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1. Teaching Philosophy

When new students enter the universities, most of them come from high schools, where they have been used to be highly involved and active in class. Somehow, it seems that many of these new students rapidly turn into observers, when they enter the universities. Often, teachers at second and third year's level find it very difficult to make the students participate during lectures. I believe that a major part of this scenario can be explained by the teaching methods at the universities. Often there are many students in the class during the first years, which makes it convenient for the teachers to perform a 45 min. lecture without trying to involve the students. By doing this, the students are not allowed to reflect on and discuss the subject taught, which makes it extremely difficult to stay focused for 45 min. in the continuous flow of information from the teacher. I believe that the process of learning should be based on mutual respect and acknowledgement between the students and the teachers. Thus, the students should be aware that they are responsible for their learning, whereas the teachers should be aware that they are responsible for providing the optimal conditions for the student's ability to learn. Therefore, my overall teaching philosophy is to create these optimal conditions, which inspires the students to acquire new knowledge and most importantly encourage them to put this knowledge into a general perspective. I believe that these conditions will arise if the teacher is engaged, well prepared, motivated and aware of how the students acquire their knowledge.

2. Teaching responsibilities and mentoring

Since the start of my PhD, teaching and mentoring has been an integral part of my professional career. I see teaching as an important part of my work, and as an opportunity to attract students to my research area. I have mentored in many different disciplines ranging from basic research on organic P to more applied research on various tools for lake restoration. Since 2001, I have been teaching numerous courses at BI, which have allowed me to obtain a strong background in general ecology. Several of these courses have been outside my research field, which have been a challenge but also stimulating and refreshing. I believe that teaching outside ones field can often be a benefit for the students, since this might lead to a better explanation of the complicated subjects by the teacher.

Below is listed the courses I have taught during the past 9 years as well as my mentoring activities.

Undergraduate courses (bachelor)

2001

BB14 Ecology A: Laboratory exercises

Teacher on a 4 weeks intensive laboratory exercise. Preparing reagents, setting up equipment, general mentoring during laboratory work, evaluating the final written report.

2002

BB71 Lake Ecology:

Teacher on a 1 week field course at field station "Søgaard". The aim of the course was to introduce the students to the general ecology in Danish lakes. I gave small lectures in addition to mentoring during field trips, laboratory work, student presentations and report writing.

BB14 Ecology A: Laboratory exercises

Teacher on a 4 weeks intensive laboratory exercise. Preparing reagents, setting up equipment, general mentoring during laboratory work, evaluating the final written report.

BB14 Ecology A: Ecology of Salt Meadows

Teacher on a 4 days course at a Danish salt meadow (2 days field trip & 2 days laboratory work). I mentored during the field trip (classification of plants, taking soil and water samples) and during laboratory work (numerous chemical analyzes). Evaluating the final written report.

2003

BB14 Ecology A: Ecology of Salt Meadows:

Teacher on a 4 days course at a Danish salt meadow (2 days field trip & 2 days laboratory work). I mentored during the field trip (classification of plants, taking soil and water samples) and during laboratory work (numerous chemical analyzes). Evaluating the final written report.

2006

BB81 Lake and Stream Ecology:

Teacher on a 8 days field course, where the students learn about the general ecology in Danish lakes and streams. I gave small lectures in addition to mentoring during field trips to lakes and streams. I arranged laboratory work, student presentations and evaluated the final written report.

BB69 Danish Nature Types:

Teacher on a 3 days field trip to different Danish nature types. I mentored during the field trip, gave small lectures at the different locations, and helped out during laboratory exercises.

2009

BB819 Practical's in Aquatic Ecology:

Teacher on a course in general ecology for exchange students. I gave lectures in lake restoration.

2010

BB69 Danish Nature Types:

This course is a combination of lectures and a 3 days field trip to different Danish nature types. I gave lectures and coordinated student presentations.

BB819 Practical's in Aquatic Ecology:

General ecology course for exchange students. I was responsible for lectures in lake restoration.

BB510 Ecology (2009-ongoing):

Major ecology course covering the ecology in freshwater systems, marine systems and terrestrial systems. I was responsible for lectures in terrestrial ecology, covering aspects such as: primary production in terrestrial systems, grazing of the primary producers, and degradation of the primary producers. In addition, I held exercise lectures, prepared written exam questions, evaluated and graded the exam and participated in the preparation of the course evaluation (see appendix 7).

2011 (spring)

Nat501 (ongoing):

Removal of Phosphate in the aquatic environment. 1st year student project in corporation with Dr. Ulla Gro Nielsen, Department of physics and Chemistry (IFK). Multidisciplinary project linking limnology and analytical chemistry. The students will be synthesizing their own chemical for immobilization of phosphate, collect lake sediment during a field trip, and treating the sediment with the phosphate binding chemical. The course is evaluated by a report.

2012-ongoing

FF503.

Responsible teacher for the first year course for all students at science. Approximately 350 students. . I perform lectures, training classes, lab exercises, as well as facilitating study groups in general ecology, covering aspects such as: primary production, energy transfer and restoration of ecosystems terrestrial systems, grazing of the primary producers, and degradation of the primary producers. In addition, I prepare and grade projects and written exam questions. Graduate courses (master)

2009-ongoing

BB808 Freshwater or Marine biology.

Co-responsible for the freshwater part of this course. Mentoring during the student's formulation of hypotheses and preparation of project descriptions. General mentoring during a 6 days excursion to field station "Søgaard", including field trips, laboratory work, student presentations and preparation/evaluation of a final report.

PhD course 2014:

Ph.D. course by Aqualink and CLEAR. August 2nd to 9th 2014, "Lake Restoration and lake management".

Outreach

2001

I have planned "Brobygning for gymnasieelever", which is a 2 day outreach to high school students. This involved a one day field trip to a small stream and 1 day of laboratory work.

2002 I have planned "Brobygning for gymnasieelever", which is a 2 day outreach to high school students. This involved a one day field trip to a small stream and 1 day of laboratory work.

2007 Study project for high school students. 3 days excursion to field station "Søgaard" with the aim to promote interdisciplinary collaborations between high school teachers. I was in charge of laboratory work, field work, and lectures.

2008 Study project for high school students. 3 days excursion to field station "Søgaard" with the aim to promote interdisciplinary collaborations between high school teachers. I was in charge of laboratory work, field work, and lectures. Gasts lecture at IGB, Berlin 2008. Entitled: "Chemical lake restoration, experiences from Danish lakes".

2010 Wednesday seminars at Institute of Biology, SDU. In combination with a fellow post doc from the NordCee group, I have arranged and hosted weekly 30 min. seminars, during 2009-2010. Students, scientific personnel, and guest speakers were invited to present their research.

Mentoring

During my PhD and post doc period I have mentored several students at various stages in their education. I consider mentoring of students a very significant part of my job, since mentoring allows me to directly influence the future scientists. I enjoy having discussions with the students which are always highly motivated for learning, and often have many ideas, which allows me to reflect and use my acquired knowledge. When mentoring, I always try to create an informal atmosphere, creating a dialog between the student and me. I always encourage the students to ask all the questions they might have, and allowing them to influence the outcome of the project description. I am fully aware of letting the students find all the answers; thus, I will often ask the student for their opinion instead of giving the right answer. In that way the student's opinion is valued, and the student is encouraged to draw their own conclusions, which I believe is a very important part of their education. Below is listed my mentoring activities (1 PhD student, 2 master students, 2 bachelor students, 13 Individual study activity students)

2006:

Co-supervisor on a master project by Michael Jørgensen: The influence of light on the phosphorus retention in two shallow Danish lakes. I mentored during all stages of the project (project description, laboratory work, data evaluation, report writing and examination). The project was evaluated by an oral examination, in which I participated.

2007

Co-supervisor on an individual study activity by Sussi Mortensen: Effects of aluminum and Phoslock on the sediment release from Danish Lake Vedsted. I was involved in the project description and mentoring during laboratory work. Co supervisor on a bachelor project by Sem Vanvelthoven: Comparison of different phosphorus binding compounds in relation to lake restoration. I was responsible for and mentored during all stages of the project (project description, laboratory work, data evaluation, report writing, arranging exam, and examination). The project was evaluated by an oral examination, in which I participated.

2008

Co supervisor on a bachelor project by Charlotte Jørgensen: Mineralization of inositol hexakisphosphate in lake sediments. I mentored during all stages of the project (project description, laboratory work, data evaluation, report writing, and examination). The project was evaluated by a written report.

2009

Co-supervisor on a litterateur project (environmental engineers) by Charlotte H. Jensen: Litterateur study on chemical lake restoration methods. I mentored during report writing and evaluation. The project was evaluated by a written rapport. Co-supervisor on a litterateur project (environmental engineers) by Melanie J. Sønderup: Biological methods for restorations of lakes. I mentored during, report writing and evaluation). The project was evaluated by a written rapport.

Co-supervisor on an individual study activity by Mirjam Dubke & Stephan Maria Lotter: Effects of Chironomids on sediment - water fluxes of nutrients in Phoslock treated sediments. I mentored during all stages of the project (project description, laboratory work, data evaluation, report writing and evaluation). The project was evaluated by a written rapport.

Co-supervisor on an individual study activity (forprojekt for environmental engineers) by Malde V. Beinthin, Charlotte H. Jensen & Melanie J. Sønderup: Crushed concrete for binding of phosphate. I mentored during all stages of the project (project description, laboratory work, data evaluation, report writing and evaluation). The project was evaluated by a written rapport.

Co supervisor on a PhD project by Charlotte Jørgensen (2009-2013): Ecological significance of organic phosphorus in freshwater sediments. I am mentoring during all stages of the PhD project (project description, laboratory work, data evaluation, report writing, manuscript preparation, peer review of manuscripts).

2010

Co-supervisor on an individual study activity by Malde V. Beinthin & Melanie J. Sønderup: Column experiments with crushed concrete. I mentored during all stages of the project (project description, laboratory work, data evaluation, report writing and evaluation). The project was evaluated by a written rapport.

Co-supervisor on an individual study activity by Christian Vinther: Effect of sediment removal in lake Sorte. I mentored during all stages of the project (project description, laboratory work, data evaluation, report writing and evaluation). The project was evaluated by a written rapport.

Co-supervisor on an individual study activity by Katja Schmitz & Joerg Johannes: Effects of Phoslock, a phosphate-binding bentonite product, on lake sediment and submerged plants. I mentored during all stages of the project (project description, laboratory work, data evaluation, report writing and evaluation). The project was evaluated by a written rapport.

Co-supervisor on a master project by Heidi M. Nielsen: Redox induced release of dissolved organic phosphorus from lake sediments. I mentored during all stages of the project (project description, laboratory work, data evaluation, report writing and examination). The project was evaluated by an oral examination, in which I participated. In addition to mentoring the above mentioned students, I have been co-mentoring a study group in limnology (2010) arranged by associate professor Henning S. Jensen, SDU. 3 students were attending this group (Charlotte Jørgensen, Christian Vinther & Mai J. Høi)

2011:

Co supervisor on a PhD project by Maria Jensen (2011-2014): Cycling of phosphorus between sediment and water in lakes undergoing restoration. I am mentoring during all stages of the PhD project (project description, laboratory work, data evaluation, report writing, manuscript preparation, peer review of manuscripts).

Co supervisor on a PhD project by Anna-Marie Klamt (2012-2015): Sediment biogeochemistry and lake management under changing water levels. I am mentoring during all stages of the PhD project (project description, laboratory work, data evaluation, report writing, manuscript preparation, peer review of manuscripts).

2013:

Co supervisor on a master project by Ronja Nygaard Pedersen.

Supervisor on a Bachelor project by Niels Svane

2014:

Co supervisor (Elisabeth Fuchs)

Co supervisor (Ana Funes/Katrin)

Supervisor on ISA (Palle Jonas)

Supervisor on ISA (Kristiane Astrid Balslev)

Teaching methods

As a biologist, the teaching will be conducted in several ways. Thus, lab courses, excursions and lectures are all integral parts of the education. During lab courses and excursions the students will automatically be activated and I consider motivation, enthusiasm and preparation as the most important requirements for the teacher. Thus, a well prepared, enthusiastic and motivated teacher will be able to inspire the students and let them see the relevance and perspective of the lab course/field trips. These more informal ways of teaching also allow the teacher and the students to make valuable relations, giving the teacher the opportunity to obtain important information on how the students experiences their education or other issues of general interest to the institute.

During lectures, the teaching will generally be more formal. However, I strive to make it as informal as possible and to create a dialog between the teacher and the students during lectures. Hence, I believe that this is the best way to make the students reflect on the topics, and in addition provide me (the teacher) with important information on whether the students have grasped the concepts taught.

During my lessons I use PowerPoint as a main tool. I like to approach the student in a relaxed, informal and often humorous way. Thus, I aim at using many illustrative slides, often with funny pictures, which I find being well met by the students. This results in a more relaxed atmosphere in the class room, and I find that more students opens up and are willing to participate actively.

During the "Teacher-Training Programme for Assistant Lecturers" I have worked intensively with developing my teaching methods with great success, as seen from the student evaluations, and email correspondences (see appendix 7).

During this programme, I revised my way of teaching completely. Consequently, I now feel a great interest and motivation in finding different ways to activate the students, and I have experienced that my way of teaching has become more relaxed and more focused on the student grasping important concepts instead of me presenting all my theory. In addition, I actually feel that I spend less time preparing for the lessons. I have had great success with several different ways of initiating dialogs and activating the students, and below are listed examples of some of the activities I have used during my lectures:

1. Small sum-meetings, which are breaks of a few min. where I ask a question, which the student should discuss in small groups of 2-3 persons. It is highly important that the questions are well prepared and not just a simple yes/no question, or questions with an obvious given answer. I have successfully used the sum-meetings to make the student describe important figures from their curriculum. The benefits of sum-meetings are several fold. It creates important breaks in the flow of information, and allows the student to discuss the particular themes being addressed. Secondly, by making the students discuss in small groups, they can validate their own opinions against a college, which makes it less embarrassing to answer incorrectly. Thus, the sum meetings force all students to participate and discuss the topic and in addition make it possible for the teacher to ask any student afterwards. This is in sharp contrast to the so called "dead calls", where the teacher just picks a random student to answer a question. I do not like this way of teaching, since it can put the students in unpleasant positions, and eventually scare them away from the lectures.

2. Repetition of previous lecture. By providing the students with a blank piece of paper and 5-10 min. to repeat the previous lecture, the students are forced to reflect on the last lecture and to put it on paper. After this small break, we discuss what the students have noticed, which gives a great platform for the new lecturer, since the students are now fully updated on last lecture. This repetition can be done completely unstructured to let the student brain storm, or it can be more structured by giving them certain topics from the previous lecture, that I want them to address. By letting the students work alone on the repetition, there will still be "problems" with students that are afraid of wrong answers, and consequently do not participate.

This can be overcome by mixing the answers among the students. Consequently, the students will read up the repetition of their colleagues. By this, I can freely, ask all the students and in addition ask them if they agree on what is on their paper.

3. A case is another way to make breaks in the lectures and to make the students reflect and use their new knowledge. I often use the cases to make the students grasp more complicated theory, or to see the connection of more topics. A case is also a very good way to introduce the relevance of the course to the students. By letting the students work through the case before giving the answers, they have experienced potential lacks in knowledge by themselves, which should inspire them to address the topics again to fill out the gaps in knowledge. By giving examples of previous exam questions, the student will also feel the relevance of understanding the case, and also the importance of following the lectures.

Curriculum/course planning and revisions

Since I have taken over courses that were already planned, I have no experience in planning courses, but at present, I am involved in organizing a course in biogeochemistry for the master education at SDC in China (see appendix 3). In addition, I am currently revising the curriculum for the terrestrial ecology part of BB510 in collaboration with associate professor Henning S. Jensen. At institute level, I have been engaged in a committee ("Visions udvalget") addressing the construction of the bachelor education in Biology. In addition, there were rumors of several students wanting to leave the education for other universities because they felt left out here at SDU. Based on this, I initiated and conducted a survey among the 3rd year students asking them for their uncensored opinion on the bachelor education. In general the questions asked addressed 1) Relevance of the education (placement of courses, relevance of courses etc.), 2) Structure of the education (e.g. opinion on quarterly structure of the education and schedule planning) 3) Possible improvements of the education 4) any other aspects of their education. This survey was a great success, where the students were very enthusiastic, constructive and pleased to be heard. This helped me to identify several obvious suggestions for improving the bachelor education, which I presented on the following institute meeting. Some of the suggestions were: 1) replacement of several courses which had very little relevance for the students, 3) a general need for more biology courses during the first year. These suggestions have now been implemented in a revision of the bachelor education, which is presently submitted for acceptance. The students also expressed their need for stronger relations to the institute earlier in the education, which has now been addressed by improving the study environment at Institute of Biology. In addition, the students expressed their need for easier access to general guidance regarding their education. This has subsequently been addressed by connecting the study counselor to the institute once a week. I was very pleased to feel the support from the institute during this process, and this survey and the initiatives taken afterwards has resulted in a more positive atmosphere among the students and also convinced several of the student (wanting to leave SDU) to stay.

3. Course material

I have not yet developed major contributions to course material: However, I have designed various cases for use in lectures. For example, when I teach courses in lake restoration, a case can be a very efficient way to present different measures of lake restoration, and to demonstrate how they affect the water body (see evaluation from BB819, appendix 7). In addition, I prepare hand outs of my PowerPoint presentations before each lecture. I believe that this makes it easier for the students to focus on my lecture instead of writing notes.

4.Assessment

I have experiences with most forms of assessments from written reports to oral exams. During BB510, I have prepared questions for the exam, conducted standard answers, and graded the exam afterwards. In addition, I have held oral examinations of 2 master students, which involves grading the written report and questioning the student during the oral exam together with the censor. During the individual study activities (I have mentored), grading was always based on a written report. In BB510, I implemented e-tests where I developed a set of essay questions after each lesson, and posted them on blackboard. I told the students that the question would be relevant for their exam, which was an extra motivating factor. The use of e-tests gave me the opportunity to observe whether the students grasped what I found important, during the lectures. In case of too many wrong answers, I could repeat the topic in the beginning of the following lecture. This was greatly appreciated by the students, as seen by their evaluations (appendix 7), and I will definitely consider using e-tests in my future teaching. In addition, to student assessments, I have done numerous peer reviews for 7 different journals and 1 program grant (see appendix 1).

5.Student evaluations

During my teaching in 2010, I performed informal evaluations of my lectures in BB819 and BB510. My intent was to obtain information on my teaching style and the activities I brought in to the lectures. These results can be seen in the figures below, which show that the students are very pleased with my teaching style and the way I activate them. More importantly, they feel that my teaching style motivates them to learn more and to get a better understanding of the topic, which I consider the most important finding. I also received emails from the student stating that they appreciated my teaching style and the way I worked in class (See appendix 7), which I consider a great motivating factor for continuing discovering new activities during lectures. During the informal evaluation of BB819 and BB510 I asked the following questions (see below). Answers are illustrated in the three diagrams below. In BB819 12 persons participated in the evaluation, whereas 8 persons participated in BB510:

A)Activation Have you become more active in class because of sum-meetings etc.? 1.Yes I have become more active in class, and I am not nervous to be asked
2.Yes I have become more active in class, but I still don't like to be asked and answer in front of the class
3.No, I have not become more active in class

B)
Learning Do you feel that you have gained a better understanding of the curriculum because of sum-meetings etc.?
1.Yes, I have gained a better understanding of the curriculum
2.No, I have not gained a better understanding of the curriculum 3.I did not participate in the sum-meetings etc.

C)
Overall opinion What are your overall opinion about the sum-meetings etc.?
1.Very good idea
2.Good idea
3.Neutral
4.Bad idea

D)
Use of case (BB819 only!)
Did the case help you to get a better understanding of the mechanisms and techniques used for lake restoration?
1.Yes, it helped my understanding of lake restoration
2.It was OK to do something different in class, but it did not improve my understanding of lake restoration
3.It was a total waste of time

E)Use of e-tests (BB510 only!)
Did you take the test?
1.Yes, I took the test
2.I did not now that the test existed, and did not take it
3.I did not take the test since blackboard didn't work
4.I did not take the test due to lack of time
How was the level of the test?

1. Too difficult, I used too much time on answering each question
2. Appropriate
3. Too easy
4. I did not take the test, and have no opinion

What is your general opinion on e-tests?

1. Very good idea
2. Good idea
3. Neutral
4. Bad idea

6. Formal pedagogical education

During 2010, I have followed several courses to improve my teaching. I have benefitted greatly, from the new tools for teaching I have achieved during these courses (see below), and can see from the evaluations that the students appreciate my way of teaching.

1. The 2010 Teacher-Training Programme for assistant lecturers at the University of Southern Denmark (8 ECTS). Certificate and assessment enclosed in appendix ??
2. BB9 Workshop – familiarizing yourself with the new e-learn system (1/4 ECTS)
3. The human voice in personal development (1 ECTS)
4. Teaching natural science subjects – the background and tools for improving the benefits for students (1/2 ECTS)
5. Activity during lectures (1/4 ECTS)
6. Using cases in teaching (1/4 ECTS)
7. The good lecture (1/4 ECTS)