identifying with invisible disabilities [25]. Moreover, other scholars have proposed using a multidimensional approach to the social model used by Putnam [1] as a solution to including invisible disabilities in research [28]

Further, other critics [29] state that PDI could potentially be too western for universal use. Disability research outside western academia is lacking in some respects, and remains focused on "functional" aspects of disability culture [29]. We simply do not know which or what identity constructs are valid in non-western society. This is an incredibly valid claim and certainly warrants more research. However, Unal [30] answers this critique in their use of PDI in a nonwestern context.

### IV. CONCLUSION AND IMPLICATIONS FOR PHYSICS EDUCATION RESEARCH

In terms of PER, PDI is a particularly pertinent framework because it is an analytic tool to study inequity and ableism in education, both systemic and individual, as well as both internal and external. PDI is also a useful tool for developing teaching strategies focusing on fertilizing identity development and self-advocacy in students [31]. Teaching through a lens of PDI can help students better develop and feel included in their community, better helping students "navigate ableism, stigma, and discrimination that [they] face daily" [31]. Identity formation correlates highly with success in physics and eventual career choice [10], and physics identity intersects with and is affected by social identity [11]. Research using PDI can support educators in helping students grow and thrive in their classes and learning communities, isolating how students feel about themselves in relation to their environment, as well as their environment in relation to themselves.

PDI is an incredibly useful framework for use in PER.

Title	Author	Journal	Discipline	Use of PDI
Whose identity politics? – Lessons for emerging critical disability geography in Hungary	Timar and Fabula (2013)	Geogr. Helv., 68, 171–179, 2013	Political Science	Uses all PDI domains and subdomains. Treats domains and subdomains as a boolean value.
Domestic citizenship and Disability in Saskatchewan in the 1930's	Bray (2010)	Athabasca University Academic and Professional Development Fund Report 2010-2011	Political Science	Uses one PDI domain (self-worth) and examines the intersection of disability and class
The Importance of Disability Identity, Self-Advocacy, and Disability Activism	Smith and Mueller (2021)	Inclusive Practices. December 2021.	Education	Combines self-worth and pride into an internal domain and combines common cause and discrimination into an external domain. Provides strategies and recommendations for teachers.
Disability identity: Exploring narrative accounts of disability.	Dunn and Burcaw (2013)	Rehabilitation Psychology, 58(2), 148–157	Social Psychology	Uses three internal domains of PDI due to the apoliticality of their study. Thematically analyze 6 narratives of disabled people.
Evolving abilities: a framework for an aging and disability lifestyle blog	Semenza (2015)	California State University, Long Beach ProQuest Dissertations Publishing, 2015	Aging and Disability	Uses all PDI domains in conjunction with Brault's (2012) domains of disability (not disability identity). Pays special attention to the multidimensionality
Disability self-worth relates to lower anxiety and depression in people with visual impairment	Zapata and Pearlstein (2022)	Journal of Clinical Psychology, 1–9.	Clinical Psychology	Uses one PDI domain (self worth) to expand on Dunn and Burcaw's (2013) model of identity formation.
The development of disability pride through challenging internalized idealist and ableist norms in turkish society: a grounded theory study	Unal (2018)	Middle East Technical University, 2018.	Social Sciences	Uses one PDI domain (pride) to create their conceptual framework. Componentizes pride using PDI subdomains. A nonwestern use of PDI.
Disability as Culture	Hopson (2019)	Multicultural Education, 27(1), 22-24 Fall 2019	Multicultural Studies	Uses three internal domains to develop a construct of "disability identity" in terms of disability culture.
The measurement of beliefs, attitudes, and roles related to disability in a sample of rehabilitation professionals and clients	Murray (2010)	Indiana University of Pennsylvania ProQuest Dissertations Publishing, 2010.	Clinical Psychology	Uses one PDI domain (pride) to develop a new construct of "pride vs. stigma/shame".

TABLE I. Use of PDI in research

10% of undergrads in the United States are disabled in some way, and 25% of those students choose some STEM field as their major [32]. Despite this noninsignificant population and legal protections afforded to disabled people by the federal government, academia often lacks in affording equal access to disabled students [32]. Ableism, often, is ordinary in academia; and a discrimination framework, one which focuses primarily on the idea that if discrimination is isolated then it can be eliminated and the -ism at hand can be cured, is one of many frameworks [33] by which to study and mitigate ableism. PDI expands upon a discrimination framework and provides an alternative way to viewing ableism and its effects on students and the classroom. Ableism is, at its core, political, but it is not purely about discrimination. It is a collection of unfounded yet epidemic philosophies about what it means to be normal, what it means to be correct, and what it means to belong. The culmination of these philosophies govern what it means to be human; and relevant to PER, what it means to be a physicist. Yes, discrimination is a key tenet of PDI, but PDI also focuses on internal belonging, on change, and on euphoria when it comes to disability.

A framework for understanding identity in physics is critical for helping students become physicists [10]. Understanding social identity allows us to examine the doing of physics culture, but as of right now there does not exist a framework which answers the need for a nonbinary examination of disability identity in physics [34]. There is a demonstrated need in PER for frameworks which can be used for social justice and to better create a system of equity in physics [35]. PDI is one such framework. Not only is PDI useful for responding to the need for methodological approaches to understand

the experiences of disabled physicists and an "interrogation of existing structures" in physics [36], it responds to the need for an identity framework which can be used to critique the culture of physics and how it can affect disabled physicists [11].

Ableism is real, pervasive, ordinary, and can be done and perpetuated by good people. Oftentimes this doing and perpetuation is caused by a failing to understand experiences of disabled people, and a lack of questioning of how the environment created by and for abled people can affect their disabled peers [36]. With this paper, I aim to give the PER community a new, useful tool to examine ableist structures and the experiences of disabled people in physics: PDI. With this paper, I have not only shown that PDI has utility in PER, but that future research and education practices should use PDI. My hope is that educators can use PDI to design and implement more inclusive classroom practices, as well as use PDI to interrogate their own classroom practices and relationships with disability as an identity through PDI's domains and themes [39]. My hope, too, is that education researchers can use PDI to guide future research to examine the intersection between disability and physics identity, and examine how to better include disabled students in physics.

## ACKNOWLEDGMENTS

Special thanks to my advisor, Geraldine L. Cochran for her editing and structuring work on this paper. Without her, none of my work would be possible.

- [1] M. Putnam, *Conceptualizing Disability* Journal of Disability Policy Studies, Vol. 16, no. 3, 2005, pp 188-198. <https://doi.org/10.1177/10442073050160030601>
- [2] S.R. Taylor, *The Body is Not an Apology - Button Poetry Live Performance*. Camp Bar, St. Paul Minnesota, 2 April 2018.
- [3] T. Siebers, *Disability and the theory of complex embodiment-for identity politics in a new register* The Disability Studies Reader, 2013 pp. 283-302. <https://doi.org/10.4324/9780203077887-31>
- [4] A.J. Forber-Pratt, D.A. Lyew, C. Mueller, L.B. Samples, *Disability identity development: A systematic review of the literature* Rehabilitation Psychology, Vol. 62, no. 2, 2017, pp. 198-207. <https://doi.org/10.1037/rep0000134>
- [5] L.A. Schur, *Disability and the psychology of political participation* Journal of Disability Policy Studies, Vol. 9, no. 2, 1998, pp. 3-31. <https://doi.org/10.1177/104420739800900202>
- [6] A.J. Forber-Pratt, (2018). *(re)Defining disability culture: Perspectives from the Americans with disabilities act generation* Culture & Psychology, Vol. 25, no. 2, 2018, pp. 241-256. <https://doi.org/10.1177/1354067x18799714>
- [7] B. Hooks, *Teaching to transgress* Taylor & Francis Group, 1994
- [8] C. McKinney, *Crippling the classroom: Disability as a teaching method in the humanities* Transformations: The Journal of Inclusive Scholarship and Pedagogy, Vol. 25, no. 2, 2016, pp. 114. <https://doi.org/10.5325/trajincschped.25.2.0114>
- [9] A. Traxler and J. Blue, *Disability in Physics: Learning from Binary Mistakes* in: Physics Education and Gender, 2020, pp. 129-152. [https://doi.org/10.1007/978-3-030-41933-2\\_8](https://doi.org/10.1007/978-3-030-41933-2_8).
- [10] Z. Hazari, G. Sonnert, P.M. Sadler, M.C. Shanahan, *Connecting High School physics experiences, outcome expectations, physics identity, and physics career choice: A gender study* Journal of Research in Science Teaching, 2010. <https://doi.org/10.1002/tea.20363>
- [11] S. Hyater-Adams, C. Fracchiolla, N. Finkelstein, K. Hinko, *Critical look at physics identity: An operationalized framework for examining race and physics identity* Physical Review Physics Education Research, Vol. 14, no. 1, 2018. <https://doi.org/10.1103/physrevphyseduces.14.010132>
- [12] A.J. Gonsalves, A.T. Danielsson, *Introduction: Why do we need identity in physics education research?* Cultural Studies of Science Education, 2020, pp. 1-8. [https://doi.org/10.1007/978-3-030-41933-2\\_1](https://doi.org/10.1007/978-3-030-41933-2_1)
- [13] W. James, K. Lamons, R. Spilka, C. Bustamante, E.M. Scanlon, J.J. Chini, *Hidden walls: STEM course barriers identified by students with disabilities*. 2019 Physics Education Research Conference Proceedings. <https://doi.org/10.1119/perc.2019.pr.james>
- [14] T.J. Yosso, *Whose culture has capital? A critical race theory discussion of Community Cultural Wealth* Race Ethnicity and Education, Vol. 8, no. 1, 2005 pp. 69-91. <https://doi.org/10.1080/1361332052000341006>
- [15] A.J. Forber-Pratt, M.P. Zape, *Disability identity development model: Voices from the ADA-generation* Disability and Health Journal, Vol. 10, no. 2, 2017, pp. 350-355. <https://doi.org/10.1016/j.dhjo.2016.12.013>
- [16] Z. Hazari, D. Chari, G. Potvin, E. Brewes, *The context dependence of physics identity: Examining the role of Performance/competence, recognition, interest, and sense of belonging for Lower and Upper Female Physics undergraduates* Journal of Research in Science Teaching, Vol. 57, no. 10, 2020, pp. 1583-1607. <https://doi.org/10.1002/tea.21644>
- [17] Z.Y. Kalender, E. Marshman, C.D. Schunn, T.J. Nokes-Malach, C. Singh, *Gendered patterns in the construction of physics identity from motivational factors* Physical Review Physics Education Research, Vol. 15, no. 2, 2019. <https://doi.org/10.1103/physrevphyseduces.15.020119>
- [18] R.M. Lock, J. Castillo, Z. Hazari, G. Potvin, *Determining strategies that predict physics identity: Emphasizing recognition and interest* 2015 Physics Education Research Conference Proceedings. <https://doi.org/10.1119/perc.2015.pr.045>
- [19] H. Hahn, *The minority group model of disability: Implications for medical sociology* Research in the Sociology of Health Care, Vol. 11, 1994, pp. 3-24.
- [20] N.E. Groce, *Everyone here spoke sign language: Hereditary deafness on Martha's vineyard* Harvard University Press, 2003.
- [21] J.C. Rothman, *The challenge of disability and access: Reconceptualizing the role of the medical model* Journal of Social Work in Disability and Rehabilitation, Vol. 9, no. 2-3, 2010, pp. 194-222. <https://doi.org/10.1080/1536710x.2010.493488>
- [22] D. Stienstra, *Race/ethnicity and disability studies* in: Routledge Handbook of Disability Studies, 2009, pp. 453-466. <https://doi.org/10.4324/9780429430817-32>
- [23] K. Björnsdóttir, R. Traustadóttir, *Stuck in the land of disability? the intersection of learning difficulties, class, gender and religion* Disability & Society, Vol. 25, no. 1, 2010, pp. 49-62. <https://doi.org/10.1080/09687590903363340>
- [24] L. Gagliano, *Disability identity development in people with congenital blindness: An evaluative analysis of gill's model* ProQuest Dissertations & Theses Global, 2021, (2581905386)
- [25] M. Gagnon, M. Stuart, *Manufacturing disability: HIV, women and the construction of difference* Nursing Philosophy, Vol. 10, no. 1, 2009, pp. 42-52. <https://doi.org/10.1111/j.1466-769x.2008.00380.x>
- [26] M. L. Mills, *Invisible disabilities, visible Service Dogs: the discrimination of Service Dog handlers* Disability & Society, Vol. 32, no. 5, 2017, pp. 635-656. <https://doi.org/10.1080/09687599.2017.1307718>
- [27] J.L. Haney, *Representations of autism in the social work literature from 1970 to 2013: A critical content analysis* ProQuest Dissertations & Theses Global, 2014, (1651954432).
- [28] P. Giavrimis, *SOCIAL INEQUALITIES AND EDUCATIONAL INCLUSION FOR CHILDREN WITH DISABILITIES IN GREECE* Current Politics and Economics of Europe, Vol. 30, no. 1, 2019, pp. 5-43.
- [29] S. Dauncey, *Three Days to Walk: a personal story of life writing and disability consciousness in China* Disability & Society, Vol. 27 no. 3, 2012, pp. 311-323. [doi:10.1080/09687599.2012.654984](https://doi.org/10.1080/09687599.2012.654984)
- [30] B. Ünal, *The development of disability pride through challenging internalized idealist and ableist norms in Turkish society: A grounded theory study*, 2018
- [31] I. Smith, C.O. Mueller, *The Importance of Disability Identity, Self-Advocacy, and Disability Activism* Inclusive Practices, 2021. <https://doi.org/10.1177/27324745211057155>
- [32] E. Scanlon, J. Schreffler, W. James, E. Vasquez, J.J. Chini, *Postsecondary physics curricula and Universal Design for Learning: Planning for diverse learners* Physical

- Review Physics Education Research, Vol. 14 no. 2, 2018. <https://doi.org/10.1103/physrevphyseducres.14.020101>
- [33] F.K. Campbell, *The violence of technicism: Ableism as Humiliation and Degrading Treatment* in: *Ableism in Academia*, 2020, pp. 202-224. <https://doi.org/10.2307/j.ctv13xprjr.18>
- [34] A. Traxler, J. Blue *Disability in Physics: Learning from Binary Mistakes* in: *Physics Education and Gender. Cultural Studies of Science Education*, Vol 19, 2020. [https://doi.org/10.1007/978-3-030-41933-2\\_8](https://doi.org/10.1007/978-3-030-41933-2_8)
- [35] M. Rodriguez, R. Barthelemy, M. McCormick, *Critical race and feminist standpoint theories in physics education research: A historical review and potential applications* *Physical Review Physics Education Research*, Vol. 18, no. 1, 2022. <https://doi.org/10.1103/physrevphyseducres.18.013101>
- [36] D.P. Oleynik, E.M. Scanlon, J.J. Chini, *Examining physicists' perspectives of career viability and knowledge of impairment* 2021 Physics Education Research Conference Proceedings. <https://doi.org/10.1119/perc.2021.pr.oleynik>
- [37] W.E. Cross, *The Thomas and Cross models of psychological nigrescence* *Journal of Black Psychology*, Vol. 5, no. 1, pp. 13-31, 1978. <https://doi.org/10.1177/009579847800500102>
- [38] For further reading on this, see Yosso (2005)[14].
- [39] For an example, see Smith and Mueller [31]