



Henrik Skov Midtiby, (interviewed by Donna Hurford, SDU Universitetspædagogik)
Postdoc, TEK
The Maersk Mc-Kinney Moller Institute,
Tlf.: 2135 6105
Email: hemi@mmmi.sdu.dk

Ways Henrik engages students with active learning

- ✓ Weekly plan which includes: learning goals, pre-session preparation, links to Youtube videos, session outline, exam questions to practise
- ✓ Student Response System - <http://socrative.com/>
- ✓ Students correcting students' work supported with correction guidance from the teacher
- ✓ Teacher's correction guidance includes assessment criteria
- ✓ Peer teaching – showing learning by presenting arguments
- ✓ Videos showing how to solve Mathematics problems created by the teacher and uploaded to Youtube

1. What do you teach?

A 14 week Bachelors course on Maths and Physics.

2. Who do you teach?

Chemical Engineers who are in their 1st Semester, they are straight from High School.

3. What is the class size?

48 students are registered but on average 30 come to class.

4. What approaches do you use to engage students with learning?

I would like to help them learn but I know I am not able to just stand at the blackboard and write something down so they understand it directly. They need to work with it themselves. I have a high preference for using the blackboard to explain things to build figures from the ground up, to make the reasoning at the blackboard because then it's at a velocity they can follow instead of just pacing through a PPT.

So you think by physically creating it in front of them is preferable to just showing a slide?

Yes, because if you just show them the result you will not focus that much on the process of arriving at it and in Maths and Physics it's quite important to explain how you have done something. It is not enough to just give the answer they need to explain how they have tried to handle it and the process as well as the answer.

And when they come to university have they been prepared for that? Is that how they are already used to working?

They are not that experienced in writing if they have a written exam. To state what they expect before they do the calculation, that's quite new for many of them to estimate accurately so they can justify their answers and believe in them

You have explained that you think is important to show them a process and walk them through it. Can you now talk to me about some other approaches to improve their learning?

Student Response System

During the class time I sometimes use these concepts tests, so I am giving a multiple choice question and we use <http://socrative.com/> to show their answers. With that system I can get a quick overview to see if they all have the right answers and if that is not the case we can get some discussion about what are the features of the correct solution and choose that one so with that tool I try and activate the students during the class. In the last few months I have been using a new student response system "The Answer Pad", which allows the student to draw responses to the given questions.

Group Work and Peer Instruction

When we use **Socrative** if they have answered incorrectly I encourage them to find someone who answered correctly and then they are given a few minutes to convince the other one that they were wrong and that often helps them to go in the right direction.

Weekly Session Plan

And to try to activate them before the class, they are handed a weekly session plan with a description of what we are going to look at this week, what they should have prepared before coming to class usually it's about reading something from the lecture notes.

I have written some lecture notes myself and I have some references for videos, some I have recorded myself and others are available at www.khanacademy.org The students don't always do the session preparation but I'm not checking this thoroughly, I have some statistics from Youtube on how many times the videos have been viewed but I don't know who has viewed them. The plan includes what I intend to cover during the class so if they choose not to attend then they know what we have covered.

*And how do you use **Youtube videos**?*

I make demonstration videos of Mathematica, a piece of software they use during the course and also I try and explain some of the Mathematics behind the course. I use an electronic pen with a black background so I simulate what I would do on the blackboard. I'm happy to do it and most of the students are also satisfied with it, some of them think they would prefer to have it on paper. But it takes 15 minutes to prepare a video and much more time if I have to explain it in writing. I am building a library of content that will cover old exam questions and I record some lecturing.

I also refer the students to Khan Academy, I am quite inspired by that page and I have modeled my screencasts on its approach. I suggest quite strongly that the students watch the Khan videos and try the exercises: there is a tutor page so I can see which students have done the exercises.

Weekly Goals

I have a Teaching Assistant who works to the plan and who focuses on the exercises and there is a list of weekly goals, which start 'After this week you should be able to ...' and I list some exam questions related to them. These plans are uploaded to Blackboard every week and the links are to the videos so they can view them right away: that's my tool for telling them I expect them to do this. In principle if they miss a session they can review the guidance and do the work and then test themselves with these exercises. That's the intention behind it and when I ask the students they seem to be very happy with it.

5. Do you use assessment through the course as well as final assessment?

They have some weekly hand-ins where I have written a small exercise, these are voluntary they are not required to do them. Often I get 30 hand-ins and they often correspond to those who are attending class. They have to upload them by Wednesday evening and on Thursday I prepare a correction guide for that exercise which is based on the common mistakes I see in their work. Then we use 20 minutes in class on Friday where they use my correction guide to correct another student's work that is randomly allocated to them. I don't have time to mark 30 hand-ins every week.

Why do you use peer correction?

I attended a DUN <http://www.dun-net.dk/> seminar this spring on how to use peer correction and other assessment stuff. They presented some quite interesting results from Sweden I think, and I thought I better try this. I was very curious about how the students would react and the students seem to appreciate it. The scripts are not anonymous; you can see the student's name. The students haven't complained about it not being anonymous. I don't know if any are not attending because of that.

It is part of the correction guide to check there is a name on the task as they have not done that so well. They are getting better at it but also it gives them some exercise in writing what they have done. One of the students gave a quite harsh comment on another student's work, *'It looks right but it would be a 1000 times easier if you explained what you did'*. I don't know if I would be able to give that comment directly but it had a certain effect.

So when they correct each other's work, they know the exercise so if they did it wrong they can look at the correction guide so I know they are on the right path

If you had the time to give every student individual feedback which method do you think you would prefer? To give each student individual feedback or to use the peer correction approach you use now?

That's difficult, a year ago I would have said I should go round and talk with everyone but I'm not sure now. It depends if I asked a completely unknown question to them and they had no background to it then of course it would be better if I go out but if it's a topic where less than half have understood but about a third have understood then I think it's a really good way of doing it because both benefit. The one who got it right is trained in using arguments and if you can explain it you can understand it better than if you just can do it.

Do you use assessment rubrics?

With the peer correction I provide a list of assessment criteria for example: Have you stated the problem? Have you described all the numbers you are working on? This is part of an assessment rubric. So the students know what I expect.

6. Are there any constraints or barriers which limit how you teach and engage students with learning?

Well they have to be motivated. I see it as partly my responsibility to motivate them. I have to show that what do in class is relevant to their everyday life. That's how I try to motivate them to show how it's related to the world around us.

Thank you Henrik for your time