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Through the Sociological Lens: Learning Mathematics in a Mumbai Classroom

SAURABH KHANNA

I entered a seventh grade mathematics classroom at a senior secondary school located in Santa Cruz, Mumbai. The students were sitting at desks made for two, arranged in three rows. Of the 13 girls, 11 were sitting in the right-hand row, nearest the door. The other two girls were sitting at a separate desk to the teacher's left, and one of them was wearing the 'Class prefect' badge. The 19 boys were in the centre and left-hand rows. The lesson was taught in English, on 'An introduction to linear equations in one variable', and the teacher, a native of Mumbai, had a B.Ed. and M.Sc. in Mathematics.

The school is an unaided private institution affiliated to the Central Board of Secondary Education. There is a policy of providing financial aid to needy students, particularly to those who had only one working parent. The problems that plague public and low-fee private schools in India are well known, but this is a well-established school with trained teachers and resource-rich classrooms. What is mathematics learning like for students here?

Gender differences

The teacher explained the concept of linear equations very briefly, and then got back to writing questions on the board, waiting for the students to solve and respond. She often called out names to invite answers; the names followed a pattern rotating through four of five students. The teacher's gaze after writing down a question was almost always directed towards the students who had answered the previous questions correctly. The classroom dynamic was very competitive. The four boys sitting in the front desks were often the first to respond, but they were closely challenged several times by the class prefect and her partner. The other boys further back were not responding. Some of them seemed engaged, but the boys at the very back, as well as the girls in the right-hand row made no apparent effort to respond or take notes.

What does this stark categorization based on seating mean for mathematics learning in this classroom? It informally legitimizes stratifications, 'labeling' the students, and likely

pushing them towards acting in accordance with what was expected of them (Rist, 1977, p. 296). Notably, one stratification in this classroom is based on gender. I remember from my experience of teaching students in lower primary grades that differences between the sexes are not much pronounced then, a fact that is corroborated by Forsgasz and Leder (2001). But I could see these differences widening in the secondary grade classroom I was observing. Boys clearly outpaced girls in classroom participation. The focus on speed and competition in the classroom tasks could be favouring the male students, as is evident from Fennema's research as well (Fennema & Peterson, 1986). Sporadic efforts to work collaboratively made by the female students were dismissed twice by the teacher, with firm remarks to "focus on their own work".

Another visible aspect is that the classroom stratification comprises sub-layers within layers. For instance, one must realize that the universe of female students engaging with mathematics itself (which one often considers to be facing injustice as a whole) is further segregated into multiple levels, as is evident from the visible gap in engagement between the class prefect and her partner, and the other girls.

Socioeconomic status differences

A majority of the students came from middle to high income families, hence class inequities were not very conspicuous. But I had an interesting conversation with the teacher regarding students receiving financial aid grants from the school:

SK The department head told me that the school supports needy students.

Teacher Yes. And I have to pay extra attention to such students.

SK Why is that?

Teacher Sometimes students are not motivated in class. At least their parents push them since they are paying the fee. Taking out that economic incentive is not good for the classroom sometimes.

This excerpt can be looked at from two angles. First, it is interesting to see how a lack of academic motivation is automatically being attributed to students from financially weaker backgrounds. This is much in line with what Skovsmose has highlighted regarding students' dispositions (Skovsmose, 2007, p. 87). An automatic assumption of mediocrity from the students' financial *background*, would also go on to further harm their *foregrounds* (their perception of opportunities available, and hence their aspirations). This ruined foreground does little to motivate the students, and they are left with diminished intentions to learn, hence initiating a downward spiral. Secondly, the teacher also assumes here that economic incentive is the primary motivation for parents to push their children. Such assumptions about their parents will almost always get communicated to the students, restricting their foregrounds even further. Students with such skewed dispositions will construct restricted meanings, which will push them further down the spiral.

Discussion

The school has good infrastructure, the teachers are qualified and well trained and the majority of students come from relatively privileged socio-economic backgrounds (as compared to the city's demographics). The school also organizes quarterly workshops to update teachers on latest developments in their respective fields. Despite ticking all the right boxes (aspects found missing in many public and low-fee private schools in the region), the classroom proceedings were found lacking from a sociological perspective.

A continuous theme running throughout my observations, as well as during my conversations with the staff, was a strong spirit of competition and rivalry. This competitive spirit possibly emanated from competition among elite schools in the region, as parents from relatively privileged backgrounds prefer to get their children admitted to schools showcasing the best outcomes. This was also conspicuous among teachers competing to be the best performing section within a grade. The notion percolates down to some students as well, as is evident from the eagerness of the boys at the front to contest and answer questions in a flash. Such vibrant energy and quick responses pouring in might even provide the superficial impression of a well-engaged classroom. But a closer look reveals that cracks do persist, as we have seen. This becomes even more problematic when a perpetual emphasis on achievement of a minority overshadows the learning needs of a majority of students.

SK From your experience, which approach do you think makes the students learn better?

Teacher I think that we can give students independence and it is good. S1, S2, S3 [*three boys at the front desks*] do well regardless of the approach.

SK How well do the girls engage in learning mathematics?

Teacher Girls are good as well! S4 [*the class prefect*] is very good in mathematics. S5 [*her partner*] has also done well by collaborating with her often. They both work very hard.

The teacher tends to stay restricted to a minority of well-performing boys and girls even when asked about the classroom as a whole. This fits with Keddie's analysis (1971, p. 66), where equal rights are not granted to each pupil based on his or her normal status (which here could be based on the perceived ability of particular groups of students). Further, the fact that academically weaker students did not appear to know formal mathematical terms went against them. Their attempts to understand concepts in an everyday context and language were not well appreciated. Moreover, rather than attempting to inform the weaker student's understanding (S6 as seen below), the teacher ignores him and moves ahead to ask other (and possibly well informed) students.

Teacher Very good [*to the boys at the front desks*]. What do we mean by linear equations in one variable?

S6 [*sitting at a desk third from the back*] Adding and subtracting

Teacher [*interrupting*] Not just that, how do we solve linear equations? [*looking back to the front desks*]

Other aspects that came out during our conversations pertained to the teacher's assertion of her belief in 'inclusive schooling', as well as the school's promotion of a model of 'self-paced learning'. If we couple these notions with an emphasis on competition and achievement, the situation gets oddly skewed in favour of academically brighter students. In other words, an inclusive model of self-paced learning would theoretically embrace the pace of the slowest student. But that would be highly inefficient given this context's competitive demands. Hence, in reality, the classroom effectively embraces the pace of the fastest students answering questions in quick succession. The ones left behind must fend for themselves.

I observed that problems related to social factors can persist in a resource-rich and well-regarded mathematics classroom. Although this is only one example, it raises important questions. What could cause a mathematics class in a well-established school to underperform on sociological dimensions, despite having all the recommended ingredients for excellence and inclusion? Does a fierce sense of competition among (and within) such elite schools really shift the focus towards a well performing minority, and consequently obscure issues faced by the majority? Are similar sociological issues overlooked in public and low-fee private schools, possibly due to larger problems at hand? Further research is needed to address these questions. From a sociological perspective, a truly inclusive mathematics classroom must allow leeway for multiple definitions and multiple pathways of learning (and not just multiple paces along a single path, such as in self-paced learning). This becomes imperative, for instance, in light of research findings pointing out that thinking of mathematics as a domain of 'reason and rationality' could be detrimental to female students (Paechter, 2001). Similar arguments could be drawn for students belonging to any other layer of social stratification—be it based on class, caste, ethnicity, or religion. Given the plethora of resources at hand, well-resourced 'elite' schools are best placed to address these issues by innovating and experimenting with more flexible teaching-learning approaches. The successful prototypes can then be developed for cost-effective promulgation to other schools as well.

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From the Archives

The following is an edited excerpt from *Excellence and equity in mathematics classrooms* by George M.A. Stanic, Laurie Hart Reyes, in issue 7(2), pp. 27–31.

Were John Dewey still alive, he would probably look at the present arguments about excellence and equity in education as reflections of a false dichotomy. Just as he reconstructed the relationships between interest and effort and between the child and the curriculum, he would help us see the relationship between excellence and equity in a new light.

In this article, we will not do what Dewey would have done because we are still struggling with ideas of excellence and equity. Instead, we would like to express our concerns about achieving equity, especially at a time when excellence has become a rallying cry for people inside and outside the field of education. The main point of this article is that even if the goal of equity is seen as crucial and threatened by the “excellence movement” in education, the most difficult problem is to determine exactly what constitutes equitable treatment of students in schools and classrooms. Given that most, if not all, teachers would agree that their interactions with students should reflect fairness and justice (*i.e.*, equity), what can they do to ensure that equity exists in their classrooms? [...]

The excellence movement in education has come to focus not just on students’ level of achievement but also on what subject matter they are studying. One way to critique this movement and to argue for the importance of equity would be to focus on what subject matter is considered valuable by those who are calling for excellence in education. Although a discussion of high status and low status knowledge is necessary, our discussion of the relationship between excellence and equity begins with the assumption that knowledge of mathematics is important for everyone. In order to participate fully in our democratic processes and to be unrestricted in career choice and advancement, individuals must be able to understand and apply mathematical ideas. Therefore, although mathematics educators do need to examine their assumptions about the importance of mathematics, we begin this paper with the belief that all people should know about and be able to do mathematics.

Originally we wanted to argue not just that excellence and equity are compatible, but that true excellence cannot be achieved without equity. To make this argument, however, the basic meaning of excellence has to be changed. As long as excel means to surpass, to be superior to, or to outdo oth-

ers, it would be difficult to argue that fairness, or justice, or equity is a necessary condition for excellence. One could, of course, try to argue for basing excellence on outdoing oneself, or surpassing some criterion, so that all of us can be excellent. But outdoing oneself is a problematic concept, and recent calls for excellence in education do not seem to be based on the goal of all people surpassing some criterion. Instead, competition with others is central to the excellence movement, whether the “others” are the Soviets, the Japanese, students in another state, or even one’s own classmates.

Although not all forms of competition in our society are necessarily bad, there is reason to worry about the role of competition in our system of education in general and in classrooms in particular. When we look into classrooms, it becomes clear that striving for excellence operationalized as competing against and attempting to be superior to others can seriously threaten our quest for equity. Research on sex-related differences in mathematics performance provides at least some evidence that we have reason to be concerned. The work of Elizabeth Fennema and Penelope Peterson (1985) indicates that certain students, particularly girls, do better in cooperative learning environments than in competitive ones. The problem, of course, is that most mathematics classrooms are already competitive in nature, thus inhibiting the performance of those students who would benefit from a more cooperative environment. And the danger associated with the excellence movement lies in the fact that it will reinforce rather than change many of the taken-for-granted realities of classroom life, whereas a focus on equity would lead us to ask how we might change classrooms to make them more fair and more just for all students. The *Nation at Risk* report (USDE, 1983), if not the beginning at least the creed of the excellence movement, tells us that Americans all have the same goals for our education system, that we need simply to carry out what we know is the right thing to do. A concern for equity on the other hand, would make us constantly ask: What is the right thing to do in our schools?

Striving for excellence is, then, empty at best and harmful at worst without a concomitant concern for equity. Equity, however, is a much more difficult goal to achieve than is excellence. It is easier to show that certain students have done better than others than it is to show that all students have been treated fairly. That is why lip-service to equity as we strive for excellence is simply not enough. And that is why teachers have such a profoundly difficult task in trying to address the goals of both excellence and equity.

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