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Report from my Teaching Sabbatical in Singapore at Nanyang Technological University (NTU) and Lee Kong Chian (LKC) School of Medicine

Setting

Nanyang Technological University (NTU) is one of two universities in Singapore. As a research-intensive public university, NTU has 33,500 undergraduate and postgraduate students in the colleges of Engineering, Business, Science, and Humanities, Arts, & Social Sciences. NTU is home to several world-class autonomous institutes. Besides the main Yunnan Garden campus, NTU also has a satellite campus in Singapore's science and tech hub, one-north, and a third campus in Novena, Singapore's medical district.

NTU has a new medical school, the Lee Kong Chian School of Medicine (LKC Medicine), which is a partnership between NTU and Imperial College in London. Graduates of the five-year undergraduate medical degree program that begins in 2013 will have a strong understanding of the scientific basis of medicine, along with interdisciplinary subjects including business management, humanities and technology. The School's primary clinical partner is the National Healthcare Group, a leader in public healthcare recognized for the quality of its medical expertise, facilities and teaching. The school aims to be a future model for innovative medical education, and has a strong emphasis on Team Based Learning (TBL) and e-learning.

Preparation and planning

Listed below is a brief description of how the activities at the foreign institution were planned ahead of arrival.

- Participating in TBL-sessions in course “Introduction to medical sciences” as a content expert and co-teacher.
- Participating in TBL preparatory activities related to work with assessment and application exercises.
- Co-teaching in practical's, and the development of work concerning student guides.
- Co-teaching in clinical settings during Policlinic week and Hospital week.
- Educational research and development activities, on professionalism, touch-table, curriculum mapping, clinical teaching in primary care.
- Engagement in faculty development.
- Scheduled meetings with member's from faculty office and board of LKC Medicine, for example;

- Executive Vice Dean Prof Lionel Lee,
- Vice Dean Assoc Prof Naomi Low-Beer,
- Assistant Dean Assoc Prof Katharine Boursicot.
- Visit to Duke-NUS medical education and participate in TBL activities.
- Visit department for Medical Informatics at NTU.
- Staff meetings at faculty office.
- Taking part in application activities for new applicants.
- Taking part in startup activities for the new student cohort of 74 students.
- Involving in social activities LKCmedicine and NTU.
- Involving in general academic activities at NTU.

Strategies to maximize the personal and institutional outcomes of the teaching sabbatical

- Working as a co-teacher rather than teacher.
- Following student activities at year 1 and 2, in a week to week basis.
- Engaging in educational research and development.
- Engaging in faculty development and related interest.
- Involving with clinical related teaching and in future clinical settings for teaching in year 3 and 4.
- Trying to get a broad view on NTU and the Singapore academic system.
- Involving administration and management activities.
- Involving to a part other universities in the region.
- Social and informal interaction with colleagues, management and administration.
- Connecting to KI in networking efforts, e.g. the connecting curriculum mapping project.
- Blog with continuingly reporting at home website.

Tasks and responsibilities

My position and work responsibilities at NTU were carried out individually or in cooperation with local resources. I was addressing the ongoing courses on fall 2014 which were year 1 and 2 in the recently started medical program at LKCmedicine. Year 1 comprises about 50 students, and year 2 about 75. Both cohorts were divided into TBL-groups of about 8 students.

Ongoing mayor courses in the period in year 1 were; “Introduction to medical sciences (C0)” and “Cardiorespiratory (C1)”, and in year 2; “GI, Blood, Infection (C3)” and “Neuro, ENT & Eyes (C4)”.

As a co-teacher and complementary content expert in the ongoing courses my task was mainly to be involved in:

- *Team Based Learning (TBL) activities*. These sessions are usually led by a facilitator without specific content knowledge, and supported by 2-4 content experts from relevant disciplines, where my orientation to general medicine and primary care in most cases were useful as a complementary content expertise.
- *“Practical seminars”*, e.g. biochemical labs. The practical’s were most of the times including a clear clinical part, as the function system based blocks integrated both normal and pathological content, and therefore my contribution

were useful and welcomed from a primary care perspective. My responsibility was in a way to include some clinical perspective in each seminar.

- “*Integrated clinical practice teaching*”, e.g. simulated patient interaction, no specific responsibility were apparent.
- *Introductory teaching in clinical settings*, i.e. the “Polyclinic week”, responsible for, at this stage of the educating, a limited international perspective to clinical work.

My task were also involving in revising and improving assessment and application material, in line with the fact that as all teachers in a TBL based course spend a large part of their time on this. This was mainly addressing the Individual Readiness Assurance (IRA) tests and the Application Exercises (AE). Also some of the Study Material and Guide to practical seminars were consecutively revised. My task included revising IRA and AE at the two main teaching blocks in year 1, and revising student guides in practical’s.

Engaging in educational research and development was also planned as one of my tasks, and in specific on a project in early stage on curriculum mapping. A comprehensive project on curriculum meta-mapping and educational explorative mining was set up in collaboration with Assistant Dean, Sandra Kemp. During my stay I was responsible for setting up a data-base on curriculum content from a wide range of sources, finding and setting up reference models, and meta-mapping (connecting) its content to each other. In a next step activity on year 1 and 2 were mapped to the model in a pilot exercise. Supporting the development of an extensive internal project plan “Curriculum meta-mapping, and teaching and learning exploration” was an included task.

In collaboration with the e-learning unit an educational development oriented project on touch-table to display the curriculum content in student settings and related aspects were addressed, in collaboration with Dr Jason Maroothynaden, involving system development. I participated in the development of an internal project plan and proposal.

A minor part of my tasks engaged in faculty development. In the lead of Katharine Boursicot, Assistant Dean of Research Education, strategies for building and promoting educational research at LKC Medicine were elaborated. Over all issues related to faculty development were also addressed in occasionally meetings with members of board of LKC Medicine at different levels.

Finally a part of my tasks were, as for other teachers, to be involved in general and social academic activities at LKC Medicine and at NTU, both from an academic point of view but also from a social and working environmental point of view.

Activities during the semester

Summary of the main activities carried out at the foreign institution, including how you have participated in other activities than (co-)teaching your own course(s).

Content expert and co-teacher in “Introduction to medical sciences” and “Cardiorespiratory” in year 1, and in “GI, Blood & Infection” and “Neuro, ENT & Eyes” in year 2.

- Co-teacher and complementary content expert in several whole day TBL sessions, in collaboration with 3-4 experts normally involved on site. This requires pre-

work days ahead on study material, RA-tests, AE exercises, and sometimes into the scientific literature. Totally involved in up to 15 TBL sessions, normally once a week giving approximately 2 days a week working time. One TBL at National University of Singapore (NUS) involved me merely as an observer. Examples of TBL content are listed below:

- Introduction to Gross Anatomy
- Basic Pharmacology
- Membrane intracellular transport, Fluid compartments & Nerves
- Immunology - Introduction, Immune cells & B lymphocytes
- Basic Pharmacology: Anti-emetics & Anti-ulcer drugs
- Anatomical Nomenclature & Planes, Early Embryology, and Basic Histology
- Overview of the Nervous System
- Homeostatic Regulation of the CVS, the Autonomic Nervous System and Renin-Angiotensin System.
- Cranium and Brain, Brain stem and Cranial Nerves.
- Co-teacher in several “Practical seminars” as exemplified below.
 - In a biochemical lab on “Enzyme Reaction and Kinetics” with a separate reporting seminar, co-teaching, held twice on 27 and 29 August.
 - Introduction to Gross Anatomy, Basic Histology, Introduction to Imaging
 - Spirometry, Lung Volumes and Airway Resistance
- In “Integrated Clinical Practice”, I participated in student activities with simulated patient on:
 - Observing “Clinical Communication Interaction”, a day with structured interviews with simulated patients.
 - Co-teaching in “Clinical Encounter”, a whole day with simulated patients at board, on Abdominal Pain Simulation.
- In introductory “Teaching in clinical settings”, I was a co-teacher during the “Polyclinic week” at and the “Hospital week” in year 1. Polyclinic week teaching and tutoring took place at Butik Batok Polyclinic, with seminars on roles of the GP and allied health care workers, patient satisfaction, organization of health care and individual presentations. In the hospital week at Tan Tock Seng Hospital visits on different boards, and patient simulated seminars were held.
- Seminar on integrated course “Scientific Enquiry and Special Study”, year 1, co-teacher 25 August.

Revising and improving assessment and application exercise material.

- TBL activities related to work with Individual Readiness Assurance (IRA) tests and Application Exercises (AE). For example revising IRA and AE at the two main teaching blocks year 1 “Introduction to Medical Sciences” (C1) and “Cardio-respiratory” (C2).
- Revising “Practical’s” on content and development work on the related student guides. For example revising and developing student guide to practical 1 in C2; “Measurement of Lung Volumes, Airway Resistance and Respiratory Parameters”, and here also adding a proposal for practical simulation of asthma and chronic respiratory failure using simple devices.

Educational research and development on e-learning and curriculum mapping.

- A comprehensive project on curriculum meta-mapping and educational explorative mining is set up in collaboration with Assistant Dean Dr Sandra

Kemp. On a weekly basis project meetings, from September and throughout the period.

- A developmental project on exploring curriculum content using touch-table device in student settings, involving system development in collaboration with Dr Jason Maroothynanden.
- Visit to e-learning developmental department at NTU.
- Participating in a half-day workshop on TBL principles and methods, for teachers.
- Observing 2 specific TBL-sessions year 2 from the perspective of evaluating student's participation and engagement.

Visit to clinical settings

- Visit to S:t Elisabeth Hospital, breast clinic, accompanying a patient.
- Visiting the clinical working sites at Bukit Batoc Polyclinic with Dr Wang.

Observing Multiple Mini Interviews (MMI) and other application activities for new applicants.

- Joining student and parent information before and after applicant interviews.
- Visiting student at MMI, during the planning visit.
- Information and inspiration lecture for new possible applicant, including dinner, titled "Innovation in Healthcare" by Professor the Lord Ara Darzi of Denham. Hotel Inn Singapore, 1 September.

Involvement in general academic activities at NTU and LKC Medicine.

- Engagement in faculty development and university lead, and meetings with representatives related to the Governing Board of LKC Medicine.
 - Welcoming breakfast with Dean Prof. James Best.
 - Introductory meeting with Executive Vice Dean Prof. Lionel Lee.
 - Several skype- and onsite meetings with Vice Dean Naomi Low-Ber, on overall planning and collaboration.
 - Governing Board Member Prof. Jan Carlstedt-Duke, meeting on e-learning.
 - NTU President Prof. Bertil Andersson
 - James Stratford-Martin from Imperial College, on curriculum mapping and analysis.
- Startup and on hand collaborative meetings with Assistant Deans; Katharine Boursicot, Sandra Kemp, Wong Teck Yee and Mike Ferenzi.
- Administrative meetings and continuously contacts with Assistant Director Serene Loy on administrative issues such as applying for Working Pass, and Request for letter waiver to provide Letter of Guarantee to Inland Revenue Authority.
- Taking part in startup activities for the new student cohort of 74 students.
 - Welcome dinner at Novena campus with the new cohort of students.
 - Attending the "LKC Medicine White Coat Ceremony" with networking dinner at NTU, an occasion reported at national television news.
- Participating in the "Three Planting Ceremony", at the LKC Medicine on 14 August to mark the contributions of its two parent universities, performed by Bertil Andersson President of NTU and Sir Keith O'Nions President of Imperial College London.
- Interview with editor of "The LKC Medicine" writing a profiling article on me and the STING program on the NTU internal Webb and for the internal LKC Medicine

news magazine. The report is available at:

http://enewsletter.ntu.edu.sg/thelkcmedicine/Issue14/Pages/PROFILE_Generalist-approach-brings-Professor-Gunnar-Nilsson-far.aspx

- Participating in the Staff and Student Games Day.

Involvement in social related activities with academic staff at LKC Medicine, NTU and other organizations.

- Debriefing and reflecting weekly at Fridays from 5 to about 7 pm (TGIF), on one occasion hosted by myself.
- Walking long distance two weekends with colleagues at MacRitchie Reservoir and Labrador Nature Reserve.
- One night out with colleagues from LKC Medicine at Raffels Hotel.
- Good-by dinner for a college from UK at Wine Company at Dempsey Hill.
- Private dinner with a colleague at LKC Medicine including families.
- Private BBQ hosted by a colleague, for academic staff.
- Faculty party (Caribbean Dinner and Dance) at Mandarin Orchard.
- Dinner with a STINT-fellow at NTU.
- Joining the LKC Medicine badminton team in the NTU championship, with training session and match.
- Lunches out with colleagues at office of Faculty Affairs about every second week.
- My own good-by dinner with colleagues.

Involving with other universities and related organizations

- Visit to NUS and specifically the Duke-NUS medical education.
 - o One day TBL observation in interaction with facilitators and content experts.
 - o Debriefing meeting with Senior Associate Dean Sandy Cook.
- On inquiry writing an application for the currently announced position as Pro Vice-Chancellor at the University of Queensland (UQ), in Brisbane Australia. This was followed by two extensive telephone interviews, including Deputy Vice-Cancellor, and a not taken preliminary invitation to meetings on site at UQ.
- Extensive interview with Editor Matt McFarland at The Washington Post on future perspectives of clinical and academic aspects and Medical Informatics. (See further “The incredible potential and dangers of data mining health records”, Washington Post, October 20, 2014.)
- Nobel reception at the Swedish Embassy Residence, in companion with among others the President at NTU and the Dean of LKC Medicine.

Contacts with home university

- Blogging at on home university website. Several informative and reflective submissions from my visit at LKC Medicine to the “Teachers blog” at Center for Family Medicine (CeFAM) at Stockholm County Council / Karolinska Institutet. Available at: <http://cefam-larandeblogg.blogspot.se/>.
- Two meetings with my head at the County Council, Mikael Ohrling CEO at Stockholm County Council Health Care Services, on site, during a conference held by “Health Information Management Systems Society” in Singapore 15-18 Sept.
- Meeting at NTU with Emeritus Dean of Research at Karolinska Institutet (KI), Professor Jan Carlstedt-Duke.

- Telephone conferences planning 2015, with the incoming Dean of Higher Education at KI.
- Dinner with Dean of Research Education at KI Anders Gustafsson and other representatives from KI, during a visit to NTU in late October on collaboration in research education.
- On a weekly basis responding to mandatory e-mails from KI and Stockholm Count Council.

Important lessons

The knowledge of importance for my role as leader, teacher and researcher gained during my stay at NTU can be summarized as follows.

The complexity of internationalization

Although the primary aim of the teaching sabbatical is professional (and listed below) there are several other perspectives that are essential and strongly supportive to the insights and lessons learned. Personal as well as social, cultural, political, emotional, practical and physical aspects all together frameworks the deeper knowledge I gained during my teaching sabbatical.

Constructivist pedagogic approach and the flipped classroom

This emerging and future pedagogic approach can be a basis for an entire medical program. Future implementing strategies should include strong emphasis on e-learning. Reforming traditional teaching in higher education to pedagogic model based on the flipped classroom is somewhat problematic.

TBL

Adapted and contextualized ways to implement and use the TBL approach are possible and advisable. Recourses are not smaller compared to traditional teaching. There are several essential requirements for its implementation, such as well educated facilitators. TBL takes teacher a bit out of their comfort zone. A somewhat different approach to TBL was taken at Duke-NUS.

Clinical teaching at hospital and primary care

Developing clinical teaching is demanding and requires a strong clinical partner and is strongly depending on the parallel development of health care in hospitals and in primary care oriented organizations.

Assessment

Formative and summative consecutive assessments works well within the TBL approach. However, these are usually complemented by non-TBL summative exams at the end of a semester or course.

Structured vs. opportunistic clinical teaching

Structured clinical teaching is not easily implemented in clinical years, and also an arguable concept among medical teachers.

E-learning

A comprehensive implementation of e-learning is demanding on costs, and is labor intensive. Several aspects such as a program based portfolio, student evaluation, assessments are possible to computerize among students today.

Educational research and curriculum mapping

Learning analytics needs a well and throughout mapped curriculum which is rarely found in medical education. Mapping of education activities and outcomes are fundamental to constructive alignment and quality work.

Leadership

Most universities such as NTU and UQ are setting up comprehensive and overarching centers for teaching and learning development.

Comparison between the foreign and the home Karolinska Institutet

Striking differences and similarities between medical education in Sweden and LKCMedicine, and related possibilities for changes in teaching and learning, can be summarized as follows.

Student population

- Younger (18-22), more conform, even distribution between sexes, not on age until 21, only exceptional having an family, not part time working.

The relation between research and education

- Consistently content experts from research at TBL.
- Research lab in same unit as research (same corridor).
- Research education just started.

The relation between teacher and student

- A bit formal at year 1 and 2.
- In clinical settings possibly a bit authoritarian.
- Clinical educational environment depending on the health care system, which is more business orientated.
- Involvement of parents, as the normal financer of approx. xx fee per year.

The institution's view of breadth versus specialization in education

- Several integrated courses with breath, e.g. Humanities in medicine, and Medical innovations. Basically LKCMedicine have large breadth courses based on function system, as far as seen during year 1 and 2.

Competence development for teachers

- Strong emphasis on TBL and specific teaching of facilitator as process leading teachers, without content responsibilities.
- Rarely pedagogic continuing education specifically in the medical field, but occasionally at NTU level.

Teacher recruitment

- Many teachers come from UK and Imperial College, but there are also international recruitments.

Pedagogy and its importance

- Strong focus on pedagogy, given by the TBL approach. Organizational division between administration, management and teaching (and research).

The status of pedagogical merits compared to research merits

- PhD and research merits used for teachers' recruitment.
- Some difficulties with evaluating pedagogical merits apart from published educational research.

Curriculum and courses offered

- A more pronounced system based approach compared to KI, i.e. only once a system such as respiratory system is taught in preclinical years, and merely once in clinical teaching.
- 5 year program, compared to 5,5 years in Sweden.
- No longer scientific project as in most medical programs in Sweden.
- Several integrated courses through year 1 to 2, and also all 5 years.
- Limited number of elective or selective teaching units.
- Primary health care have some but limited time in clinical years, and is done in a fast changing health care system.

Forms of examination

- TBL with IRA and GRA, as a requirement for integrated and formative examination at the end of year 1 and 2.
- Structured informal and formal feed-back to students at risk.

To what extent educational programs conform to labor market needs

- The medical program addresses well the needs declared by the government.

Use of technology

- Extensive use of iPad, e-portfolio, computerized student feedback, and other e-learning resources.

Distance education

- Not yet in medicine.

Relation between the institution and its environment

- Close contact with one hospitals and one primary health care centre.
- No contact with private hospitals and rarely to private primary care, although the main future working site for many of today students.

Special investments in education at the institution

- Massive investments in the new medical program at NTU, by the university and by the government.
- Labor intensive administration, management, IT-support and many engaged teachers.

Action plan - topics to address and if possible introduce in Sweden

Personally

- Continuous contact with colleagues at LKCMedicine.
- A collaborative meeting with the LKCMedicine staff at the AMEE conference when held in Helsinki 2016, on site or if possible at KI.
- Further developmental activities related to the flipped classroom and TBL.

For the department

- Presenting insights from the teaching sabbatical to leaders at my Department, and at the Division of Family Medicine that I am heading.
- Working with building insights in the constructivist pedagogic on different levels including course planning, course evaluation and education research projects.

For the institution and for Karolinska Institutet

- Presenting insights from NTU to the Board of Higher Education and related interest bodies at KI.
- Working with implementing the constructivist pedagogic approach in my new role as Pro-Dean of Higher Education.
- Supporting pilot implementation of TBL adapted to specific needs and contextual factors at KI.
- Promote internationalization among teachers in general and distribute information of opportunities such as the STINT teaching sabbatical.

In the Swedish research and education system

- In a long perspective work for the vision that KI is a future model for constructivist pedagogic in medical and health related education.
- At international conferences such as AMEE, and in national frameworks for medical education, present and promote information and research on TBL, the flipped classroom, and related developments in e-learning.