



Disability, Economy and the Limits of Inclusive Education

Rossi D'Souza¹

ABSTRACT

This report arises from my 5 year long and ongoing research study with blind children in a learning centre located in Mumbai. I highlight certain difficult situations that I encountered albeit with a specific aim of presenting the contradictions they revealed. I focus on the case of two of my students who although scored well in their exams and aspired to pursue higher mathematics ended up having to give up their mathematical aspirations. Through reflecting on these stories and the contradictions they revealed, I question to what extent is the problem of disability just a matter of ableist discrimination. A conclusion of the research presented in this article is that the economic dimension of disability and exclusion poses limits to how much ableism can be addressed through the route of special education.

Keywords: Disability, Ableism, Social Model of Disability, Political Economy, Reification.

1 Introduction

“In the crises of the world market,” wrote Marx (1863), “the contradictions and antagonisms of bourgeois production are strikingly revealed.” While Marx spoke of a specific kind of problem - crises of the world market, his observation illuminates a rather general social phenomenon useful for analysing other experienced situations as well. In this paper, I share my experiences with working with blind children, as a volunteer teacher for the past five and a half years in a study centre located in Mumbai, India. In my analysis, I highlight certain events related to my students’ mathematics learning, that served as a window into the internal contradictions of mathematics education. By contradictions, I do not mean in the formal or Aristotelian sense but rather from the Marxist (or Hegelian) sense in which opposing forces coexist within a particular entity - forces that although remaining latent, often reveal themselves and become obvious during a crisis (Harvey, 2014) or certain difficult situations. The aim of this research report is to present a Marxist perspective towards the question of inclusion with the hope of raising a different set of research questions rather than a set of answers. I talk about “Disability” from the standpoint of the *Social Model of*

¹ PhD student in Mathematics Education at the Homi Bhabha Centre for Science Education – TIFR (Tata Institute of Fundamental Research), Mumbai, Maharashtra, India. E-mail: rossi.dsouza@gmail.com

Disability that brings Marxist perspectives into the field of Disability Studies. I use the Marxian notion of reification as described by Burris (1988) to talk about how social relations that reproduce disablement come to be naturalized through the schooling process.

2 The Social Model of Disability versus Ableism

The social model of disability rejects dominant perceptions on disability that essentially locate the cause of disablement within bodily limitations of individuals. Defining such a view as “the individual model of disability,” the social model of disability locates the problems of disability within society. As Slorach (2016); Jaffee (2016) discuss, the ideas underlying the social model of disability were first expressed by a group of disabled socialists who called themselves the the Union of the Physically Impaired Against Segregation (UPIAS). The UPIAS rejected a causal relationship between physical impairments (for example, the loss of a limb or body function) and disability (the inability to participate in society). They declared in their Fundamental Principles of Disability document that

it is society which disables physically impaired people. Disability is something imposed on top of our impairments, by the way we are unnecessarily isolated and excluded from full participation in society. Disabled people are therefore an oppressed group in society (UPIAS, 1976, p. 4).

By articulating this distinction between impairment and disability, the social model was developed in the 1980s (Slorach, 2016) primarily by Michael Oliver and Vic Finkelstein. Advocates of the social model theorized the concept of disability by locating it within the history of class society thereby explaining the current form of disability oppression as arising out of the contradictions of industrial capitalism. The social model is based on the recognition that, as Oliver and Barnes (2012) explicitly put it, “it was the coming of Capitalism that created disability as an individual problem and it was not until the latter half of the twentieth century that this came to be challenged, largely by politicized disabled people (p. 3).” The social model is underpinned by a materialist analysis of disablement that situates the contemporary manifestations of disability oppression within the need for capital circulation and accumulation and in which “ability” is defined, “in large part, in relation to one’s exploitability as a worker for the sake of capital accumulation (Jaffee, 2016, p. 2).”

The social model laid the foundation for the field of disability studies that in turn impacted allied disciplines including mathematics education. The field of disability studies significantly influenced special education that was otherwise dominated by individual and medical models of disability and also added a further impetus to learning interventions based on the works of Vygotsky, who in the early 20th century differentiated the biological from the social dimension of disability. Vygotsky (1925) stated that: “It goes without saying that blindness and deafness are biological facts and not at all of a social nature, but the teacher has to deal not so much with these facts as with the social consequences of these facts. When we have a blind child as an object of education before us, we are compelled to deal not so much with blindness in itself, as with the conflicts which arise therefrom within the child when it enters life. ...Blindness or deafness, as a psychological fact, is not at all a misfortune, but, as a social fact, it becomes such (p. 228).” Vygotsky’s emphasis on the social learning of children with special needs proved influential to the mathematics education research community with educators adopting his sociopsychological approach to teaching mathematics to blind children (notable examples include the works of Radford (2013); Healy and Fernandes (2011); Fernandes and Healy (2013)).

However, the political changes in 1990s also saw “the politically centre right in the disability movement” gain prominence and call for the social model to be “updated” so as to shift the focus back to changing attitudes, accepting diversity, and attaining legal rights as ends in themselves (as discussed by Finkelstein, 2007). The postmodern turn saw disability being theorized as a sociocultural phenomenon (ignoring the political economic dimension) in which disability experiences are perceived to be constructed primarily through culturally embedded discourses and reinforced through social practices and social structure (for example, see Corker (1998)). Campbell (2009) argued that it is necessary to shift focus away from disability “to a more nuanced exploration of epistemologies and ontologies of ableism (p. 3).” Referring to her earlier work, Campbell (2001) defined Ableism as, “A network of beliefs, processes and practices that produces a particular kind of self and body (the corporeal standard) that is projected as the perfect, species-typical and therefore essential and fully human. Disability then is cast as a diminished state of being human (p. 44).” The concept of ableism is often cited by mathematics educators who argue for shifting focus away from the presumed disabilities of individual students and towards ways in which social environments and beliefs about difference excludes disabled students from learning mathematics. Using the

concept of Ableism, Borgioli (2008) refers to individual and medical models of disability as a “modernism view” and contrasts it with, and advocates, the postmodernism view that explains disability as a social construction based on “incorrect, immoral assumptions regarding difference (p. 134).” Implicit in this postmodernist view of disability is the idealist corollary that, the problem of disability related problems can be rectified through changing ideas and assumptions regarding difference. Borgioli advocates a postmodernism view of disability as opposed to the individual and medical view but does not consider the Marxist (social model) view which sees disability as a product of material economic relations of production.

Nevertheless Borgioli does illuminate how ableism operates in mathematics education in the context of special education, for example, when teachers are recommended to “uncomplicate” mathematics for disabled children which reinforces the idea that certain students are incapable of, and need not participate in activities that involve mathematical inquiry, etc. Hehir (2002) from a similar standpoint argues that the root cause of inequalities stems from assumptions about what it means to “walk, talk, paint read or write (p. 35).” To this Borgioli (2008) adds that there is also more than one way to ‘do mathematics.’ The concept of ableism from a postmodern standpoint does not, however, explain why mathematics education took on the particular form in which all students are expected to do mathematics in one way. Neither does it address the individualization of students. Among the most cited definitions of Ableism, the contradictions of Capitalism remain largely ignored and the problem of disability is reduced to a form of discrimination against disabled people. For example, Hehir refers to ableism as “deeply held negative attitudes towards disability analogous to racism (p. 10).” Since Hehir ignores the political history of racism and its roots in slave trade, he reduces the concept of racism to merely the discrimination of people of colour. From such a standpoint, an answer to the question of “discrimination” takes the form of a call to make our (Capitalist) society more inclusive to the needs of all people irrespective of class, race, caste, gender and disability. However, from a Marxist perspective, we see that “prejudicial attitudes are a by-product of the social relations of production” which makes it clear “that liberation from ableism is not possible within a capitalist economy (Jaffee, 2016, p. 5).”

The social model, by contrast, is underpinned by a historical materialist attempt at providing an evolutionary perspective on human society that effectively “places social relationships within a historical setting (Oliver and Barnes, 2012, p. 54).” Slorach (2016), an

advocate of the social model, describes how the present form of discrimination of disabled people arose with the development of capitalist society and modern industry. In addition to creating the proletariat as a form of an exploited class of people, industrial capitalism also demanded a competitive workforce along with a particular type of labour (for example, for operating machinery designed for being used by the “average” worker) thereby creating the notion and norm of ablebodiedness (Slorach, 2016; Finkelstein, 1981). Similarly, the social model helps explain why learning loses its social character and becomes individualized and competitive.

The social model resonates with the thinking and political advocacy of Helen Keller (1920) who described, “the blind man” not as “a single, separate person whose problem can be solved by itself, but a symptom of social maladjustment (p. 38).” While disabled people are generally perceived as external intrusions that disrupt an otherwise well adjusted society, Helen Keller argued the reverse - that a Capitalist society is maladjusted to begin with, and the figure of the blind man is merely a symptom of this maladjustment.

By presenting an alternative to individual and postmodern models of disability, the social model offers a framework which raises an entirely different set of research questions. For example, in the context of education, individual and postmodern models of disability make us ignore the historic and material reasons behind the exclusion of blind children. Consequently our research questions take the form “how do we ensure full inclusion of blind children?” or “How do we teach geometry to a blind student?” Through providing a political economic lens, the social model offers a different insight into the question of disability and it’s relation to the exclusion of blind children. Looking through the lens of the social model we realize that the question of exclusion is far more complex. Subsequently we are compelled to ask new research questions like, “What are the underlying causes behind the failure and exclusion of blind children?”

While it is important to strive for our students’ success in their (mathematics) exams the lens of ableism from a postmodern standpoint makes us disregard the political economy of failure. In fact mathematics education plays a central role in sociopolitical processes (Skovsmose and Borba, 2004) by, for example, providing means and justifications for certain forms of inclusion and exclusion (Skovsmose, 2005). As Pais (2014) points out, failing students is a necessary feature of a schooling system that is actively involved in social stratification. In a similar way, Burris (1988) highlights through the concept of reification,

that although schools function as “a social process of selection for an already stratified social order,” they take the reified appearance of an institution aimed at providing productive skills. Subsequently, “Poverty and inequality, ...appear as the consequence [of] personal deficiencies in the capacity to acquire technical skills, rather than the normal outgrowth of capitalist economic institutions.” And this appearance “lays the foundation for the meritocratic legitimation of class inequality (p. 17).” Although neither Pais nor Burris talk specifically about disability, they highlight how school need to produce a few students who excel and many students who fail. As a consequence, the “ability” or “disability” of a student comes to be fetishized as an inherent property of a student rather than an effect of social relations. The problem of equity is therefore not exclusive to people who are disadvantaged owing to their race, socio-economic position, gender, etc. but a generalised problem of the school system, that affects everyone. Although postmodernist theorists present themselves as offering an alternative to individual models of disability, just as with the medical model they seem to hold the assumption that if the students in question were not disabled, they would not face a problem.

Certainly perspectives other than the Social Model and postmodernism have been used to address the sociopolitical dimension of disability related issues through the route of mathematics education. For example Marcone (2015) critiques deficiency perspectives about disability from a poststructuralist perspective through the notion of what he calls as deficiencialism which refers to deficiency as a construction of normality (Skovsmose, 2016, p. 3). Mathematics educators have also critiqued the very notion of inclusion for taking for granted “the order of things” into which students are expected to be included/ integrated (Figueiras et al., 2016). However, in this paper, I use the social model of disability as a framework owing to it being underpinned by a political economic perspective on disability. I present the experiences of my involvement with the mathematics learning of my (blind) students through the lens of economy. I focus on the stumbling blocks that I encountered so as to present the contradictions they revealed. While certain contradictions could be overcome through innovative pedagogical strategies, the contradictions that were inherent to Capitalism pointed towards a limit to what can be achieved through inclusive education.

3 The Research work

For over the past 5 years, a group of us have been volunteering as teachers at a study centre for blind children located in Mumbai, India. The centre is privately owned but supported by the National Association for the Blind, India (NAB). The study centre caters to partially/blind students most of who attend “normal” schools (with blackboards and teachers with no knowledge of Braille). A few students do not go to any school but take help of the teachers in the centre to prepare for the National Institute of Open Schooling exams. Around 45 students aged between 6 to 20 years old are registered with the centre. Almost all of them are from lower to lower middle class backgrounds. Prior to being a part of the study centre, most of the students studying here had been confined to their homes. NAB would send teachers who would spend two hours a day, twice a week with them. As was pointed out by one of the NAB teachers Ms. Kanak (pseudonym) who now teaches at the centre, this was clearly insufficient given that in addition to the curriculum they also needed to be taught Braille, and the use of an abacus, a tactile geometry kit, etc. In addition, the children had few opportunities to socialise with their friends or even their siblings who, as Kanak had mentioned, were afraid that they would get hurt while playing. Kanak narrated how she had to struggle with parents and school authorities so that the students could come to the centre and meet with each other rather than be isolated at their homes.

My initial motivation to visit the school was not to pursue formal research but out of curiosity of having a study centre in our vicinity. However, during a conversation with the staff we were asked to engage the students with music (I sing and play the guitar), and recreational and educational activities every Saturday of the week. On average, around ten students regularly come to the centre on Saturday mornings. As time progressed and rapports strengthened (mostly owing to the informal nature of our interactions with them), our involvement with the students extended well beyond our roles as teachers. For example, among many other activities, we organized outings, trained the students for music performances during events and also volunteered to tutor during exams. Often during tutoring, a student would digress from the topic and open up about their personal experiences. These narratives indicated the social character of disability which ultimately led me to begin exploring the question of disability for my PhD research. While we used audio recorders during our teaching so that the students may have an audio recording for their revision, on deciding to pursue the question of disability, I began to take permission of the students and

the centre authorities to preserve some recordings (including student narratives) for my reflection as well.

Our interactions also compelled us to improve our understanding of the fundamentals of mathematics which was otherwise taken for granted. Teaching blind students revealed various contradictions within my own understandings of mathematics (D'Souza, 2016a). I share an example of one incident in which I taught geometry to a student named Faiz (pseudonym). With Faiz's permission, I share the following teaching incident by focusing on the contradictions revealed by the textbook.

3.1 A tuition session

In the latter half of 2014, it was time for the school going students' first semester exam (half yearly examinations of the academic year). The centre manager requested me to teach mathematics to Faiz. In the 9th standard mathematics split into of Algebra and Geometry. Faiz wanted to revise his geometry. Faiz is 100% blind. To communicate shapes, we would use our fore fingers to trace out a design on the other's palm. We began with Chapter 1: Lines and Angles. The chapter began with Euclid's postulates which was followed by axioms followed by definitions and solved examples.

Many blind students and their teachers had often pointed out that geometry is visual. Being confronted with the task of communicating textbook exercises based on diagrams revealed a contradiction. The mathematics textbook presents itself as a technology that attempts to empower students by making mathematics accessible to all. But the same textbook now served to construct blind students as incapable of learning mathematics. This did not appear to be a crisis since we had at our disposal what are called as Wikki Stix™, a set of sticky strings that could be stuck on a flat clean surface to make tactile shapes. Apparently, by using Wikki Stix™, exercises on parallel lines could easily be answered by making diagrams tactile 2. Modifying my pedagogy to include the Wikki Stix™ seemed to have solved the problem. However the section that immediately followed was Parallel planes (Refer Figure). The image of parallel planes in the textbook was drawn using straight line segments, which could certainly be drawn using the Wikki Stix™. But “drawing” a tactile image on a 2D

2 Official information about *Wikki Stix™* can be found here: <https://www.wikkistix.com/what-are-wikki-stix/>

surface did not reveal its 3D structure. Being confronted with this problem made me realize that underlying the textbook's representation of the figure of the parallel planes was the assumption that a student who "looks" at what appears to be two identical parallelograms with corresponding vertices connected, sees a cube. But Faiz did not understand it to be a representation of a 3-d cube.

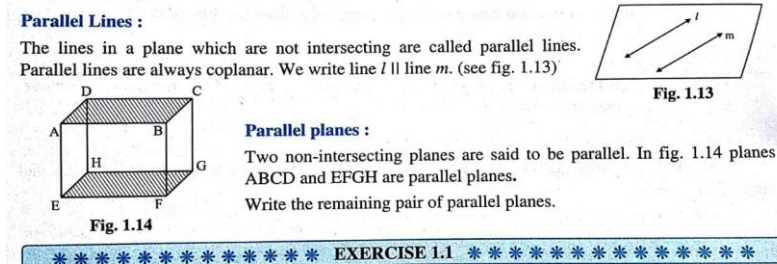


Figure: Parallel planes appear as parallelograms in 2-d.

The immediate solution to this problem was to use a 3-d block. But that would not really overcome the general question of being expected to possess a graspable version of any given abstract mathematical object. Also, at a more practical level, we did not have a cube-shaped object with us. This contradiction demanded an innovative strategy to communicate 3-dimensional mathematical objects represented as 2-d shapes in a book, so as to answer questions related to it. Fortunately, along with teaching the subject matter, I also happened to have recently been fooling around a Tower of Hanoi puzzle due to which I chanced upon a book which contained a theorem that spoke of an n -dimensional cube (n -cube, for short). The write-up presented a mathematical approach towards constructing an n -cube that proved useful in communicating the idea of a 3-dimensional cube to Faiz - we defined an n -cube as a unit of an n dimensional space. Starting with a point, which was a zero dimensional unit, we constructed a 1 dimensional unit, or 1-cube, by constructing another point a unit distance away, and then joining the points. In general, an n -cube can be drawn by constructing an $(n-1)$ -cube and then another identical $(n-1)$ -cube a unit distance away, and joining the corresponding vertices.

I asked Faiz if he could, continuing in this manner, draw a 3-cube on my palm (using his fingers). He began by tracing out a square on my palm using his fore finger and then another square a little away from the first square, and indicated joining the vertices:

Faiz: First I will draw a 2-cube, which is a square. And next to it I will draw another square. And I will join the points.

Having constructed the 3-cube on my palm, Faiz could easily point out which planes were parallel and which were perpendicular. For fun, I asked whether he could draw a 4 dimensional cube. Without hesitation he began by drawing a 3-cube on my palm and said:

Faiz: First I will draw a cube and next to it I will draw the same and join the points.

To overcome the contradictions of communicating 3-dimensional abstract objects entailed redefining how we understood mathematical ideas in ways that were not so visually spatial. With regard to communicating 3-d diagrams through the textbook, actually there are many ways of understanding dimensions, some of them even non-spatially. But taking a step back we could ask, what is the need for 3-d objects to be represented in 2-d? But with the given textbook and curriculum, this question is not asked, especially not by students. The textbook in effect functions to define the curriculum, the pedagogy and mathematics itself as a monolithic structure that delegitimises the students' own creative attempts at defining mathematics. This disables all students, and the disablement only became apparent through the lens of blind students' disablement. Students are expected to blindly use diagrams and follow prescribed instructions and methods, without questioning their use value. The textbook and the diagrams appear to be just an illustrated book, a tool that is useful for learning/teaching mathematics. But behind this reified form, the diagrams have a hidden function of sifting and excluding students. Reification obscures this function and the social relations that give rise to the need to sift and disable.

3.2 A classroom session

Just after the exams, during the students' vacations, as per the students' request, we had organized a mathematics camp. We were three researchers and 15 students aged between 9 and 20 years. The children were either partially or completely blind. All spoke Marathi, and Hindi was their second language. The sessions were audio recorded and observations were noted. The discussion were carried out in Hindi (since we found Marathi difficult). We sat in a circle on the floor and asked the children their difficulties in mathematics. Through the course of the discussions, we decided that our session would be around the topic of divisibility.

The interaction with the students during the time spent with them helped us cover various topics in mathematics. The redefining of mathematical ideas proved central to making

meaningful, democratic and inclusive learning possible. For example, as presented in an earlier paper (D'Souza, 2016b), during a discussion on negative numbers a student drove us to explore the question of where negative numbers come from. During a later session, as presented in D'Souza (2016a) the topic even and odd numbers got the students arguing. Contrary to what I intended to get the students to arrive at, that zero is not an even number - unlike even numbers, 0 has a distinct property - if you keep dividing any even number (2, 4, 6, ...) by 2, you will sooner or later arrive at an odd number. This does not happen with zero. The debate around the parity of zero forced us to think deeper about numbers, and made us discover contradictions in our arguments on the evenness of zero and the nature of definitions. The students agreed to refer to zero as an even number in the context of exams, but they kept defending the special status granted to the number zero. Although I believed that I followed a rather constructivist approach, I often found myself getting them to arrive at the "correct" answers and definitions not realizing that such a practice was shaped by an ideology that functioned in getting students to compete with each other. Had I succeeded, some students would certainly lag behind and I would have reinforced the understanding that exclusion (in this case, the lagging behind) is an expected outcome of disability. Fortunately, however, the students ensured that their friends were included in every discussion, and effectively resisted the kind power that I was unintentionally exerting.

Despite having students with various diagnosis of disabilities in the classroom, the sessions were rather inclusive and democratic owing more to a spirit of cooperation and empathy among the children than to my own efforts as the teacher. Faiz, along with the other older pupils ensured that every student would be taken along as the discussions proceeded. I suspect that they may have been doing this because they realised that some of the other students were not understanding, that my teaching was not very effective, and that they could better understand the problems the other students were having and how to help them overcome these problems. Also because the sessions were relatively informal and with only 8 to 12 students, they had the agency to do this. The students had a significant control over the pace of the discussion and ensured that none of their peers were excluded. The children took ownership of their mathematical knowledge and redefined the very norms of mathematics learning, by creatively engaging with, and bringing their own mathematization to the learning process - by redefining mathematical concepts based on their observations.

Faiz, along with another student Binita (pseudonym) had expressed their desires to pursue higher mathematics. Both went on to finish their schooling and scored well in their exams. However neither managed to fulfil their dreams of pursuing mathematics. To explore in more depth what went wrong, I digress and share an experience with another student, Sunny (pseudonym), who having joined the study later, was not a part of our learning sessions.

4 Beyond the walls of the classroom

We often received requests from the study centre to accompany a student for an exam as their writer. I volunteered to be Sunny's scribe. The exam in question had four sections - Logical Reasoning, Science, General Knowledge and Mathematics. Hundreds of candidates, most with writers, had reported at the exam venue. Although the exam was for a government job, the entrance exam was outsourced to a private agency that owned hundreds of computers in their office space. After a security check, we were assigned a computer and a young examiner was assigned to watch over us probably to ensure that I do not help my candidate. However, this could not have stopped me from cheating (i.e., using my mathematics knowledge to answer his questions) since we were allowed to talk. Hypothetically, we could have developed a code wherein if Sunny did not know an answer, he could have asked me to click on a "random" option and proceed. This would not appear to be cheating even if all the "random" clicks turned out to be the right answer.

There were hundreds of candidates in our centre alone. Examination centres were all across the country. However, the number of job openings was about a hundred. The entrance test was aimed at filling the quota for physically handicap candidates. Thousands of candidates had appeared for a government job that would select a hundred candidates with different kinds of physical impairments, not necessarily related to blindness.

Most of the mathematics questions clearly indicated that whoever framed them had a complete disregard for the fact that a significant proportion of prospective candidates were blind students (or else they had explicitly wanted to sift out blind students). In addition to word problems involving compound interest and complicated algebraic equations, even the exercises related to arithmetic were framed in a way to make it impossible for a blind candidate to solve. It was not that the questions were difficult - there are many difficult

problems that blind students could do as well as sighted students. A few questions were of the following form (only the digits are different with no observable pattern that could be make the problem simpler):

Sunny is 100% blind and rather politically conservative in terms of valuing ideals of individual responsibility among other virtues. But he found himself asking me to simplify the question, to which I replied, “If I solve the bar bracket first and continue like that, I get the answer, -241.” “Is that in the options?” asked Sunny. Hesitantly, I responded, “Option C is -241.” “Then select option C.” I felt really awkward and scared since it was happening below an examiner’s nose. We ended up cheating in an exam (even if it was not more than 3 - 4 questions) in which the consequences for malpractice was severe. However, as the exam ended, conversations with a few other candidates revealed that such cheating was quite the norm. The nature of the question on the paper indicated that it was implicitly expected that blind candidates cheat. Further, as Sunny let me know, the entrance exam was not followed by any interview but was in itself the deciding factor behind getting the job. Further, the opening was for a low level unskilled profession that obviously required no knowledge of mathematics. It was evident to both of us that the only reason such difficult questions featured in the test was to make sure that few if any candidates would get all answers correct, so that most students could be sifted out, since there were so few jobs available. The exam would serve to select a random set of hundred students from among thousands of applicants, and whether or how they did mathematics actually made no difference since it was irrelevant to their jobs. Had there been a lottery system instead, there could have been an outrage over the growing rate of unemployment in our country. But through the use of an entrance exam with mathematics in it, the onus of getting an unemployment was put on the disabled candidates. Or in other words, the victims would be blamed. They would feel (or be told) that they failed to get employment because they not did study hard enough, or are not ‘able’ to do mathematics. This incident was not exceptional as was revealed by Binita, who finished her schooling a few years ago.

5 Banality of Cheating

Binita shared her experience and bond with mathematics education. Binita loved mathematics and was very good at it, as was evident during our mathematics sessions. With Binita's permission, I audio recorded her interview.

Binita: I have done 8th and 9th ka maths [maths of the 8th - 9th standard]. So maths was really very close to me. And I loved to do maths. Basically from childhood. ...I have given entrance exam ...in which I have done much well in maths. Like I didn't face main problem because I had good contact with my maths. My basics of maths is really very good because I was in normal school I was sighted at that time till 9th. And my habit was to study one class ahead (laughs). So if I'm in eighth class I will study 9th class.

However, Binita was dissuaded from pursuing mathematics by one of the stakeholders (I will use the pseudonym, Preethi Ma'am) of the study centre. While Binita studied the same mathematics as her peers till the 9th standard, Preethi convinced Binita's mother to make her pursue the lower level mathematics for her 10th standard exam, citing the Binita's depression following her father's untimely demise as a reason. In fact Faiz too was coerced into pursuing the lower level mathematics exam that disqualified him from pursuing mathematics in college.

Author: But then why didn't you pursue mathematics?

Binita: Because ...it was not my choice to have 7th class mathematics. It was Preethi Ma'am's choice. She said that...I was suffering from that ...because I have lost my father at that time. And she was thinking that I'm not mentally matured that time. So she thought that if I do 10th wala³ maths then I ...would lose my marks. She was thinking. And she was thinking that I should score really very well. That's what she asked my parents to take 7th wala maths [maths of the 7th standard]. Otherwise I was thinking to take higher maths. ...My bond with maths was really very good; I don't think so, that maths would be a problem for me.

Binita then narrated her interaction with a sighted friend who had volunteered as a writer for a visually challenged student and who boasted about how he cheated by writing the exam himself and how no one cared that cheating was so common.

Binita: Some of my friends who are sighted who became writer of some people, they gave me their experience that he was writing all the paper ...so I said how can it be

³ In colloquial hindi, *wala* roughly translates to "associated with," although it can have multiple connotations.

possible like no one sees at that time? looked at that time? So he told, No. No one care about those all things ...he told me then I was in shock. ...

Binita shared her concern of the far reaching implications that cheating can have on other blind people whose abilities would be brought into question owing to the pervasiveness of cheating.

Binita: it gives wrong impression of blind people; that people are using their writer only to get good marks. It will give this kind of indication only. So I got panicked; I told him that from the next time just don't do that. ...Next time I will pass something, then everyone will say that "arre writer use kiya hoga na? (Oh, You used a writer, no?), Haan tab toh paas hona hi tha! (Yes! then you would pass only!)" It gives a really wrong impression on blind.

As Binita mentioned this incident, I couldn't help but recall the few instances in which I cheated in Sunny's exam. And this put me in a dilemma regarding whether or not I should have confessed to her that I too cheated. Binita cited the case of Faiz to highlight the problems faced by blind people during employment.

Binita: Faiz is doing job as phone operator in [a nearby government] Hospital. ...If they will give job also, for the visually challenged or handicap children, they won't make you to do more work. ...One of my friends who has passed BSc IT [an undergraduate degree in Information Technology (IT)], from [a prestigious college], he got placed in [a prestigious software firm]. He has done with his training in Kerala and he has been shifted in Chennai. But, it is three weeks he has been there. He is not doing anything, he said. They are till now figuring out what can he do....Big industry ...they will take a visually challenged or they will take any handicap person, but they will not, they won't give them work.

Like Binita, Faiz was also discouraged from pursuing higher mathematics. While Faiz was given the job of a telephone booth attendant ("phone operator"), Binita's other friend was more fortunate to be employed in IT in a prestigious firm. But he too found himself without an opportunity to utilize his expertise and knowledge.

6 From the school to the labour market

Faiz had often expressed his desire to pursue higher mathematics so long as I would tutor him along the way, to which I happily agreed to oblige. However, Faiz ended up with a low paying unskilled job (of a phone booth attendant). His underemployment was justified owing to his having a high school certificate that indicated a lower level mathematics.

These experiences highlight the significance and value of a certificate. A certificate is a fetish. It is just a piece of paper with something printed on it. But it is magical: it appears to be able to provide employment. Faiz, Binita, and Sunny pursued education in the hope of getting certificates that would have some exchange value, in helping them get jobs. They achieved the objectives of getting education, passing the exams, and getting certificates. And they actually did do some interesting mathematics at the centre, if not at their schools. But they did not get jobs in which they would continue to do mathematics. Perhaps it was because their certificates were only for low-level mathematics, rather than higher-level. But actually, whatever the certificate, it may not provide employment, because there is a severe shortage of jobs. So we see that actually a certificate has another magical quality: that of ‘proving’ that a person is not sufficiently qualified for a job. In other words, the certificate also functions to disable and exclude.

In addition to being a fetish, a certificate is also a piece of paper that is a reification of the examination process through which it was produced. The actual ‘certification’ process is a mystery. It may seem that any student can pass the exams and get a certificate if they work hard enough. But this obscures the fact very few students of certain classes, castes, genders, and abilities actually do pass the exams. A certificate obscures the social relations that actually determine whether or not one passes the exams. As Val Burrell (1988) wrote,

The social relations responsible for the reproduction of class inequality have, in effect, been incorporated within (and disguised behind) the technical processes of skill acquisition (Bowles and Gintis, 1976). Credentials, like other commodities, come to be fetishized as an inherent source of value, rather than seen as a token of the underlying structure of social relations. Insofar as schooling is perceived as an essentially technical process of acquiring and certifying productive skills, rather than as a social process of selection for an already stratified social order, differences in educational attainment are seen as a reflection of individual differences in intelligence or motivation. Poverty and inequality, from this perspective, appear as the consequence personal deficiencies in the capacity to acquire technical skills, rather than the normal outgrowth of capitalist economic institutions. This appearance lays the foundation for the meritocratic legitimation of class inequality, both at the level of popular ideology and in the more elaborate theoretical constructions of bourgeois social science (p. 17).

Faiz's journey from academia to the labour market revealed a contradiction between producing a mathematically competent workforce and realizing that competence albeit in an economy that does not offer adequate employment opportunities to facilitate that realisation. While Faiz had successfully overcome ableism in mathematics education at various levels, his success could not find expression beyond the limits of academia and into the labour market. Faiz's experience of being unable to pursue mathematics was not a unique case but a general trend. As a student leaves the sphere of learning and enters into the labour market, they find themselves confronted by a different set of rules which are ultimately drafted by the laws of the market.

The experiences of Faiz and Binita provided a deeper insight into our experience with the textbook. While at first, the textbook appeared as an innocent teaching tool, after listening to and reflecting upon the experiences of my ex-students, the same textbook now served as a window into the workings of the schooling process under capitalism as a whole, that produces reified objects like a textbook. The appearance of reified objects masks how schools are, as Pais (2013) emphasizes, places of economic production in which failure and exclusion are an integral part, and are endemic to the schooling process. Only through the existence of failure can we rationalize having, as Marx (1990) called it, "the industrial reserve army or surplus population (p. 786)." Without a reserve army of unemployed, wages could not be sufficiently low, and profits could not keep increasing. And consequently, the existence of an industrial reserve army of a predominantly "ablebodied" unemployed population further justifies, from a reified standpoint, the marginalized position of disabled people.

By reflecting on Faiz and Binita's experiences through an economic lens, the textbook now revealed itself to be a technology designed to be used by the "average" student analogous to how industrial machinery is designed for use by the average worker for the sake of greater efficiency at the price of individual marginalization. Ableism in the textbook was revealed to be an outcome of the process of making the schooling process more efficient for the interests of Capital. Subsequently, it became clear that developing more accessible teaching tools could certainly not solve this problem. The problem was not simply that that textbooks are inaccessible. To explain my point, I compare the textbook with Mr. Billows feeding machine that featured in Charlie Chaplin's movie, *Modern Times*.

Six minutes into the movie *Modern Times*, there features a scene in which three men enter an office with a 5 foot tall machine. The equipment called Mr. Billows feeding machine

is accompanied by a “mechanical salesman” that describes the appliance as “a practical device which automatically feeds your men while at work.” By eliminating the lunch break, it allows the owner to increase the length of the working day and thus increase the amount of surplus value that can be extracted from the workers. In the movie, Charlie Chaplin plays the character of an assembly line worker who is used to test the feeding machine. Being a little smaller in stature than the average assembly line worker, at times he had to stretch his neck to have the device wipe his mouth. However, the machine malfunctions and spills food all over the place, thereby creating a hilarious scene. Charlie Chaplin’s boss thus decides that the feeding machine is not a “practical” idea. It proved to be difficult to design a machine for such tasks because there is no normal human that acts or reacts with mathematical precision.

The scene made it evident that the problem of the machine was not simply that it malfunctioned, although, for the factory owner it was just that. While the factory owner could only see a problem in the machine, the movie depicts the machine from the perspective of a worker, and lays bare the class conflict between workers and owners, showing how the the problems lies with the mode of production of Industrial Capitalism as a whole.

Textbooks work in the similar way. They are tools that enable disablement. The textbook, examination, certification, education system, allows increasing amounts of surplus value to be extracted from workers. And the ableist assumptions underpinning the textbook are not merely a matter of discrimination but an outcome of a complex of social and economic relations that produced the textbook as a reified object designed to efficiently “feed” a certain amount of specified mathematical knowledge to a maximum number of students. But even if the students do end up having consumed a decent portion of knowledge (whether through a constructivist route or otherwise), it is unlikely that they will find opportunities for realizing their mathematical potential, beyond the walls of their classroom.

6.1 Summary and Concluding remarks

A central aim of this paper is to rethink the complexity associated with the question of disability. While we must indeed strive towards making our schools and learning environments less discriminatory, this should be seen as the least we can do, rather than the central agenda of our research. As mathematics educators, we assume that our responsibility towards our students’ mathematics learning begins and ends with the classroom. However, the

problems of ableism extend far beyond. More importantly, ableism is a problem not in itself but derivative of economic forces.

And further, we act as though the problems faced by our students are an outcome of their impairments. As Helen Keller (1920) put it, “We have been accustomed to regard the unemployed deaf and blind as victims of their infirmities. That is to say, we have supposed that if their sight and hearing were miraculously restored, they would find work (p. 242).” By modifying the quote of Helen Keller and replacing terms associated with employment with those related to learning, I state that “We have been accustomed to regard the ‘failed or excluded’ deaf and blind children as victims of their infirmities. That is to say, we have supposed that if their sight and hearing were miraculously restored, they would receive a meaningful and useful mathematics education.” Most of our attempts at addressing disability remain individual attempts at solving problems that stem from the contradictions of capitalism. That is, our responses towards the pervasiveness of different forms and intersections of oppression like caste, race, gender and ableism, on the one hand remain confined within the classroom, and on the other hand, remain attempts at helping disabled students adapt to a competitive society driven by market values. We then work towards making our classroom more diverse and inclusive to counter the pervasiveness of ableism. However, such attempts are bound to run into contradictions. As Pais (2014) points out, an analysis of inclusive mathematics education from a lens of economy “evinces the contradiction involved in a system that, although struggling for equity, needs to produce a certain amount of failure (p. 1088).” In this regard, we need to shift our attention back into the contradictions of Capitalism and critically look at the various reified objects it creates.

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Submetido em Novembro de 2018

Aprovado em Dezembro de 2018