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Teaching Statement

of Manjil P. Saikia

Mathematics is a fun and useful subject to learn. However, these two aspects of the subject are sometimes submerged in a quagmire of abstraction. An essential part of my teaching would be to remind students about these aspects while also imparting in them, a desire to know more.

I like to start the first class/lecture with a puzzle or an important but easily stated mathematical result, which the students will be able to solve or prove efficiently by the end of the course. For example, a first course in graph theory could start with several different magic tricks involving playing cards, where no sophisticated background is necessary to decipher the trick. This, in my view addresses both the 'fun', as well as the 'usefulness' aspect of the subject. It helps the students stay attentive to the material for them to solve the initial puzzle or problem by the end of the course. It also gives a sense of accomplishment after the entire course is completed when students are themselves able to solve this seemingly intractable problem in the beginning of the course.

In the past, I have tried to learn and remember several tricks I have seen good teachers use, which I would like to implement in my own teaching. For instance, I was very impressed by a teacher, who used to write one or two problems in the board before the beginning of each lecture and would announce that whoever solved them would be rewarded with books or chocolates. Usually, the solutions could be found by paying close attention to the lecture where he would surreptitiously give hints to solve the problems. Once, we figured this out, we were very attentive in his lectures and as a result it was one of the most memorable course I have taken in my student years.

An important aspect which I would like to achieve in my classroom is to have a good interaction with the students. This, I hope can be achieved by discussing problems at appropriate points in time during the lectures, as well as by encouraging questions from the students. Of course, my enthusiasm for mathematics would be directly proportional to the audience interaction in my lectures. This enthusiasm is what I would like to show my students in every class, and thereby hope to encourage them to delve more into the subject. With a blended teaching mode, there are now more tools than ever to do live interactions of this sort, inlcuding but not limited to online live polls, graphics, etc.

Overall, I would strive to show mathematics as a human subject, where the people behind the theorems, lemmas and conjectures are not forgotten. I try to show how a concrete theory, in most cases began with a single remarkable result, which then was extended or generalized by several people to create the beautiful mathematics that the students learn.

I have been actively involved in Olympiad training camps at various centers across North-East India since 2008. These camps are for high school students, who wish to participate in Indian mathematical Olympiads. Although the camps usually last for a week, I have gone on to interact

with the students even after the camps ended, and I have had memorable experiences in these camps. It was through them that I first understood how much I loved to teach.

During my graduate studies I didn't have any specific teaching opportunity apart from filling in for two professors for a lecture each. However, I tried to give several seminar talks at our weekly combinatorics working group seminar, as well as at the Vienna Discrete Mathematics seminar. Usually, the topics are based on one's own research, but I have also given talks about the background of my research topic which were aimed at mostly masters students and were very well received. In addition to these, I have given several introductory talks at various seminar courses in the Faculty of Mathematics at the University of Vienna, which were attended by both bachelors' and masters' students.

In my postdoctoral years at Cardiff University, I had few opportunities to interact with students face-to-face due to the ongoing COVID-19 pandemic. But this also allowed me to branch out and try new tools for teaching in an online mode to some undergraduate students that I mentor in India. This year (in 2022) I assisted in the Foundations of Mathematics II course for first year undergraduate students. Although I was not in charge of directing the module, but I got the opportunity to interact in-person with students and help them clear their queries in a workshop component of the course (5 hours each week).

Since my undergraduate years in India, I have been very closely associated with several outreach activities for school and college students in Assam, via a web-magazine that I helped co-found and edit, called Gonit Sora (https://gonitsora.com). During the COVID-19 pandemic we branched out and used online tools extensively and reached several hundreds of students all across India via webinars, one-on-one interactions as well as selected topics courses (in combinatorics and number theory).

I am also interested in organizing research-led teaching (possiblt over short-term projects). I have tried this model in a limited way and have so far had several papers published with non-research course students from India. My fields of study, discrete mathematics and number theory gives ample opportunities to do this. Using such an approach also has the added benefit of motivating young students towards research by giving them a closer look and experience at the life of a research mathematician.