My first time teaching a class of students

Even though I have been suffering from a suspected case of whooping cough, I have tried to make hay while it was day. The ILC workshop on 9 July directed me to have a lesson plan – and as of writing I haven't reviewed it yet – while I seized the chance to practice leadership and team-building skills in the water activities day camp on 19 July. In particular, the crucial element of delegation pulsed within me as we put on our thinking caps and figured out how to get everyone on a canoe, or when my Physics partner (a girl) and I raced to catch rubber duckies during the afternoon canoeing session. For a while after the adventure out at sea, I felt that I could conquer my greatest fear.

My greatest fear lies not in difficult students, inadequate preparation, being too ill to teach or anything else of the sort – although if I spoke, I risked coughing and making noise – but in the self-fulfilling, self-perpetuating prophecy of being unfit to teach, and carelessly bringing out the worst in better teachers, jeopardizing their self-image. The next two paragraphs marked the first half of my teaching at the EPYMT course Towards Differential Geometry, and I secretly hoped to lead a miraculously good lesson in the second half.

Like most urban youths, I teach my parents how to operate the computer and mobile device: the word processor, the spreadsheet, the browser and images. I couldn't quite understand why they thought I learnt computer skills at school when I mostly learnt simply through play – trial and error. I found computer things a walk in the park, while my parents considered them akin to rock-climbing in a triathlon. When my mum felt frustrated at me, she would snap at me, saying, "You are a bad teacher."

It was my turn to teach on Thursday, and yet I had postponed preparation until night fell. Everyone told me to sleep more because I had a very bad cough, but I couldn't put down unfinished work at night. As my parents scolded me for staying up, I hastily put together some exercises, including some basic ones and cramming a few others on one page. Some of them turned out to be undoable in class. I did not mean to suffocate the students with difficult exercises, and I regret preparing for class at the last minute. The more senior postgraduate tutors seemed to dominate the class instead, explaining the correct working and peppering the silences with quirk musings linking this course's maths to high-school maths and real-life applications.

Learning to improve

The following week, seeing that I have little time to improve, I began observing the two postgraduate TAs, Gary and Marco, for good teaching practices before it was my turn. There were four TAs in each tutorial group. It wasn’t long before I found some.

On Monday, Gary broke down a certain quantity’s calculation into four simple steps. Marco explained how differential geometry connected with physics and his work. Even though I couldn’t speak without inducing a coughing fit, I found it very illuminating to jot down on the whiteboard mathematicians’ names, special mathematical terms and simple diagrams as Marco said them, freeing his arms to gesture extemporaneously.

T is for Tuesday and for teamwork in action, and we didn't expect it. A bee got trapped in an overhead lamp, and although I wasn't scared, having had close encounters with such dangerous insects, it wasn't the case for the rest of the class. Gary and Jojo tried to get the bee out of the room, stationing chairs one on the rightmost entrance and another on the left (the tutorial classroom had only two doors at the back), and when the bee eventually got out, they shut the doors together instantly. "Phew! That was so close," I think they said. I, in turn, find it very revealing to observe the chemistry demonstrated in such "times of crisis", not unlike in the risky water camp. We reviewed concepts with the students in a piecemeal fashion, rather unsystematically. I wish for moments like that to be the norm during the tutorials.

The highlight of the entire teaching experience: EPYMT's annual guest lectures. This time our guest lecture took up a good part of the tutorial, and it left me with an hour before and an hour after the lecture. To give them a break from the tenuous (and to them, seemingly pointless and non-school-syllabus) calculations, in the first hour I played a film, "Mesh", by filmmaker Beau Janzen and mathematician Konrad Polthier, to illustrate how the differential geometric concepts they learnt, such as various types of curvature, applies to real-life computer modelling and visualization. (In the final tutorial, Gary also showed us samples of his research work involving meshes of patients' brains and blood vessels and objects used in computer graphics by the research team he belongs to, and explained to us how calculating the curvature helped analyze medical data and study computer vision.)

In the hour afterwards, we returned to classwork, and realized that one of our tutorial group's students, a F.3 girl, had not learnt any calculus at all, and doodled her time away instead of doing any exercises. Horrified and bewildered, we asked each other, "How did she pass the admission test and make it here?" So Jojo, the remaining tutor among us and the least learned in differential geometry, but a gifted maths student herself, gave her a crash course in differentiation and integration. Even though I was observing at a distance, I could see the student wincing and struggling to feed her mind concepts too advanced at her stage.

There were two quizzes and a concluding examination. Our group was responsible for setting the second quiz. To help the students study for the second quiz, I prepared very standard questions, some of which have answers in the notes, and when a student asked for more drills, I came up on the spot with some extra questions at hand. Even though I printed my final set of notes early, I again forgot to provide answers for questions not mentioned in the notes. Although students could go home and check their answers against online tools such as Wolfram|Alpha, the biggest drawback of not giving answers to check was that I couldn't tell in class if the students understood the material, especially those who dared not ask questions, and help them immediately. After the second quiz following my last class I taught, I remembered that one of the answers I gave to an extra question was wrong, but it pertained to the quiz and it was too late to correct it.

I helped mark the papers for the second quiz and the examination, and I found the results rather disappointing. I set the simplest calculation-only question in the second quiz on very basic geometric concepts, and only a handful could answer it correctly – the rest couldn't do the question (and I blame myself for improvising practice exercises for such a question instead of preparing them with answers beforehand – see

previous paragraph), or made elementary mistakes. The examination polarized the students much, much more, and I said while marking the paper of a boy known to have won a mathematics contest, "He will never touch mathematics again if he ever saw his marks."

Moreover, the girl who hadn't learnt calculus ended up among the bottom two of all students in all assessments. She came from a prestigious school, and according to her, her teacher pushed her into this advanced course, and we unanimously thought, "to suffer".

I felt unable to identify with secondary school students under the HKDSE. They had underperformed and didn't ask us questions about the course material – perhaps a sign of apathy towards the course.

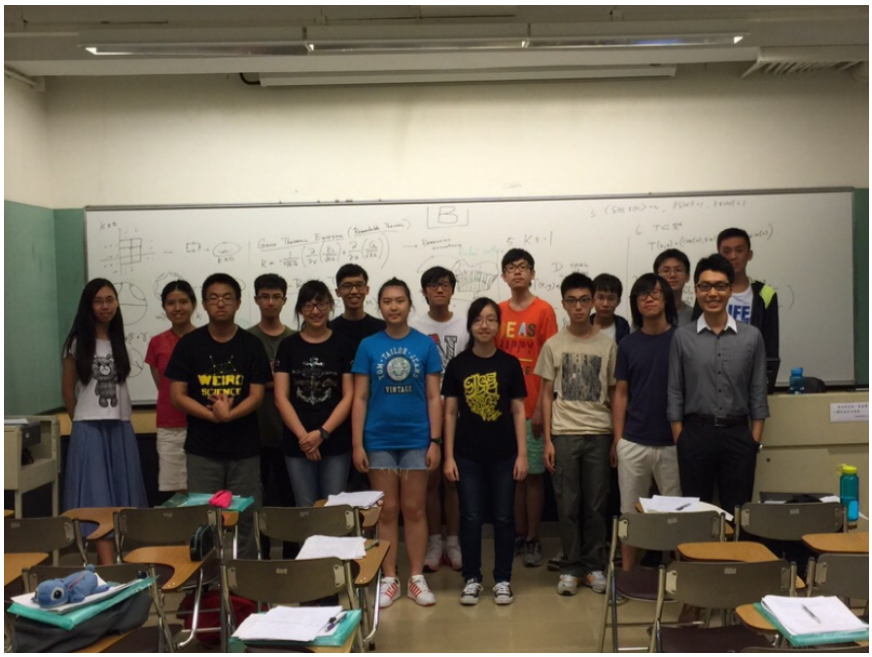
Possible further improvements

Apart from providing answers, I might have sought Gary and Marco's expertise in preparing tutorial exercises and answers, and not kept the task to myself lest another steal my glory – there's nothing to glory about in the end when I'm a novice to teaching. By not seeking help, I denied myself the opportunity to shorten my learning curve. This could have been an excellent opportunity to exercise my desire for teamwork further, trusting the senior TAs for their stories that shaped them into the effective teachers in regular undergraduate tutorials.

On top of that, I have comprehensive resources on fundamental calculus, through which I learnt advanced mathematics earlier than my peers. Had I known early that a student – though each of us were only responsible for three students, she was nevertheless part of our group of twelve – was struggling, I could have provided her with the helpful resource so that she could patch up her understanding at home. Better still, I should have prepared exercises for all levels of ability – with answers.

In addition, unlike in the past, the lecturer in charge of the lectures had compressed the teaching period to just a little over two weeks, so we naturally crammed exercises in our tutorial notes or flew off a tangent (pun intended because tangents are in the course syllabus) talking about real-life applications of differential geometry, neglecting to pay attention to the differing abilities in the group and what turned out to be a lower level of comprehension than expected. It is not wrong to motivate students to appreciate the unreasonable effectiveness of mathematics, though in retrospect, it did not seem appropriate for us to lay aside concurrently the more pressing aim of complex concept comprehension, course examination excellence and a better overall learning experience for students.

We had a well-behaved class of students, and we appreciated their few but meaningful questions on mathematics and university life, indicating their interest in further studies and beyond. Teachers, newbies or otherwise, do well to remember that students who excel in school – regular, summer and otherwise – are much happier than those who could only derive their pleasure elsewhere.



Our tutorial class
TAs: Jojo (left 1), me (left 2, back row); Gary (right 1 front row), Marco (right 2, front row)