Internationalizing a teaching instance: An example from PhD education

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1) Description of the teaching-/supervision session

I have been the course director for the PhD course "Epidemiology 1: an introduction to Epidemiology" at the Karolinska Institutet (KI) during the past few years. The aim of this course is to provide an introduction of epidemiological theory and practice, to the PhD students at KI, whether or not they are in the PhD program of Epidemiology. The content of the course includes primarily 1) study design, interpretation of results, and analysis, 2) causation, measure of disease occurrence, and measure of association, and 3) evaluation of study validity. The teaching and learning activities include lectures, individual assignment (e.g., reading articles), pair assignment (e.g., exercise during lectures), and group assignment (e.g., design a study and present the study to the entire class). The assessment comprises of different formats, including peer assessment (in giving feedback to each other's performance), presentation of the group assignment (with feedback from the lecturer and fellow students), and a written exam (critically review a scientific article). The below table demonstrates the layout of the course during a 5-day period.

| Schedule for Epidemiology I: An Introduction to Epidemiology					
	Day 1	Day 2	Day 3	Day 4	Day 4
9.15-10.00	Course introduction	Cohort study	Case-control study	Validity	Presentations from group assignment – design a study
10.15-11.00	Inspirational lecture on epidemiology				
11.15-12.00	Causality in Epidemiology		Register-based Studies	Quantify confounding and bias effect	
12.00-13.00	Lunch	Lunch	Lunch	Lunch	Lunch
13.00-13.45	Causality in Epidemiology	Feedback on Paper 1 and exercise	Feedback on Paper 2 and exercise	Group assignment – design a study	Exam - Paper 3
14.00-14.45	Study designs in epidemiological research	A real-life example of cohort study	A real-life example of case-control study		Discussion – Paper 3

| 15.00-16.00 | 1. How to review a paper
2. Review Paper 1 | Review Paper 2 | Review Paper 3 and
Group assignment – design a study | | |

The students of the courses are PhD students, primarily from KI, who have a greatly varying background spreading from epidemiology, public health, biostatistics, to clinical medicine, molecular biology, and computer science. Similarly, the participants have varying cultural background, including approximately 50% of the students with a Swedish background, whereas the others from other parts of Europe, Asia, Africa, and elsewhere. The intended learning outcomes include the below that, after successful completion of this course, the students are expected to

- Give examples of the contribution of epidemiology to science and discuss the importance of epidemiology as a research discipline.
- Estimate and interpret measures of disease occurrence and association, as well as describe how a specific measure is governed by study design.
- Explain strengths and weaknesses of common epidemiological study designs.
- Identify and explain possible sources of bias in epidemiological studies.
- Describe theoretical models for causation and discuss the principles of causal mechanisms.
- Apply knowledge of epidemiological concepts when critically reviewing scientific literature.

2) Review

The set-up of the course is very much aimed to be in line with the constructive alignment theory of Professor John B. Biggs (1), where the teacher's intention should be well reflected in and aligned with the intended learning outcomes, the teaching and learning activities, as well as the assessment. In terms of intended learning outcomes, we aimed to approach the entire classification of educational goals, from the lower order of thinking skills to the higher order of thinking skills (Figure), according to Bloom (2) and Anderson and Krathwohl (3). Similarly, the teaching and learning activities are planned so cultivate different ways of learning, through individual-, pair- and group-assignments. These activities are designed to meet different educational goals, starting from memorizing facts (e.g., concepts) to applying knowledge (e.g., calculation of disease occurrence) and creating new ideas and hypotheses (e.g., design a new study with a new hypothesis). These activities are also in alignment with the intended learning outcomes, which vary from memorizing concepts and terminologies to more advanced understanding and application of new knowledge. Finally, the assessment, including peer assessment, group presentation, and the written exam all cover different aspects of the intended learning outcomes.
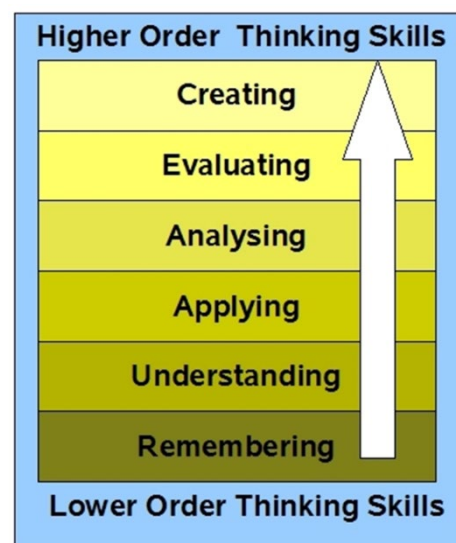
Because the students of this course have greatly varying academic and cultural background, and many of them will eventually start a career outside Sweden, interculturally informed teaching is indeed important (now that it is clear to me after taking this course). Although very few of the students in the course have English as their first language, vast majority of the students have English as a *Lingua Franca* and language is normally not a substantial barrier in teaching and learning in this course. It is however clear that there is still room to improve the English language proficiency of the students (4). Because this is a 5-day course, it is difficult to invest long-term efforts in this regard, however it is possible to intervene in different ways, including 1) providing study materials ahead of the lectures so that students (if needed) where have time to better prepare themselves for the lectures, 2) using different medias to deliver information (e.g., video clips, images, handouts, post-it notes, etc.), 3) less-is-more (i.e., focusing on the key contents and more slowly), and 4) arrange intentionally the groups so that students with less optimal English would have a chance to learn from students with better English.

In addition to language, other improvements could also be helpful. The most interesting one is to set ground rules in the beginning of the course, concerning aspects of mutual respect, confidentiality, equality and diversity (5). These ground rules would make us to agree with each other, already in the beginning of the course, that we acknowledge that we are different in terms of how we appear and what we have experienced in life, but we are equals, and we respect and work on that. It is also interesting to set the ground even better by showing the students that the world is indeed different, but perhaps to a smaller as we might have expected, through perhaps showing them information from Gapminder. This will also create an atmosphere that the students get to know each other a bit better, through understanding how the world continents and populations looked alike through the history in terms of health and wealth (5). Because Epidemiology is very closely related to public and global health, another useful thing to do is to also introduce and compare health problems across regions and populations, instead of focusing on Sweden or the Europe. Introducing literatures from different parts of the world addressing the same research question could also help.

In conclusion of this section, although I do see incorporating interculturally-informed teaching to the course as a challenge, I move perceive it as a real opportunity to improve the course beyond its current status.

3) Developing the teaching-/supervision session
There are a few things that I will change in my teaching in general (not limited to the above-mentioned course).

First, I will start off any course I teach by setting the ground rules of the class, emphasizing mutual respect, confidentiality, equality and diversity, because this will 1) facilitate communication and 2) reduce the risk of negative critical incidents, among many other benefits (5).

Second, although English language proficiency has not been a major barrier in my teaching so far, I will pay more attention to this aspect in the future. I will make the study materials available to the students (reading materials, PowerPoint slides, handouts, etc.) well ahead of time so that the students with less English language proficiency will have sufficient time to prepare themselves (4). I will use more often

different medias for information delivery during the lectures, including more illustrations, less words, clearer words, etc. and I will spend more time on the key messages whereas reduce the total amount of content to make sure that the key messages are well received (4). I will pay attention to the tones, pace, and use of pause and gestures during the lectures, because these all help to create a positive atmosphere during the lecturing and motivate students' engagement (4). If a clear need of language help is identified, other measures such as involvement of language professionals should be considered.

In addition to language consideration, I will further take into account the students' varying cultural and academic background and cultivate their (and my) intercultural competence, in communicating effectively and appropriately in intercultural situations (6). Different tools could be used in this respect, including 1) behaviors such as display of respect and empathy, 2) use of language (e.g., clearly, simply, and sensitively), and 3) interaction management (e.g. gestures). I will also in general cultivate communications among the students, especially students of different cultural and academic background. This can be encouraged by some of the things described in the above section, including providing a global perspective of the subject topic of the course and using study materials from different parts of the world during the teaching. This could also be approached by implementing more interactive activities during the teaching and engaging more students to participate in such activities, as well as extrapolating the discussion from one setting to other parts of the globe to inspire genuine interests of all students.

In short courses like the one described in the beginning the follow-up of the students' learning is mostly done through assessment. Because assessment might guide importantly what the students learn and how they learn it, I will try to align more the intended learning outcomes, the learning and teaching activities, and the specific assessment (1). For instance, to test the achievement of different levels of educational goals, I will use different formats of formative assessment (e.g., written exam) and summative assessment (e.g., self-assessment, peer assessment, or group assignment) (7).

References:

1. Biggs, John B.; Tang, Catherine Kim Chow (2011). Teaching for quality learning at university: what the student does. Maidenhead: McGraw-Hill.
2. Bloom, B. (1956). Taxonomy of educational objectives: The classification of educational goals. In B. S. Bloom (Ed.) Susan Fauer Company, Inc., pp. 201-207.
3. Anderson, L., & Krathwohl, D. (2001). A taxonomy for learning, teaching and assessing: A revision of Bloom's taxonomy of educational objectives. New York: Longman.
4. Carroll, J. (2015). Tools for teaching in an educationally mobile world.
5. Green, W. (2011). Promising practices' for inclusive teaching and learning. Available at http://ioc.global/wp-content/uploads/2017/07/promising_practices.pdf
6. Deardorff, Darla K. (2009). The SAGE Handbook of Intercultural Competence.
7. Coyle, D., Hood, P., & Marsh, D. (2010). Content and Language Integrated Learning.