

How can we enhance self-motivation in students taking non-mandatory courses?

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Abstract

As a teacher, I am expected to engage in an interactive teaching style, engaging the students in varied learning activities, including class discussion facilitated by the use of the white board, group reflections, step-wise quizzes and think-pair-share discussions, and other various strategies promoting active learning (Holmes et al. 2015). The reasoning behind this shift in teaching style is grounded in new insights into learning outcomes in the field of pedagogy, showing that students learn more when actively engaged during the teaching sessions. In January 2018, I started in a new position as an associate professor at the Department of Biological Sciences at the University of Bergen. Since the start, I have engaged in new courses as course leader every semester. Motivated by the wish to bring more students into the teaching room and take part in non-mandatory teaching, I re-designed one of the courses, based on various tenets predicting that this would make the students come to teaching sessions and learn more. The very skeletal empirical data show that less students signed up, but the ones who did, were more motivated and presumably learned more.

Keywords: Interactive teaching; active learning; self-motivation

1. Introduction

Though the majority of college and university classes still work much like they did 20-30 years ago, teachers who are deploying student active learning techniques are reporting stronger results. This might be because interacting with the content of the course material through active learning has advantages over old-style teacher driven lectures (Campbell & Mayer 2009). The interactive aspect helps to maintain student concentration and deepens learning towards the higher-level skills like critical thinking and logical reasoning (Strømsø et al. 2018, Holmes et al. 2015, Raaheim 2013, Hernes & Letsrud 2009). It also helps to engage students who might otherwise struggle or the ones that choose not to come to lectures because they are bored by old-style lectures (and lecturers).

Active learning can be broadly defined as “anything that involves students doing things and thinking about the things they are doing.” (Bonwell & Eison 1991). At its core, active learning puts students at the center and values meaningful creating and collaborating over passively consuming (Hutchings et al. 2011). But does this actually work in classes where you do not demand mandatory presence (Wang 2015)? Do students like to take on the extra workload of coming prepared and participating actively in class?

The courses I ‘inherited’ were based on old-style lecturing with varying degree of attendance in class, and the courses had relatively many students, 90 and 130, respectively, the first semester I ran them as business as usual, like they had been run in previous years.

As a backdrop for re-designing the courses to become more interactive, I borrowed inspiration from a blogpost by Tricia Whenham (www.nureva.com/blog/education/9-benefits-of-active-learning-and-why-your-college-should-try-it). She lists nine reasons to give active learning a chance:

1. *Requires student preparation* - Active learning requires day-to-day effort beyond simply showing up to class. Every student is visible – hence no one can hide on the back row of the lecture room. It becomes very apparent to teachers and fellow students if you come unprepared.

2. *Increases engagement* - Students who are actively learning are actively engaged. Whether solving a problem, debating an issue or researching a concept, they are processing ideas and forging deeper understanding.

3. *Improves critical thinking* - In a world where fake news has become part of our daily discourse, the ability to identify a legitimate source or spot a faulty argument is only becoming more important. Active learning shifts the focus of learning – from passively (and possibly unquestioningly)

digesting information to being accountable for actively engaging with sources and perspectives. When students share ideas, they learn to build stronger arguments, challenge presumptions and recognize leaps of logic.

4. *Increases retention* - According to Dale's Cone of Experience, students remember about 10% of what they read, 20% of what they hear, but 90% of what they do. Active learning classrooms are, more active. Students are often applying their ideas, working on collaborative projects or using approaches like group problem solving or design thinking to solidify their learning.

5. *Encourages risk taking* - Students may initially resist the move to active learning as it is easier to sit in class and take notes (or zone out) until the talking is done. Active learning pulls students out of their comfort zone by creating an environment where risk taking is encouraged. As they get more comfortable sharing their thoughts, defending their conclusions and building on each other's ideas, they will gain confidence and self-possession.

6. *Develops collaborative skills* - Collaboration is central to most active learning approaches. In increasingly team-oriented workplaces, students whose only experience is with essay writing and exams will find themselves at a disadvantage. By working together in breakout groups, students develop the abilities they will need to collaborate in a real-world job.

7. *Makes tech more powerful* - Many active learning classrooms are filled with collaborative tools that are used by the students themselves. Furniture can also be moved around and re-arranged according to group size and usage needs. This is in contrast to more standard lecture halls, which rely on display technology only used by the instructor, and permanent bench rows, making the actual layout very little flexible.

8. *Sparks creative thinking* - Creativity is one of the key skills needed for the workplace of the future and one of the hardest to teach using traditional methods. Active learning helps students understand that creativity goes beyond the Eureka moment – it develops with effort and hard work. With lots of practice flexing their creative muscles, students also see how both individual reflection and collaborative exchange can lead to better ideas and more novel solutions to problems.

9. *Fosters real problem solving* - The ability to solve complex problems was called out by the World Economic Forum as the most important skill needed for future jobs. One of the main aims of active learning is to train students to understand that no one has all the answers, and that no single discipline is going to solve the complex problems facing the world today. We need to train future members of society to work and think in ways that fosters real problem solving.

2. Methods & results

I will base my reflections on empirical data gathered during the re-design of course *MNF110 – Climate, Man and the Environment* into course *SDG215 - UN Sustainable Development Goal 15: Life on land*. When I took MNF110 over in spring of 2018, this course had been running since the late 1990's.

2.1 Course description for MNF110 - Environment, Climate and the Human History

Objectives and Content

Humans have transformed their natural environment for thousands of years by cultivating the soil and domesticating plants and animals. Humankind's influence on the natural processes of the planet has been so massive in the last 200 years that the Holocene epoch in the aftermath of the Ice Age has ended. We currently live in the Anthropocene era, with mass eradication of animal species, climate change and physical changes in the Earth's surface. The course discusses how geographic factors, environmental conditions, social conditions and unequal access to resources have led to these changes, while pointing at solutions for a greener future and sustainable development. The course focuses specifically on the consequences of domestication of plants, animals and landscapes, as well as the consequences that different forms of energy exploitation have had on development and changes in nature and society. Resilience and sustainability in socio-ecological systems are key topics in the course.

Learning Outcomes

Upon completion of the course, the student should have the following learning outcomes defined in terms of knowledge, skills and general competence:

Knowledge

- Can explain selected aspects of the global environmental development in a sustainability perspective, and explain how different natural foundations have led history to develop differently across the continents.
- Can explain the correlation between human activity and global environmental changes and be able to outline solutions for sustainable development.

Skills

- Has developed insights into the environmental and social dynamics that are decisive in order to promote sustainable development.
- Masters project work on a given topic and can conduct knowledge-based dissemination.

General competence

- Has experience with project work.
- Compulsory Assignments and Attendance: Compulsory attendance at first lecture. Compulsory participation in project groups/excursions.
- Forms of Assessment: Written digital examination (5 hours), accounts for 100% of total grade.
- Grading Scale: The grading scale used is A to F. Grade A is the highest passing grade in the grading scale, grade F is a fail.

2.2 Course description for course SDG215 - UN Sustainable Development Goal 15: Life on land

Objectives and Content

In 2015 the United Nations adopted 17 interconnected Sustainable Development Goals (SDGs) addressing the global challenges of poverty, inequality, climate change, environmental degradation, prosperity, peace, and justice. The goals are to be achieved by 2030. In order to realize this, we urgently need to act and to engage the younger generations. This course focuses specifically on SDG 15: Life on land. SDG 15 aims to "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss". It has 12 specified targets related to how to preserve and sustainably use the Earth's terrestrial species and ecosystems. Human influence on the natural processes of the planet has been so massive in the last 200 years that the Holocene epoch in the time after the last glaciation has ended and we now live in the Anthropocene era, with mass eradication of animal species, climate change and physical changes in the Earth's surface. Thus, humans have transformed their natural environment over thousands of years by cultivating the soil and dominating plants and animals. The course discusses the human influence on these processes, and the possible solutions needed for a green change and a sustainable development. Resilience and sustainability in social-ecological systems are key concepts in the subject. The course focuses on clearly defining the SDG challenges, rather than giving the students complete solutions.

Sustainable development is a theme that concerns all students, and the course is therefore open to all. The teacher will use active learning methods, and the students will play key roles in discussing the opportunities and challenges pertaining to SDG 15. Through active learning, the student learns about SDG 15 and its targets and indicators, their scientific basis, and their interrelatedness to the other SDGs. The students will train in:

- i) finding, using, and evaluating international reports, governmental white papers, and scientific literature relevant to SDG 15;
- ii) identifying different stakeholders and their motivations;

- iii) composing and using scientifically sound arguments when debating SDG 15;
- iv) separating science from values and ideologies in own arguments and those of others;
- v) creating and presenting a poster in the course final symposium.

The student will also get a basic understanding of the properties (physical, ecological, environmental, climate change) of terrestrial systems that contribute to making the challenges under SDG 15 global, and the key governmental and intergovernmental arenas for decision-making relevant to SDG 15.

Learning Outcomes

Knowledge

Upon completion of the course, a student should be able to:

- Identify the main processes that contribute to the challenges faced by life on land (SDG 15).
- Describe the SDG 15 targets, indicators and central trade-offs among them and in relation to other SDGs.
- Explain the history and outlines of the most important international agreements and conventions relevant for SDG 15.
- Identify the key governmental and intergovernmental arenas for decision-making relevant for SDG 15.

Skills

Upon completion of the course, a student should be able to:

- Describe the main challenges for life on land grounded in evidence-based knowledge.
- Analyse and interrelate SDG 15 targets in light of the other SDG targets.
- Identify different stakeholders and recognise their motivations.
- Evaluate existing research and identify research needs related to SDG 15.
- Master different types of presentation techniques , e.g. poster and essay.

General competence

Upon completion of the course, a student should be able to:

- Find, navigate, and make connections between scientific literature and the literature of reports, conventions, and policy documents.
- Compose and use scientifically grounded arguments for relevant societal debates, both orally and in writing, individually and in groups.
- Provide constructive peer feedback, based on critical and solution oriented views.
- Identify and separate between scientific knowledge, values, and ideologies.

- Required Previous Knowledge: None
- Recommended Previous Knowledge: Fundamental ecological understanding (e.g. ecological subjects in the bachelor program: BIO102, BIO201, MNF115).
- Credit Reduction due to Course Overlap: None
- Access to the Course: The course is open to all students at University of Bergen.

Teaching and learning methods

This course is mainly based on active learning methods, where the students play a key role in their learning. Student will work in groups, with individual assignments and group assignments, including:

- individual essays
- group presentations
- peer reviews of their fellow students' assignments
- preparing for and performing a debate
- preparing a poster and presenting it at a course conference
- Compulsory Assignments and Attendance - Mandatory attendance at the first lecture.
- Compulsory participation on project groups / excursions.
 - Approved compulsory assignments.

- Forms of Assessment: Portfolio assessment consisting of:
 - Written assignments, individually and in groups
 - Presentations
 - Poster and essay presented at the final course symposium
- Examination Support Material: None.
- Grading Scale: Pass/Fail

2.3 Student attendance

MNF110

In spring of 2018 130 students signed up for the course MNF110, and out of these 84 competed the exam, where of 19 failed (tab. 1), the final result being 65 completed candidates. Many of the candidates who failed used their right to take the exam again the following semester (18 of them), where of 4 failed again. The total number of passed students were hence 80 for this course. The student attendance in class varied typically between 10 and 20.

Table 1. Distribution of grades on MNF110 in spring of 2018. 130 students originally signed up for the course, and 84 completed the exam. Grey indicates grade distribution of the 18 doing the re-try the following semester.

Grade	Students	Grade	Students
A	2	A	0
B	6	B	1
C	13	C	3
D	18	D	5
E	26	E	5
F	19	F	4

SDG215

In the spring of 2019, 25 students signed up for the course SDG215, and 13 finally passed the course by the end of the semester (this course is pass/fail). There is no possibilities for a second try. The student attendance in class varied typically between 8 and 12, as not all in-class assignments were mandatory.

3. Discussion & conclusions

Both of these courses are non-mandatory and open to all students at all faculties at the university, and even some high school students and students from the Western Norway University of Applied Sciences could attend. This “open access” can be seen both as an advantage – as there are few inter-faculty courses for students interested in interdisciplinary work, and as a drawback since there are few such courses and there is no culture amongst faculty to promote or suggest such courses for their students at UiB.

The two courses compared here (MNF110 and SDG215) are not identical, which may explain the difference in student turnout between years of comparison. The branding of the two older courses (MNF110 and MN115) - past and present - is probably responsible for creating a certain image, which may or may not appeal to students. Information and word-of-mouth spread amongst student peers probably weigh heavily on decision making at semester start. As an example, MNF115, was written up on a list of courses with “super easy credits” published in the student newspaper at UiB. The course had also over the years gained a certain reputation of being “easy”, or more precisely, the exam at the end of the course was easy to pass without having attended too many classes. I also teach this course, and it had 104 signed up students in the fall of 2018. I suspect that MNF110 had a similar reputation amongst students when I took it over, and many students may have been surprised by the exam that demanded in-depth knowledge of the curriculum, hence all the E’s and F’s (tab. 1) that year.

In contrast, SDG215 is branded as a new course focused on the sustainable development goals, even though it contains many of the core arguments and topics of MNF110. It is also taught in English and uses active teaching methods. This resulted in many international students taking it (6 out of 13). They attended classes much more regularly than their Norwegian student counterparts, and seemed more genuinely interested and motivated to work with assignments and in discussions. I am not sure why Norwegian students are mostly focused at only delivering in the minimum of requirements, instead of participating fully, but this was certainly also observed for the MNF115 course with 104 Norwegian students, and MNF110 with 130 Norwegian students. Many of these students focused a lot on their rights as students and on getting information on what was the minimum requirements for passing. I think to break this circle and get a positive relation to interactive teaching; we need to focus more on promoting self-motivation amongst the students. I rather prefer a smaller group of motivated students in comparison of a bigger group of unmotivated ones. If you do not like studying, you should not study. However, this is not promoted by the incentive system of the university where departments are funded based on the number of students they move through, regardless of motivation or quality of education. The students that signed up and were lost under the course of the SDG215 course, fell off mostly in the very beginning when they realized that they had to be interactive. This was a cost they were not willing to bear, and I am not sure if this is because of having signed up for too many courses or double bookings with other course schedules.

In relation to the 9 points promoting interactive teaching, I particularly found; *Requires student preparation, Increases engagement, Improves critical thinking, Encourages risk taking, Develops collaborative skills, Sparks creative thinking, and Fosters real problem solving*, to hold true for my experience with the students that did complete SDG215. At the same time as we work with students' motivation to engage, we need to work with teachers' motivations, e.g. to allow time and room to develop new courses and on reflection and improvement of teaching skills. This is not the case for many newly appointed associate professors. Over time, they will inspire more students to sign up for and complete courses engaging in active teaching techniques.

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Conflict of interest

The author has no conflict of interest.

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