

## **Heightening learning outcome and congruence in an existing MSc course**

Sune Tjalfe Thomsen

Department of Geosciences and Natural Resource Management, Section for Forest, Nature and Biomass  
University of Copenhagen

### **Justification**

In the fall of 2017 I was included as one of the main teachers in a 7.5 ETCS MSc course. The course had been running for quite some years, with a well-established structure, reoccurring teachers, and with mainly positive student feedback. It was my first time teaching in University of Copenhagen, and even though I had previous experience, I was reluctant to impose alterations to the existing course structure. During the course – and especially during my work on constructive alignment of the same course – I got the feeling that even though this was already a good course, there would be ways to make the course even better.

I agreed with the two other main teachers (and course responsables) that we would aim to make use of the constructive alignment analysis, and this final project report for Teaching and Learning in Higher Education is therefore a description of my efforts further refine, present, discuss and implement the suggestions from the aforementioned constructive alignment. However, before getting too deep into the details, I will start by describing the course in more detail.

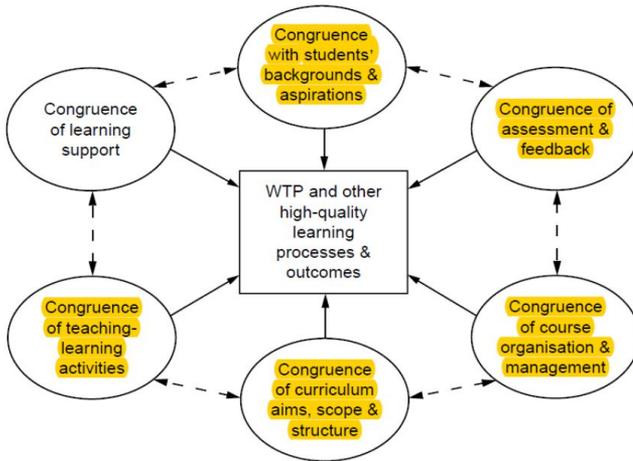
### **The course**

The course in question is “From plants to bioenergy”. A 7.5 ETCS course that covers a quite wide span of topics from plant cell wall structure, over molecular plant breeding strategies for biomass target traits, all the way

to process enzymology. Due to the wide span of topics there is also high teacher diversity and around 10 different teachers are giving lectures.

Generally, the course is mainly taught with PowerPoint based classroom teaching. There are around 20 students attending and since it is an elective course offered on 4 different study programmes there are likewise high student diversity. In previous years close to none student were filling in the final course evaluation, but when communicating with previous students there were generally rather positive feedback.

The complete constructive alignment of the course should not be repeated here but in short, the analysis was based mainly on Hounsell and Hounsell's (Hounsell & Hounsell, 2007) description of the constructive alignment, where the concept of congruence is introduced as a broader framework. They introduced several dimensions of congruence that I included in the constructive alignment analysis. In the final recommendations I reached during the analysis, I found room for improvements in most of the six teaching-learning environments which is defined by Hounsell and Hounsell (see illustration).



**Fig. 6.1.** Illustration adapted from Hounsell and Hounsell (Hounsell & Hounsell, 2007) showing the congruence between teaching and learning environments, and their impact on ways of thinking and practising (WTP) in a subject (i.e the student). The highlighted course settings were all highlighted in my analysis.

The most important findings in this analysis were the following. In relation to both the congruence of curriculum structure, course management and teaching activities, I found it beneficial to underline “the red thread” in the course to a further extent. E.g. by using the first and/or last part of each course day to talk about how the topic of the day is related to topics of past or future topics. I suggested that it should be one of the main teachers contextualising the lectures of the invited experts, as this would create a sense of congruence throughout the course and increase congruence between invited teachers and course ILOs. In line with this, I suggested to have more uniform ILOs throughout the duration of the course and to present them in a more structured way. Furthermore, I suggested that the main teacher should do a roll-call, making it possible to enforce the demand of 80% attendance which is given in the course description.

In relation to the congruence of assessment and feedback, I claimed in the analysis that the summative assessment could be optimised since we only to a limited extent were training the students what is being tested in exam, while the exam is not fully reflecting the learning outcomes we want to achieve. Therefore, I came up with two suggestions. 1) Ask all teachers to make at least one exam like questions at each course day, and provide these as voluntary homework. And 2) Include the existing poster session, which is used in the teaching, as a more important part of the summative assessment, e.g. by grading the posters and letting this grade count for 25% of the final grade.

So, on this basis, I set out investigate to which degree there is agreement between my analysis (from the constructive alignment exercise), the opinion of the previous students and the opinions of my colleagues, on how to heightening learning outcome and congruence in the “*From plants to bioenergy*” course. And further, I will describe which alterations to the course there ended up being be agreement upon within the group of main teachers. It should be noted that the narrative style of this report is successively and personal, unlike scientific writing, as this was advised by a colleague who read the draft.

## Planning

At this point I had reached the conclusion that even if this were a popular course, there were room for optimisation. I had some ideas of where to make an effort from the aforementioned constructive alignment, and it

was now time to get inputs and insights from the other stakeholders. This part was divided into 3 distinct phases. 1) A planning phase where I defined a few work hypothesis on how to improve the course. 2) An interview with previous students who had just finalised the course to discuss my ideas and to get better hold on the student perspective. 3) And finally, an interview and discussion with the two other main teachers/course responsables in which we both discussed my recommendations and planned how to introduce these changes in the course.

### **The planning phase**

I only had the possibility to talk to a few students for a limited time, and therefore the planning should enable to get honest and constructive answers in that limited time. I chose to work with an interview guide that I divided into 5 themes. 1) The expectations of the students. 2) The students' perception of the expectations to them, which in this case relates to congruence between the exam and the skills they were taught. 3) The "red thread" during the course. 4) Ways to increase attendance. And finally, 5) congruence of reading material.

In the interview guide, the first questions within each theme were opened given room for honest and unexpected answers. Additionally, a few more concrete follow-up questions were defined within each theme. And in most cases I ended a theme by proposing solutions to specific problems. I had planned to interview 4 student, however, when the date and time were settled only two student were able to attend. I decided to make a group interview, aiming for a more dynamic interview with both students present. Further I planned to make a sound recording, avoiding the agony of taking notes during the interview.

### **The interview with previous students**

Two students from two different study programmes attended the interview. Coffee, tee, and Danish pastry helped creating a friendly atmosphere. The students were happy to help and they answered my questions readily. It should be kept in mind that these were only two students and that the answers are not necessarily the voice of the majority.

## Discussion with course responsables

After the interview with students I planned a meeting with the two other main teachers/course responsables, where I presented my conclusion based on the constructive alignment and the student interviews. The desired output of this meeting was not only theoretical inputs but actual planning. And further this planning should be learning-centred to a further extent instead of the content-centred approach that often is the outcome of course planning meeting, and which have the tendency to result in a “list of topics” rather than real learning experiences (Fink, 2003; Jørgensen, 2015).

For this meeting an interview guide was prepared as well, however this meeting also served as an actual conversation on how to arrange the course next time. Therefore, it was not a real interview but rather a structured meeting. The two other main teachers/course responsables seemed pleased with some new inputs to a course that they had been teaching for years, and the meeting outcome were several new elements that we agreed upon. These elements and the inputs from students and teachers alike will be presented in following section.

## Discussion

### The interview with previous students

*1) The expectations of the students (to the course).* According to my analysis there were a risk that the course was too fractionated, with large student diversity and a number of different expert teachers. But at first, the student on the contrary appraised the flow of the course when moving from one topic to another. Likewise, they found the level of the course appropriate.

Since I made it clear that all ideas and inputs were welcome, the student already at this point had some recommendations. Firstly they would like a bit more research-based teaching, and especially a tour of the different laboratories of the main teachers were recommended since this can give a nice insight into the scientific process. I really liked this idea, also since it can be used as a part of the recruitment process of new MSc students. Secondly, they proposed to do several smaller reports, and present it – as a way to encourage preparation. This idea is also quite interesting to me, do to two aspects. On one hand, we do struggle to get the students to prepare which this would support, and simultaneous using small reports as a

fast written exercise can be a very nice change of media enabling another learning dimension and more variation in teaching methods.

**2) *The students' perception of the expectations to them.*** In the open-ended part of this theme, the students were a bit puzzled. I suspect that they are not used to relating to this. The more closed questions in this theme circled around the issue: "*do you feel the exam tested the skilled you were taught during the course?*", since I found that there might be a lack of congruence. I asked them specifically if including an exam-like question in each lecture would be beneficial and they responded very positive to this idea. They mentioned that it would aid both their learning and their exam preparation.

As a part of the course there is a poster session that we use to round up the course, where the student all prepare a scientific style poster about a given topic. Until this point, attending this poster session has been a prerequisite in order to go to the exam. However, in my analysis I found that the student often do not prioritise this session. Therefore, I proposed to make the poster count as a part of the grading (e.g. 25% of the final grade). The students' response to this idea was: "*That would be a good way of "getting something back", and people would make more of an effort*". This I naturally agreed upon. Also, since we repeatedly use smaller poster sessions as a teaching methods, while we do not test those skills as a part of the exam. Thereby we will also improve the congruence between the exam and the skills taught.

**3) *The "red thread" during the course.*** Since there are many teachers and many subjects in the course I asked the students of whether they felt there was a "red thread" during the course? And generally they liked the progression and felt that overall arrangement of the topics were good. I asked specifically if any central concepts repeated to a counterproductive extent, and to my surprise they did not find that. On the contrary, the student mentioned a few cases where new teachers assumed a specific topic were already explained in previous session, where it was actually not the case. This is an obvious lack of coordination that should be addressed from now on.

We hereafter discussed options to further improve the "red thread" of the course. I suggested a more organized and uniform way of using and presenting ILO's (intended learning outcomes), e.g. as a standardized slide in the beginning of each lecture. This was seen positively upon by the two students who also suggested a summery after each topic. I ask further if the

introduction and/or rounding up should be done by a main teacher (opposed to guest lecturers), in order to secure coherence and flow during the course. This suggestion was also acknowledged by the students.

A further comment from the students was regarding the two fieldtrips in the course, where they stated that they did not always know what they were looking at. Therefore, they suggested having a more thorough presentation of the industries in the preceding lecture. They even found it beneficial to submit a short report afterwards. These suggestions are in my opinion both obvious and easy to implement.

**4) *Ways to increase attendance.*** We experienced a drop of attendance during the progression of the course, and that is even though an 80% attendance is obliged according to the course description. I learned from a colleague that a simple roll-call can help, since it will make the students feel “seen”. So I asked the students how they would feel about such a roll-call. The students had another take on the matter that was quite informative to me. They felt that a roll-call is rather condescending and that no-one should feel forced to go to class. Instead they stated that “*People should go because classes are interesting and helpful – not out of obligation!*” This is a very reasonable argument in my opinion and the students even followed up with some interesting points and ideas on how to increase attendance in other ways. It is important that the students feel a gain from attending class. Therefore, there have to be difference between reading yourself and going to class, and especially going through exercises and examples are very helpful. They suggested more exercises and student presentations that students have to prepare in advance and present in class. Alternatively, the students should submit a short written report (about ½ page) after each session. These ideas were indeed interesting.

**5) *Congruence of reading material.*** Here I asked three simple questions, and the student gave likewise short answers. I asked if they bought the book, they said “*no, but they had scanned copy*”. I asked if it would have been worth the investment, they said “*no*”. And, I asked if a compendium would be preferable, they said “*yes, and it would be nice to include more scientific papers*”. These answers are in line with my own impression of the text book.

Based on the insights gained at this interview I prepared my recommendations to how to heightening learning outcome and congruence in “From

plants to bioenergy” and arranged a meeting with the main teachers/course responsables.

### **Discussion with course responsables**

I started this meeting with a description of the constructive alignment, how this let me to some intermediate recommendations, and how these were refined during the meeting with the students. Overall, the course responsables agreed to a very large extent with the diagnosis of the course, and that it was time to assess a few elements. We agreed that we have a few inherent challenges due to high teacher diversity and high topic diversity, and with that I presented my proposals condensed into three themes. Namely, “The red thread”, better coherence between ILOs and the exam, and, minor changes and suggestions. In order to not repeat too many points I will rap our common conclusions in a list form (below).

1. We agreed to have a recurring intro-slide with ILOs in the beginning of each lecture, and we likewise agreed to have a slide describing how the lecture of the day relates to previous lectures. The main teachers will not do a summing up in the end guest lecturers classes (as proposed by the students) since it can undermine the authority of the guest lectures, which were an important point from a co-teacher.
2. Furthermore, we agreed to include an exam-like exercise as homework after each session. The students are expected to upload a one-slide answer prior to the following lectures, and we will choose at random who to present in the following lecture.
3. We agreed letting the poster session count towards the final grade of the exam (20%). In order to underline the importance of this session, however, it is not for certain that we can alter the exam without given permission from the study board.
4. In relation to the book, we agreed to build a compendium including chapters of books, articles, and smaller sections that we prepare ourselves. Further, we will include a small note of 10-15 lines of text describing how each piece of literature is important for the students to increase motivation (another point from a co-teacher).
5. We agreed to make a tour-de-lab of the most important laboratories.
6. We will make more of an effort to put the fieldtrip into context.

7. And finally, we agreed that we will not do a roll-call to increase attendance, but rather hope that higher quality, more exercises, and even more relevant lectures will make students prioritize the course.

In my opinion, these points are all implementable and they support the ambition to make learning-centred planning creating a good learning experiences.

## What is next?

The short answer is implementation by a common effort and dedicated work by all teachers involved in “From plants to bioenergy”. I feel rather confident that changes will be made and that these changes will be heightening the quality, *i.e.* the learning outcome and congruence, in the course. I know for a fact that the course responsables have already engaged in implementing some of the features.

The entirety of this process – from the start of the constructive alignment to the final common conclusions – have been an interesting learning experience to me, exemplifying one way of optimizing an existing course. Especially, it has been eye-opening how the perspectives of other stakeholders have the ability to both support and clarify my own assumptions, but also, how they can see pitfalls I did not recognize in my own eager to optimize.

## References

- Fink, L. D. (2003). *Creating significant learning experiences: An integrated approach to designing college courses*. San Francisco, CA: Jossey-Bass.
- Hounsell, D., & Hounsell, J. (2007). Teaching-learning environments in contemporary mass higher education. In *Bjep monograph series ii, number 4-student learning and university teaching* (Vol. 91, 111, pp. 91–111). British Psychological Society.
- Jørgensen, S., P. (2015). Course planning. In L. Rienecker, P. S. Jørgensen, J. Dolin, & G. H. Ingerslev (Eds.), *University teaching and learning* (1st ed., pp. 165–174). Samfundslitteratur.