STINT Teaching Sabbatical 2018 (2017)
Final Report

School of Biological Sciences, NTU

Nanyang Technological University Singapore

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I had the opportunity to go for a sabbatical to Nanyang Technical University (NTU). I applied to STINT to be able to go on a sabbatical to learn more about flipped classroom and in particular Team Based Learning (TBL) in large classes, since I have previously set up and run TBL in small classes and the fact that Lund University are planning to run TBL at the medical school in large classes. However I ended up in the School of Biology and teaching in a course called Current Topics in Immunology which had more of a traditional teaching approach with students working in teams and the class size was similar to our immunology classes in Lund. Regardless of my original aim I had a fantastic time and learned new things and had time to reflect over teaching immunology and teaching in general.

The School of Biology was founded in 2002 which makes it a relatively new faculty. My impression is that they have brought in leading scientists from overseas in biomedical science and cell biology, which also are interested in teaching. The School of Biology holds 45-50 principal investigators and 6-7 of these are in the field of immunology. Their aim is to provide students with hands-on training on state of the art techniques and high quality research at both undergraduate and graduate level. They have a 4-year bachelor honors program in biology as well as several biology double degree programs including Psychology, Structure Biology, Pharmacology, Food Science, Medical Chemistry, Biomedical Materials and Chinese Medicine in conjunction with the Beijing University of Chinese Medicine in China. The students have several mandatory courses as well a large portion of selected courses. To be able to receive a Bachelor degree the students need to obtain a minimum of 131 Academic Units (AU) over four years and they are expected to perform undergraduate research in a research lab. After graduation the students take on careers not only in the medical field or becoming a research scientist, some are found in the public sector, such as in banking and finance and also as postgraduates at the National Institute of Education (NIE).

Preparation and Planning

I contacted my host Associate Professor Su I-Hsin in February 2017 and went for a weeklong planning trip in the beginning of April 2017. Since I was pregnant with my daughter I had to postpone my sabbatical to 2018, which was not a problem for my host and we planned from the start for my arrival in the fall of 2018.

During the planning trip we planned the teaching and went through the course as it was in 2017. I know others had have more of a choice of different course and modules, but since STINT is only in the fall it was straightforward that I was going to be involved in the advanced immunology course and co-direct with Associate Professor I-Hsin. The course had run for some years and the set up was already there. I had influence on my lectures, tutorials, papers I selected for the T cell topic for the student presentations and the final exam. During the week, we had several fruitful discussions regarding both teaching and science in general as well as being in academia. Associate Professor I-Hsin is an amazing host and took excellent care of me during this week as

well as during my sabbatical. She introduced me to several of the teachers on the course as well as researchers in my field. She also invited me for Taiwan Tea in her office, a long procedure compared to my normal tea but much more pleasant and tasty. During the week she also took me out for dinner and showed me the local mall and where to go grocery shopping, faculty bus on campus, North Spine for lunch etc.

For administration and general things I was taken care of by Ms Sophia Li Hui, who also helped out during the sabbatical for practical things as well as organized requests from the STINT fellows like a tour of the library, visit to NUS etc. During the week I also had a chance to meet with vice president of international affairs Prof Er Meng Hwa, whom informed us about NTU. I also had an opportunity to meet with the housing at NTU and I had a tour around the campus to look at different apartments. In the beginning I chose a large standard 2-bedroom flat with a proper kitchen, but in the end I went for the smaller version with a kitchenette, which worked fine for our stay.

An overview of the NTU campus including housings for faculty, toddlers room and NTU swimming pool.

Our flat was located on the 2nd floor, which meant that we had cockroaches visiting, however the elevator was out several times during our stay so it was easier to carry a stroller two floors than thirteen. Overall I think our flat was well equipped and much nicer than those I was viewing on the planning trip.

Since I already knew at the point of my planning trip that I will bring a 9 months old daughter with me I also took time to localize the nearest Ikea, since the flat is furnished but not for children which meant I needed to get a high chair, a bed etc. for my daughter. I also visited the larger grocery store to

see what kind of assortment of baby food they had. Since most people with children in Singapore has a maid who cooks separately for the babies, the range of baby food was very limited. I am glad I did this and therefore I brought a lot of baby food like baby cereal and pouches, the later a lifesaver on the metro. However, I could see a change in this towards the end of our stay as most of the stores started to increase their assortment of baby food.

Taking the metro, the NTU campus is approximately located 60-90 min away from central Singapore and is an amazingly green and hilly campus with a swimming pool and multiple playgrounds as well as small grocery stores, which surprisingly has the same price range as their bigger stores at Pioneer/Boon lay. NTU has also a faculty club, toddler's room and a reading room free to use for faculty members and their families. Every weekend and public holidays there were also a special faculty bus taking faculty members and their families to Boon lay so they could do their weekly shopping.

Tasks and Responsibilities

I have been mainly involved in the course Current Topics of Immunology, where I acted as co-director together with my host Associate Professor Su I-Hsin. Current Topics of Immunology (BS4004), which is a selectable course for the bachelor programs in biology as well as elected selectable course for graduate students and runs every fall semester. Prior to taking this course the students need to have passed an elective basic immunology course (which runs every spring semester) and an advanced mandatory course in molecular and cell biology. The students (total 30 students in 2018, normally 18-24) were a mixture of PhD students, graduate and undergraduate students including 5 exchange students from the Netherlands, Germany and Denmark. They were divided into five different teams and expected to learn how to critically review scientific findings in the field of immunology and ask valid scientific questions. A few students were also already working on research projects in different immunology labs. My host I-Hsin had two of the undergraduate students working in her lab from the course, which was very valuable for me to get a student's perspective on the course. The course is examined by both tasks and a final open book exam, the latter format a new experience for me. Several other courses that the students could select did not have a final written exam. According to I-Hsin this could be one of the reasons it was hard to recruit students to the course, but on the other hand you got students who were more motivated to study.

The teachers on the course were international and reflected the aim of SBS. We had one teacher who himself had graduated from NTU and his title included Nanyang. I guess this reflects on their proudness of being a young successful university, which has been successfully bringing up great scientists and teachers. We were 8 teachers plus teaching assistants and all teachers were teaching in their respective research area, which is similar to what we do in Lund as well. So students will experience frontline Immunology research and overall I felt it was very similar both on level and content to what we are doing in Lund. Except that our students in Lund only has a single course and

the students at NTU are doing several parallel courses as well as research work in a lab.

Current Topics of Immunology totals 3 Academic units (AU). One AU equals 1 hour of lecture/tutorial per week or 3 hours of labwork per week. Each semester includes 13 teaching weeks and 3 weeks of revision and examinations. As mentioned before, students normally take 4-5 courses at the same time during one semester.

Current topics of Immunology consisted of 20 hours of lectures in 5 topics. The topics included innate immunity, T cell biology, B cell biology, tumor immunology and mucosal immunology. The students also had tutorials as well as presentations of research articles and a research proposal.

I had lectures in T cell biology, gave tutorials and was part of all student presentations and research proposals. I also wrote exam questions for the final exam as well as marked these exams. I had the opportunity to follow the other teacher's lectures which was a great when planning my own, which I wish I had the time to do in Sweden. It makes things much easier when you know what has been discussed previously in other lectures and you can then easily refer to what was said by other teachers, thereby avoiding too much repetition and build on to their topics.

All lectures were recorded and posted online on Blackboard for the course and kept for max 2 years. I have heard from other courses, especially larger courses at NTU that students tend to rather watch lectures online rather than showing up in class and this became more prominent throughout the course. In Lund, we have similar issues with students not tending to show up at lectures and this also increases during the semester. This occurs despite the fact that we do not record our lectures, but of course they have access to handouts. On our course most students tended to attend class during the whole semester, which we did not anticipate due to the above mentioned reason, and other years they had seen the same trend. However, I was surprised to see that students did not show up all the time for tutorials or presentations, these were not recorded or mandatory so by not showing up they missed out on important discussions and marks. Back home we ensure that the student participates in student activities by making it mandatory; here it was more about the students missing out on a part of the grade, which apparently was not a big deal for the students.

The format of the course focused on tutorials and the different student teams presenting research papers and their own research proposals, which enabled me to co-teach, which I thought was good since otherwise it had been more or less the same as in Lund.

Besides the lectures the students had once-a-week tutorials, here I was amazed by the fact the students only got credited for 1 hour but we were scheduled for 2 hours. What I could understand the students did not complain and 90 % of the time we used that extra hour. In Sweden the students would have definitely complained. Another thing was the schedule, which sometimes

jumped from applied immunology to more cellular immunology and the reason for this was that it was scheduled around when teachers were available since the teachers are top scientists, thus travelling abroad or engaged with other things. Again I never heard any students complain and I know this would be a major complaint back home.

We had 5 tutorials before the teams presented their articles and most of them involved a teacher presenting a research article followed by a discussion with a more or less active class. In mine I did it differently; I made the students read some reviews about the subject and combined it with lectures given by other teachers as well as mine and gave the teams a task to discuss and present on the whiteboard so more of a flip class room approach. Since I knew the students were quiet, at least on lectures, and asked none or very few questions it was a bit nervous and of course there were no whiteboard pens as well. But I had a fantastic teaching assistant, who went and got a pen to each group and after a few minutes discussions where ongoing and it turned out very well with great discussions and presentations on the whiteboards. However, I never managed to find out if the students liked the fact they had to discuss and summarize themselves instead of me summarizing a paper.

One of the tutorial rooms at SBS.

The largest active learning room at Medical School at NTU.which can hold 200 students

At NTU all tutorial rooms have been transformed into fantastic active learning rooms, designed for flipped classroom teaching and student interaction with no typical orientation. Screens and whiteboards are placed around the walls and there are round tables for the students to sit in their teams. The most famous building with tutorial rooms at NTU is the Hives, personally I prefer the newer building at North Spine called the Arc. I doubt they were named after the two Swedish bands but great places for students both to have tutorials and studying together on their free time and interact with each other. The SBS had their own tutorial rooms as well as most schools had their own. NTU has made a great economial investment to remodel all of their tutorial rooms from normal small class rooms into these fantastic high tech active learning rooms.

To the left the Hives and to the right the Arc

As mentioned before the students were divided into 5 different groups, each group was given the task to present a research article from one of 5 topics and then later on write a research proposal together in their group on the same topic.

One team presented each time slot a research article for 60 min including future perspectives and I and I-Hsin plus the responsible teacher for that subject asked questions during the presentations as well as other students and the teaching assistants. The first team that presented had all team members involved in the presentation and even though we told that it is ok to pick a few of the members for the presentation, since it can be a bit messy to listen to 6 different speakers, all teams did the same thing. It was of course a mix of quality and confidence among the presenters. I think this was the first time I saw students presenting by reading from their smart phones. Overall they did a fantastic job and I am amazed how ambitious the students were. However, it was sometimes a bit surprising to see that neither students not from the team presenting nor from the rest of the class could answer a question regarding something fundamental we had discussed several times in different contexts. I got the impression that sometimes they understood what they presented in that context but not the basics behind it and this I also could see when marking the exams.

After all teams had presented their articles, we had 3-4 meetings with them where they could discuss their research proposals. Afterwards, they submitted them to us and the last thing before the exam they presented them to the expert in the subject and then for the whole class. Again here were many ambitious students and some less active in the teams. It was hard to sometimes understand if all students in the team had been involved in the process or just a few of the members. In the team I had I tried to involve all of the members in the discussion but I could clearly see who had been actively involved in the process. The research proposals were very ambitious and high tech and thought through which resulted in great discussions.

The final exam was an open book exam and had 7 large questions (20 marks each) were the students had to pick 5 of these as answers. The format of the questions included data analysis from papers and then questions based on them, so the student needed to be able to analyze the data presented and knowing the topic, which encouraged the students to apply their knowledge rather than memorizing it. I think the level of difficulty was similar to our closed book exams in Lund. This was the first time I experienced an open book exam, and I could not honestly see a difference in the answers compared to what I am used to in a closed book exam. I think this can be due to that the student only had 3 hours to complete the exam and did not have time to use material they brought if they did. To pass the exam the students only needed 30 % correct answers compared to 60-70 %, which we normally have in Lund to pass. The open book exam made up only 40 % of the whole grade, since the students got 30 % each from the research articles presentation and the research proposals.

Other Activities During the Semester

Besides the Immunology course I was also involved in a PhD course there I gave a lecture about my own research but with more detail introduction to the subject since the students come from different disciplines.

I went also to some of their pedagogical training courses and we, three STINT fellows at NTU had a chance to meet the head of pedagogical training Professor Peter Locker. This was an inspiring and nice meting and gave us the background and how the teachers are trained, but also NTUs vision on active student teaching. I think the teaching training is similar to what we do in Lund except it is joint over the faculties and all PhD students have a mandatory course to take. PhD students has to be a teaching assistant during their PhD. Interestingly how many hours you had to do dependent if you were from Singapore or foreign origin, 100 hours versus 300 hours respectively. When I talked to the teacher assistants it was hard to collect 300 hours, so in general the course directors where quite generous in how they counted these hours.

Besides teaching I was also involved in the lab of I-Hsins Journal-club on Mondays as well as work in progress meeting twice a month with 3 other research groups. SBS also had every Friday at 4 pm a PI talking about hers/his science, which was a fantastic idea and great opportunity to see what science were at SBS. After the PI talks there where happy hour and different lab were hosting this event every Friday. Interestingly here it was mainly PIs and few postdoc and PhD students, the later two categories normally came from the hosting lab. In Sweden this would be rather opposite or more of a mix of all categories. I was also a moderator on the biannual Singaporean Immunology retreat.

Compare and Reflect on the Teaching Experience

In general my impression at NTU is that the students are learning much more by peer learning than I am used to in Sweden.
In our course, current topics in Immunology, the students worked in teams. The teams where constructed so that each team consisted of both senior students in form of PhD students as well undergraduates and graduate students (master students). The weak and strong students where spread through the teams. I guess the weak students were supposed to be helped and tutored by the stronger student in the team. I am not completely convinced that this was the case in reality.

The topics and framework in the course were very similar to our own course at Lund University so that was familiar. The big difference is that the students are also at the same time taking at least four other courses and our students in Lund are full time students on the immunology course. The amount of teacher-lead time per week is the same at both places, which means that the students at NTU have less time to prepare since they also have other classes running in parallel. It took me some time to understand why sometimes these

ambitious students had not started on an assignment but after a while I realized that the other courses they were taken had deadlines before ours and no student missed a deadline in my knowledge. My impression is that the students were much more ambitious and spent most of their time studying and even on recess weeks and weekends and evenings they were at the campus studying. However they were also much more quiet in traditional lectures than back in Sweden, but in team exercises and presentations they were at least the same as Swedish students if not even more active.

However I also saw a gap in knowledge in some students so maybe it was too high a level for some of them and the peer learning method did not always benefit the weaker students. I think the weaker students would benefit more if they were given some extra support and follow up since they were already known as weaker students prior to the course. The majority of students performed well and I was impressed by their ability to discuss and critically review current topics in Immunology.

One thing I really enjoyed was that the teams when presenting their research article also presented suggestions for future experiments in the end and directions of the research. This they also used later on in the research proposal.

Overall I thought also the students were very confident speakers compared to the average student in Sweden.

The students were much more homogenous cohort and all around their early twenties, where the student population is more heterogeneous in Sweden.

Action Plan

I have already implemented TBL in the teaching at LU and included similar approaches as I have observed at NTU medical school. For instance I have approached the whole class discussion of the ready assurance test (tRAT) by the different teams revealing their answers by showing signs instead of more commonly used at LU scratch cards. I think this is a great way to get the students to argue why they pick their answers and get more discussions.
Another favorite thing I saw when I observed TBL at the medical school was the fact the student could ask questions on the topic in the end of ready assurance test and this was called burning questions. This I have taken with me and introduced in our TBL and I think it is very useful since I am as a facilitator not the expert on all topics in immunology. So here I ask the students for questions they have in the different teams and then I divide them through the teams so the students themselves first have a chance to work on them and find a solution for them and simultaneously I discuss these questions with the experts in the topic. During the discussions of applied assignment I let the students first present their answers and then experts confirm or add things so the students feel comfortable that they have gotten the right answers to their questions.

One of the teachers included her own research article for the student presentations and before the team presented I was a bit worried to be honest since in Asia there they have a lot of more hierarchy than I am used to in Sweden. However, I think it worked very well in the end and also I think it was a great opportunity to hear the background story and the review process for the students that they normally would not have and the students did a great job.

Another thing I will try to use with the article presentations by the students is the fact that they ended their presentations with future experiments and directions, which I believe made them think even deeper and encouraged them to search and read more in this research area and not just focus on the article itself, which also meant a greater understanding of the science as a whole.

In Lund, we have had in the past students preparing research proposals as a team, but later changed to students doing them individually. I am not sure if I am convinced to do it in a team since it is hard to make sure all students take part in the discussion and the preparations, which was one of the reasons we changed to individual work instead. In my group at NTU I could clearly distinguish the students that had been active and understood the ideas and the science from the ones who had been less active. At NTU students were marked by their performance individually even though they presented the research proposal as a team. I think it is always hard to mark students individually when they have done a team effort and I think if we go back to this method it has to be as an unmarked assignment and make sure that all students actively take part in the assignment. One thing I like and will take with me is that the students based the research proposal on the article they presented even though they were free to pick anything that has not been published. I feel since we have it open in our assignment that the students sometimes are overwhelmed with the assignment and here the students could use a research article and have it as a base and not feeling lost.

I have already discussed my experience with potential future STINT candidates at LU and I have presented my experience of TBL at NTU at a general teaching conference at LU. I hope to be able to share more of my experience in the future at different forums. We had also a chance to share our experience with a delegation from Högskolan Väst, who came and visit us at NTU as well I have had a chance to show NTU for a colleague from Lund who were visiting NUS for a scientific collaboration.

Finally, I think being at NTU also gave me a great opportunity to discuss how teaching are done at different universities and faculties in Sweden both on our weekly meetings among NTU STINT fellows as well in Hong Kong on our half time meeting with all STINT fellows in Asia.

Acknowledgment

I would like to first give my gratitude to STINT for giving me the opportunity to go to NTU and Singapore for a sabbatical. I would like to thank my fantastic host I-Hsin and Sophia for their help during my visit. Finally I would like to thank my mother who came with me to baby sit my daughter and made it possible for me to go. And the other two STINT fellows and their families at NTU for great friendship and our Tuesday night dinners at different canteens.