UPED 620 BASIC MODULE UNIVERSITY PEDAGOGY, CLASS 51

Teaching method delivery: implementation of in-class student active learning

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BACKGROUND

The traditional teacher-centered lecture is still a viable and widely used method in higher education (Richardson, 2007), despite research clearly documents that active learning is generally more effective than traditional lecturing methods (reviewed by Prince, 2004). However, an increasing number of universities and scholars have embraced active learning methods as part of their teaching philosophy and method repertoire (Karabulut-Ilgu, et al., 2018). Traditional lectures have previously been the main method of delivery in my own teaching. During the last couple of years my teaching load and diversity of course I teach has increased. When delivering traditional lectures, I've noticed that the students get increasingly distant and distracted after approximately 15-20 minutes. This is not necessarily due to bad lecture delivery as research suggests that student attention span decrease rapidly after 10-15 minutes of a lecture (Gulpinar et al., 2005; Stuart and Rutherford, 1978). During in-class activities students are engaged after short periods of lecture (max 15 min) by introducing breaks that are designed to increase alertness, promote student engagement and performance (Ernst, 2007). As part of developing my scholarship of teaching and learning I focused on gaining experience through trying a couple of in-class student activities and flipped classroom techniques (Allen and Tanner, 2005).

THE PROJECT

The objective of this mini project was to test and evaluate how I and students experienced a transformation of teaching methods from traditional lecture-based delivery towards a process where students participates more actively during the learning process. The approach was tested in a 10-ECDT course I coordinate and are responsible for. The main delivery method teaching in this course has been traditional lectures which also include other academics teaching modules in a similar manner. In addition, the course includes three compulsory written assignments focusing on key topics within different modules. The mini project focused on implementation of *in-class student active* methods.

In-class student activity 1 – Think – Pair - Share

The first case tested was transformation from a traditional presentation-like delivery towards active student participation. Two related, but distinguishable, topics within the same course module was chosen. Each of these topics was scheduled to include two lecture hours, 45 minutes each. Both topics, **A** and **B,** involve key biological developmental processes within the same fish species, and both topics are governed by the same type of environmental signals (photoperiod and temperature). Prior initiation of the mini project, topic A was already delivered to the students as a traditional presentation (ppt) lecture. At the beginning of lectures in topic B, I explained the procedure and what was excepted by the students. The procedure was as follows. I lectured approximately 12-15 minutes before I stopped and presented a challenge/question related to the topic just lectured. The students thought individually for 2 minutes before further discussions in groups of 2-3 persons for 3-5 minutes before discussion with the whole class. This resulted in two discussion sessions for the lecture and may be considered a version of the *Think–Pair-Share* method (Lyman, 1981).

In the second lecture I handed out partial drawings and figures at the beginning of the session. I started each session by presenting the key points they should learn and that we all were expected to discuss the topics together in relation to the figure. The students and I then developed and integrated the detailed knowledge on these figures throughout the lecture. This was in a stepwise simultaneous fashion at both the projected figure on the screen by me, and by the students on their handouts. At the end of the lecture I spent 12-15 minutes to synthesize a review of the basic key knowledge from both figures we made together and structured how these aspects relates to each other.

In-class student activity 2 – flipped classroom

The second case tested was a flipped class room approach at the end of the course. The students were presented with a list of topics, formed groups of 2-3 persons and given one week to reflect outside the classroom before returning to the class room and explain the topic for the rest of their classmates. Each presentation, or other method of delivery chosen by students, was scheduled to be 15 minutes, followed by 5 minutes discussions and/or answer questions with the whole class. We performed two sessions followed by 15 minutes break before the next two sessions. My role was to chair the sessions and serve as moderator during the discussions.

Assessment of in-class activities as methods of teaching delivery

The mini project was designed and conducted while my course already ongoing. This resulted in methodical constraints regarding the means by which the students were able to give feedback. It also made it difficult to organize a written questionnaire. Nevertheless, after the lectures I managed to recruit two students that was willing to give feedback. I had long and very open discussions with each of these two students and I believe their reflections are useful and may, at least to some extent, represent experiences of a larger parts of the class as these two students also discussed and incorporated experiences voiced by their fellow students prior providing feedback. It is also assumed that feedback conveyed by classmates was accurately reported the two interviewed students. I also discussed in-class student activity 2 with a colleague that has more than 30 years' experience teaching.

FEEDBACK AND REFLECTIONS

Here I will try to sum up and contrast the feedback from students and reflect on some important aspects that that will be important for future transformation of my methods of teaching delivery. Overall, most of the student feedback reported that in-class activities tested here was beneficial for learning compared with the traditional presentation/monolog-like delivery used for topic A. It should be noted, however, when engaged in active learning activities students initially perceived this a bit uncomfortable since several of the students were not familiar with in-class activities. This was to some extent anticipated, and I tried to counteract this unease be consciously creating a safe classroom culture where all students felt included, respected and engaged. However, this is probably a process that would require more time to efficiently incorporate. The students also gave some constructive and critical feedback, particularly when it came to structuring of activities.

In-class student activity 1

Overall, the main student feedback was positive after introducing a version of the *Think-Pare-Share* method (Lyman, 1981). Generally, breaking the lecture into "shorter" sessions tended to stimulate a more attentive behavior throughout the lecture. One observation that became clear during these activities was that student engagement changes depending on what is going on in the class room. When I talked for longer than 10 min the activity and attention span continued to decrease until students became actively engaged again. Overall participation, in the form of student generated interactions/questions during sessions, was largely dominated by a group of about 6-8 students. These observations are consistent with published research (cited from

Prince, 2004). Better planned and defined opportunities for peer interactions may help increase the participation of students that tend not contribute at the whole class level, particularly during the share part of this exercise. Another point made by students was that these discussion sessions made them aware of 'key points' they missed during the presentation delivery of the lecture. Student feedback suggested that active discussion sessions was beneficial to identify and 'correct' misunderstandings directly. Hence, the interactive engagement of students appears to help them identify knowledge they struggle to understand. It also gave me a better real-time comprehension of particular themes/concepts the students found difficult. This did not only permit intervention during the actual discussions of troublesome topics, but also provided me experience that will permit improvements next time I teach this topic. Student put forth some constructive criticism as well, one obvious feedback being that they it would have been beneficial with more concise instructions on how the session was scheduled and why this was done.

The second in-class activity method was handouts of two figures that only contained the basic information and thereby serving as a frame for students to draw and fill in as the lecture progressed. This is a method I experienced and found very useful as a student myself. By projecting the figure on the screen, I could observe that large proportions of students were engaged as they looked up and pointing at the screen during our discussion. The students and I developed and filled out the main points on the figure together. Similar approaches have been reported useful when teaching medical students about renal physiology (Robison et al., 2018). However, these authors reported that this approach only resulted in significant improved student learning after they incorporated student feedback. When developing this method for my class I had fruitful discussions with an experienced colleague that have used this approach successfully teaching comparative anatomy. His advice was "keep the figure clean simple and focus on the main aspects, otherwise the students will miss the key point of the lecture". I followed his advice and my impression was that the "*less is more*" approach was helpful, at least when testing the concept for the first time in my course. Nevertheless, student feedback suggests that although this is a useful learning method, it requires more finetuning of both content and execution. This may be due to the fact that the students did not get the opportunity to prepare before attending the lecture, as this approach probably require a higher level prior knowledge of the topic than the *Think-Pare-Share* approach discussed above. Hence, most of the student criticism of the method was linked to the execution rather the concept itself. Furthermore, my overall experience was that this approach is more challenging for me as a lecturer as well. I found it

challenging to balance between telling the student and discussing with them during the process of developing key aspect on the figure. Finding a balance between being a facilitator where student actively participate themselves and the traditional lecture role was probably the biggest challenge. After discussing with students and my colleague I've come to perceive my role during this teaching method as a lecturer that builds the information on the projected figure stepwise while engaging students in discussions before drawing the next piece of the puzzle on the projected figure. Then student fill in the information into their handout figure before we move on to the next step in adding the next information to the figure. Nevertheless, in collaboration with my colleague, I will try to improve and finetune this teaching method as I believe it to be a useful method, particularly when trying to teach students how to integrate several different topics into a more coherent and overarching knowledge level.

In general, the students demonstrated a high level of engagement in the activities when given the opportunity to contribute to active learning activities. Moreover, student feedback revealed that most of them found active learning to be intellectually challenging, but also beneficial for their learning. According to the interviewed students there were some student resistance regarding the change from a lecture approach towards more active student participation. Unfortunately, I do not have sufficient feedback on why some students found it less beneficial attending active learning methods as it was more a statement without justifications. The resistance was not unexcepted but can, however, be mitigated through better explaining the purpose and expectations of activities and improved alignment with the course assessments (Bacon et al., 1999; Bentley et al., 2011; Tarayil et al., 2018). This is something I will try to follow up and improve next course.

One major concern I struggled with was the tradeoff between depth of understanding and breadth of content covered. Colleagues have indicated that they underestimated how much student participation decreased the amount of time available for them to cover other topics in their lectures. In my case much of the concern was related to the fact that this was a novel approach for me as well as for many of the students attending the class. My conclusion so fare is that if sufficient time and effort is invested into prepare both pre-class and in-class activities one can build a balanced teaching repertoire that can be reused without too much effort next semester. Nevertheless, with increasing student participation and dialogue it may be necessary to revise the amount of material to be covered. Perhaps even revisit learning outcomes and curriculum.

Given the short notice and lack of opportunity for students to prepare for these in-class activities one cannot evaluate properly the level of student preparedness. The lack of possibility to pre-lecture preparation was one of the critical points raised by the students. When applying this method in the future one important pre-requisite for a successful outcome is to ensure that students met sufficiently prepared. On the other hand, there will always be students that show up unprepared. The challenge then will be to resist the temptation to re-lecture on the expense on moving forward as planned. My conclusion so fare must be to move forward and trust that this result in higher proportion of prepared students as the course progress.

Another challenge I unexpectedly encountered during the process of planning potential teaching methods for this mini project was the layout of lecture rooms. Most of the infrastructure is designed with the traditional lecturing in mind, which present some constraints when planning and implementing in-class activities.

In-class student activity 2 – flipped classroom

The flipped-classroom concept tested here engaged the students enthusiastically as this was marketed as an exam preparatory session at the final stages of the course, with the alignment directly linked to upcoming student exams. Indeed, student feedback was overwhelmingly positive. The overall reason they appreciated this approach was the direct relevance for their upcoming final exams. The version of student presentation tested here is just one of several active learning strategies one can apply (Allen and Tanner, 2005). These authors outlines a much more comprehensive model for applying student presentation based on the work reported by Eisen (1998) where the lecturer role is more of a consultant outside the classroom, ensuring that the curriculum is covered in a high quality. The model outlined by the above authors I personally believe is too ambitious. Students will most likely develop allergies against this teaching method if it becomes overwhelming, which in turn could lead to less learning. Indeed, it has been reported that flipped classroom techniques not necessarily lead to better learning and performance at the exams (Hagen and Fratta, 2018).

The students gave positive feedback about the how the flipped classroom was organized as it provided them a reasonable *pre-class* preparation phase before the *in-class* presentations. Unfortunately, I do not have data resolving weather the flip-classroom activity improved their learning and performance on the exams. Nevertheless, student was clear on that preparing their

own presentations forced them to really focus on learning details of the topic at hand. Hence, preparing their lectures helped them identified knowledge gaps. The flipped classroom method is probably an approach I will further develop and use as part of my teaching in the future.

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