

## **SOME EXPERIENTIAL ACCOUNTS OF TEACHING MATHEMATICS**

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We are students at the Institute of Women's Teacher Training, Pune University and we are presently pursuing the course for the second year. After four months we would pass out of this college as teachers. Our teachers often read out to us many articles on education from several journals like 'Palakniti', and we have intensive discussions in our classes upon these topics. While reading articles that are related to the experiential accounts of teachers, we feel that when we ourselves would become teachers we should employ many of these new ideas in our pedagogic endeavors.

As part of our curriculum, this year we are also supposed to do project work. When we got to know in detail about the intensity of the project work and how it was to be done, we were utterly confused and did not know how to go about it. But later our teachers explained to us in a very simple manner and informed us that when we step into the actual classroom settings and interact with children, we will be faced with numerous challenges and problems. They suggested, that among the myriad of problems that teachers are generally facing within the classroom set up, we should select one particular problem and work on it with heart and soul and do a project. Our seniors had also done their projects on various issues such as – children's handwritings, memorization of numerical tables in mathematics, rote – learning of facts etc.

We wondered how it would be possible to know about the various challenges of the classroom without first having become a teacher. Without knowing the problems to their depth, would it be justified on our part to try and look for solutions to them? These and many more questions were perplexing our minds more and more.

### **THE PROCESS OF SELECTION OF THEMES FOR OUR PROJECTS**

Looking at the multiple queries that we had in our minds, our teacher organized for us a meeting with the teacher's of the girl's school located in the very vicinity of our university. It had been already decided before the meeting, that we were to work on the issues faced by the students of this particular school. During this meeting, each of the teachers of the school shared with us detailed accounts of the problems that the girls in their classes were facing academically, laying emphasis on particular themes that the girls were finding particularly hard to comprehend. Just within sometime, a huge list was formed in which were enlisted the numerous problems faced within the school.

This lead us to ask ourselves yet another question, if the teachers themselves were not able to find adequate solutions to the problems faced by their own students then how could we possible find solutions? Our teacher told us that to be able to address any kind of problem effectively and meaningfully it is very important for us to understand all dimensions of the issue. It's only by doing so that we can go to the root cause of the problem.

There were a few girls from the third class who had not yet learnt to read and write, also there were some students who had problems in identifying particular letters in the Urdu script and whenever a word would come that contained any of these letters they would face severe difficulties in reading them. Some students had severe problems reading words that were joint, while others had a tough time reading complex sentences. This was the very first time when we had an opportunity to examine their problems so closely.

While discussing the status and difficulties of girls from this class, what we also realized was that similar kinds of problems were also faced by students of classes second, fourth and fifth. It was felt that an effective way to address the problem would be to keep the class designation of the students aside and club them together in groups of 8-10 and work with them on their difficulties.

From our own class about 29 students or let us say 'would be teacher's' took up problems and challenges according to their own interest areas and began working.

Both of us (Anjum and Nazia) chose the project of working with the girls of class seventh who were facing challenges in learning and grasping the problems of in mathematics.

These girls were facing problems in even the most basic concepts such as addition, subtraction, multiplication and division; this was reported to us by their teacher. We observed that while most of the girls could somehow manage to add and multiply but almost all of them found it very difficult to subtract and divide. It was because of this that they faced challenges in understanding the more abstract and complex notions that followed in their mathematics curriculum such as algebraic equations, profit-loss, rate of interest etc. This was also informed to us by their teachers.

#### **THE PROBLEM OF HOW AND WHAT IN TEACHING.**

The day following the discussion held at the school with the teachers, we prepared lists of problems and told our teachers that we were indeed keen on selecting some problems and working on them seriously to find adequate solutions. We informed our teachers that in order to be able to address any of the problems faced by the girls seriously, we would require at least 50-60 periods.

So what was it within the broader concept of multiplication and division that we were going to teach these thirteen girls? How should we begin, which should be our starting point....these were questions that had already begin to rise in our minds.

Our teacher did not answer any of our questions in a straight forward manner. The final question one of our senior teachers asked us had the seeds of the answer to our question.

We decided to creatively design a small questionnaire that we would make the girls to attempt, and once they had attempted that questionnaire it would be able to clearly tell us their conceptual difficulties.

We prepared a small questionnaire for them which started with questions that involved the addition and subtraction of complex and non complex numbers. In this too we would proceed from simple to

difficult questions. At the very end of the questionnaire were sums based on addition and subtraction as well as division and multiplication which were complex and multi-staged.

The questionnaire was given to a total of thirteen girls. Based on the answers written down by all the thirteen girls we now created for our ease and understanding a detailed chart. As we were analyzing the reports, it began to get clearer before us that where these girls lacked and from where we could start our project. We were working with the assumption that these girls had no idea about mathematics, as this was roughly the picture given to us by their teachers. But upon the examination of the questionnaire as attempted by these girls we observed that they had solved the first three questions of our questionnaire without any fault. In the questions that followed, each girl had tried to find a solution to the problem to the best of her capacity. However, none of the girls were able to solve the final three questions of the questionnaire. Out of the thirteen girls, three had answered twelve questions absolutely correctly. After having analyzed the questionnaire we had to now plan a detailed mechanism to address their issues. While preparing the plan-outline, we kept in mind the points that came out after our discussions with their teachers. These points were as the following-

1. The teachers have explained the concepts in the prescribed textbooks to the girls more than a single time and yet the girls are not able to grasp them properly. This is the reason why they also face difficulties while solving the sums which test their conceptual clarity. Therefore the need of the hour was to devise new ways to explain them these concepts.
2. According to the available time limit, the plan outline that we charted out shall have suitable use of teaching tools.
3. Each girl's individual weaknesses and problems shall be kept in mind. We shall be in a position to constantly monitor their progress; this in turn would help us devise better plans for work in the future.

We were feeling very good while devising this sort of a work-plan. We observed in the beginning that each of the girls was at a different level of understanding. But we felt that even if we were able to help them learn the addition, subtraction, multiplication and division of three digit numbers well, we would have achieved a lot already.

For this we found out about many games. We arranged some pedagogical tools while we also made some of these tools with our own hands.

## **OUR EXPERIENCES OF TEACHING MATHEMATICS**

For teaching the girls, we had been given the last period of the day. Since this was the final class of the day, the girls would generally be both tired and bored by then. Their moods would be rather fluctuating and they would be more eager to play than to sit down and study. So in the initial days we faced a lot of hardships because of this.

'Didi, today we have got utterly bored the entire day, please let us free for today and tomorrow we shall definitely study, today we don't have the mood for it'. Every day in the initial days we would lose about fifteen to twenty minutes in convincing the girls only. So later we decided that we would devote the first

ten minutes of our class everyday to the playing of games. We noticed that when we decided this, the girls would concentrate for the remaining twenty minutes of the class.

After the first ten days, the girls themselves suggested, “didi, let’s not play today”

In the beginning we asked each of the girls to come up on the blackboard and solve a particular type of a mathematical problem on it. This was a completely new experience for them and it also helped us understand where the girls were having difficulties. When we would notice that a particular girl was making a mistake, even before we could correct it, another girl would offer to solve the problem. About ten girls were weak in additions, so we decided to teach them by making bundles of match sticks having either ten or hundred sticks each. This experiment helped them gain a better understanding of topics like loan, fractions, percentage etc. After four days, out of the ten about six girls were able to solve the sums with much ease. The girls were also given home assignments, which they would sincerely complete and bring back to us.

Often, the girls would come running to meet us and show us their work much before the designated time and would tell us how much they liked our classes and that they had never understood with so much clarity before. Hearing all of this our hearts would fill with happiness.

However there were still four girls who seemed to require much help. One of them was Nusrat , she would perpetually ask questions and sometimes we would feel she is testing us. She was an intelligent child and we could see that she understood. But despite this, her sum solving skills were still in need of betterment.

One day our patience was challenged and both of us began shouting at Nusrat. It had been the first time when something of this sort was happening but Nusrat began wailing loudly.

We were feeling extremely awkward and to control the situation we said to her that she had been such an intelligent girl and asked such wise questions, why then was she crying like a coward? On hearing this she immediately wiped her tears and said, “I am not a coward, our teacher told us that whenever one has a doubt it’s good to clear it, that’s why I asked you questions but why did you people scold me?”

We apologized. Subsequently there was change in Nusrat’s academic performance. We could not say how this change was brought about, but there was certainly a good change.

There was another girl in the class called Sophia. She was prompt at giving oral answers and was always the first one to answer in the class. She was so quick to answer that the girls would often get irritated and tell us that she required no help as she already knew everything in mathematics! We began to notice, that the questions that Sophia could so easily solve orally she would commit mistakes while solving them on paper. We noticed that during addition or subtraction, instead of writing the digits one below the other she would write them in a haphazard way. We called her attention to this problem; Sophia understood what we were saying and took charge. In four-five days she stopped, making those mistakes. Then we did not have to work any harder on Sophia, rather she was the one who came forward and began to help the other girls in the class.

## **THE BENEFITS OF AN INFORMAL ENVIRONMENT**

We had always tried to create an environment of freedom in our classroom. We actually behaved with the girls as if we were really their sisters. We were told by the teachers that the girls would not study unless we were strict and stern with them, so in the beginning we too tried to be strict. But gradually we realized that this was not necessary, so before wasting any time we opened up the environment.

Today, when we are writing down our experiences we are able to understand why these girls are facing so many problems in learning mathematics. This has been possible because we had actually become like their friends. It gives us immense pleasure to see that we were able to help out these girls and achieve the target that we had set for ourselves. In the last one and a half years, we must have taught for at least forty periods, we have made detailed notes on them, have worked and reworked on our notes- but the amount of happiness and satisfaction that we felt during our engagement with these girls was altogether different, we also learnt so much from this entire experience with the girls.

## **OUR OBSERVATIONS AND SOME QUESTIONS**

Three of the girls from the class- Rashida, Hina and Samreen have not shown any major improvements yet. Hina has already decided to drop out from school after the seventh grade, so she does not really bother about studies. Her seniors have also suggested her to study further, but perhaps she needs more guidance to get convinced of the need of education.

Samreen and Rashida are filled with mathematics-phobia. They strongly believe in their incapacity to learn mathematics. Perhaps, they had a negative experience related to mathematics when they were younger and its impact was so strong that this fear is so entrenched in their hearts. We tried a lot of pedagogical experiments but up till now have been unsuccessful in helping them out.

Our senior most teacher used to tell us that just like a small pebble can disrupt the flow of water, similarly a small negative experience can obstruct the flow of knowledge. Thus our task as teachers and educators was to help find that blockage and clear that away. Then we would be helping the knowledge to once again attain its natural flow.

We recall that during this process out of the thirteen girls we were indeed able to help out ten. To be honest, we ourselves learned so much during the entire process.

During our course we had a very detailed and elaborate discussion on 'the right to education act'. According to the prescribed law the teacher is supposed to teach each student in the class with equal care and attention. As a teacher your orientation and behavior towards each child in the class should be based on equality. Despite these various considerations it has been observed that, there are some students who are able to understand concepts better and much quicker while there are many who learn slowly and take time to understand concepts properly. There are some students who are able to understand many concepts within a small time while there are many students who are only able to

understand very less concepts in the same time span. The question that arises at this juncture is, in such circumstances what should a teacher do, what shall be his method of work?

Should children be taught at their own specific learning speeds and capacities, should the tools by which they understand in the best possible manner be implemented for the process of teaching? These were the questions that we were now facing. Because of this project work which had been an important part of our own curriculum, we have been able to raise many questions as well as find answers too many questions whose answers we possibly could not have found otherwise. The children who have not been able to learn, there is an immediate and urgent need to work with those children at a deeper level.

The amount of time that we had been given for this designated task was now coming to an end; we had completed our fifty periods with the girls. But because of the fact that still we have not been able to complete the syllabus in the given course, we are going to continue doing our work here with the girls. It is during this time that we sometimes do happen to meet Hina, Rashida and Samreen. We have heart to heart informal conversations with them and on some rare occasions when they are in the mood and in the correct framework of mind-we also solve some mathematical problems with them.

We know that success is still a distant dream but the fact that we are trying our best is in itself filling our hearts with immense amount of satisfaction and peace.

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