



## **Developing the course Nature and Landscape**

### **Politics with a focus on deep learning**

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## **Developing the course Nature and Landscape Politics with a focus on deep learning**

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### **Introduction**

Department of Food and Resource Economics A core characteristic of graduates from natural resources management is that in their professional career they come to work interdisciplinary in their own problem solving and through communicating and collaborating with people from other professional disciplines and educational backgrounds. Therefore, the students are trained not only in natural sciences, but also in social science theory and research methods. The course Nature and Landscape Politics (hereafter described as NLP) at Faculty of Science at the University of Copenhagen (UCPH) is an example of that. NLP is included in the Natural Resources Bachelor study program (NRB), and the aim of the NLP course is to introduce the primarily natural science student to policy analysis in the context of nature and landscape management (KU-Science, 2014 - 2015, 2015). It is intended that the students gain an understanding of stakeholders' role in nature resource management and how, institutions and structures both enable and limit policy making - all this in order to enable the students, as future professionals, to navigate and use their professional skills.

NLP is a popular course, which is mostly positively evaluated. The annual evaluations do however indicate a need for better alignment between the intended learning outcome (ILOs), teaching learning activities (TLAs), and assessment tasks (examination) in the course, as only a minority of students (totally) agree to have achieved the competencies outlined in the course description (33.3 % in 2014, 28.6 % in 2015, cf. NLP Course Evaluations 2014;2015). At the same time, a majority (totally) agreed that here

was a good relationship between the teaching elements (66.6% in 2014, 70.5 % in 2015), indicating that the main challenge may not so much be in the inner consistency of the course, but more in an overall uncertainty as to what are actually the competencies they are to acquire and a sense of actually having achieved these.

This suggests a need for deeper learning, i.e. learning that goes beyond the surface (accumulation of more or less incoherent facts and details), giving rise to reflection and makes the student able to use the newly acquired knowledge to create meaningful contexts (Biggs and Tang, 2007). Additionally, students are driven by an internal motivational emphasis (Entwistle, 1981; Ramsden, 1992a). The aim of this paper is therefore to analyze the barriers and opportunities for achieving deep learning, and propose changes that can increase the students' deeper learning through improved alignment of the course.

We will address the problem from different perspectives: (1) First, we will look at the didactic challenges in achieving alignment and deep learning and identify a framework for analysis, (2) then we will briefly describe the NLP course and, (3) the students' evaluations and, based on these, (4) analyze the barriers and opportunities for deep(er) learning through constructive alignment. We will look at the changes that have been made over time as well as looking ahead and suggest proposals for change. The project will draw on different types of empirical data:

- Student evaluations – written and oral - from the course in 2014 and 2015 (NLP Course Evaluations 2014 & 2015; Boon, 2014a; Clausen, 2015a) including teacher evaluation (Boon, 2014b; Clausen, 2015b).
- Own observations and reflections from conducting the course
- Feed-back on the proposed strategy from other teachers at IFRO

## **The didactic challenge of teaching for deep learning**

The overall didactic task for university teachers is to support and study the processes that promote learning as best as possible. 'Didactics' can be defined as the art or science of teaching (Marzano, 2007). Fundamental questions are: What should be learned? Who should learn it? Why should it be learned (purpose)? How is teaching and assessment best organized for the students to learn it? In what context should they learn it? (Ulriksen, 2014, p. 73). It is therefore important what the content is, which methods

are used, what the formal terms of a teaching subject are, which teacher role the teaching involves, how teaching is documented and evaluated and how the teaching is justified in a larger context such as for instance in relation to the kind of citizen – and professional - whom the education implicitly or explicitly helps to create. In this regard education always affects and "does" something to people on both a conscious and subconscious level (Ramsden, 1992a).

## Principles of deep learning

Students can take different approaches to learning. Deep and surface learning are two such approaches to learning, derived from original empirical research (Marton and Säljö 1976) and since elaborated upon (Ramsden, 1992b; Biggs, 1987; Entwistle, 1981). Students that adopt "... a deep approach to learning characteristically exhibit: an explicit intent to develop their own understanding of material (Biggs, 2003; Entwistle, 1981), knowledge, which is highly structured (Biggs and Collis, 1982; Boulton-Lewis, 1998); an ability to apply their own and other's ideas/concepts to new situations (Ramsden, 1992a), and a highly developed integration of knowledge (Biggs, 2003)" (Meyers and Nulty, 2009). In contrast, students adopting a surface approach to learning typically attempt to meet course requirements through minimal effort (Biggs, 2003). Here, students focus on 'the signs', treat 'parts' as separate, focus on 'essentials', use memorization, do not connect facts and concepts, fail to distinguish principles from examples, do not separate knowledge from everyday activity, and consider tasks as external impositions (Entwistle, 1981; Ramsden, 1992a). It follows that 'High quality' learning outcome is related to deep approaches to learning, and different key classifications have been developed to help deep approaches thrive (ibid.).

In our evaluation of the ability of the NLP course to generate deep learning among the students, we have chosen Meyer's and Nulty's (2009) five curriculum design principles for facilitating deep approaches to learning. It is a recent theoretical framework where the interactive element is central – an approach we would like to develop in the course. According to Meyers and Nulty, 2009, teaching materials, tasks and experience should all be:

- i. Authentic, real-world and relevant
- ii. Constructive, sequential and interlinked

- iii. Require students to use and engage with progressively higher order cognitive processes
- iv. Aligned teaching and learning material with each other and the desired learning outcomes
- v. Provide a challenge, interest and motivation to learn.

The key focus of Meyers and Nulty (2009)'s five principles is the creation and use of a system of curriculum components that result in more active learning through student-centered learning. Student-centered learning is where the students take a central role in the educational process (Paraskevas & Wickens 2003), in contrast to traditional one-way communication where "it is supposed that knowledge is passed from the learned lecturer to the eager student" (Allan, 1999). In student centered learning, students become active participants in the learning process and engage in analysis, synthesis, evaluation and exploration of values and attitudes (Boud, Cohen, and Sampson, 2001; Sivan, Leung, Woon, and Kember, 2000).

## 22.1 Principles of constructive alignment

Attaining deep learning can be made more manageable through the principle of constructive alignment. Constructive alignment highlights the relationship between intended learning outcome (ILOs), teaching learning activities (TLAs) and assessment tasks, that is, methods of evaluation in terms of supporting student learning (Biggs and Tang, 2012) [Figure 22.1]. 'Alignment' can in this regard be translated as something which is in line (Ulriksen, 2014, p. 41) while 'constructive' refers to a learning that involves that the students themselves are active in the construction of their own knowledge (Biggs and Tang, 2007). A course is coherent when there is consistency between objectives of the course, the teaching and learning activities, and the ways in which students are assessed and evaluated in the course (Ulriksen, 2014, p. 41).

In a successfully coherent course, the teacher will 'construct' the inner logic of the course (Entwistle, 2009) and gives the students a way of thinking that allows 'deep learning' (Biggs and Tang, 2007; Bowden and Marton, 2004; Ramsden, 1992a). Constructive alignment takes place throughout the learning environment of the students, that is, a system, which beyond the classroom also includes the department and faculty of the university and its

administrative institutions. In this paper, however, our primary focus is on the alignment and deep learning within the NLP course.

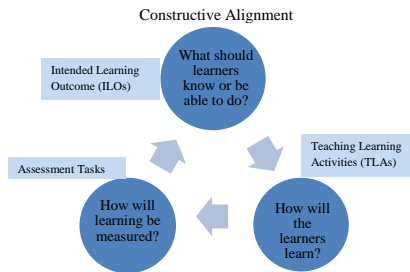


Fig. 22.1: Principle of Constructive alignment between teaching learning activities (TLAs), intended learning outcome (ILOs) and assessment tasks (examination) in a course (Inspired from Biggs, 1999).

## Aims and contents of the course Nature and Landscape Politics

The NLP course provides an introduction to policy analysis applied to nature and landscape management. The aim of the course is "to provide the students with tools (theories and methods) to understand and analyze nature and environmental politics". The NLP course is a mandatory course in the NRB education, study direction 'nature management'. The course is located at year two, block one. The course is typically attended by 25-35 students, mainly from the NRB. The NRB 'nature management' study program has aspects of problem-oriented, interdisciplinary training. Basically, however, the education is grounded in natural sciences with elements of other disciplines, which appears in for instance economics, environmental and planning law, theory of science (with emphasis on positivism), and the NLP course. The students attending are mainly trained in the positivist tradition, i.e. the assumption that we can strive towards one true knowledge of the world through principles of falsification (Pedersen and Toft, 2004). The NLP runs over nine weeks, including exam week. It is structured along a series of lectures on preselected topics related to the different phases of policy making (agenda setting, policy formulation, implementation, evaluation) and underlying theories (e.g. on power, democracy, participation,

steering), exercises in the class, one half-day excursion, and group work to prepare two written essays (see below). The NLP course learning objectives are consistent with the principle of 'Constructive Alignment'. They are closely thought together with the course structure and activities, signal clearly what students need to practice in the course and what they should be assessed on in an exam situation (KU-Science 2014/2015). The students get acquainted with the course's learning objectives, form of teaching activities and exam form already when they read the course description on the course's website (KU-Science 2014/2015). All three parts are clearly formulated, and are also presented in the course's first teaching session. During the course, the overall learning objectives are deconstructed into smaller parts, which are presented at the beginning of each course lesson. The learning objectives are inspired by the SOLO taxonomy, showing the stages of a learning process (Biggs and Tang, 2007): the surface learning is taking place during the first step of the learning process where students' learning is limited to representation of facts and simple problems and then, later on, targeted the deep self-creating meaningful connections at a higher level of abstraction. The learning objectives are 'learned' through activities consisting of lectures, supported by smaller exercises and one big roleplay, text readings, group discussions and presentations. The course uses many external lecturers who relate their lectures to specific empirical and theoretical work and in the end of the course an excursion to a relevant institution (for instance a NGO or a Ministry) is included. During the course, the students work in groups to prepare two written essays, applying selected theories to a real life policy case. The essays must be handed in as a prerequisite for attending oral examination.

The exam is a 30 minute individual oral exam, preceded by drawing an exam question, and 25 minutes of preparation. The exam question are constructed so students are tested in their learning within the three overall learning objectives of the course: Demonstrate (reproduce) knowledge of policies for nature use and protection of Denmark as well as theories with which to analyze them; Apply theory to nature and landscape (environmental) policy cases – and as part of this, they are asked to refer to the case used in their essays; Compare and discuss the relevance and implications of applying different theories and methods to a selected policy case. In this sense, the NLP course is on all levels targeted to follow the EU's Bologna Directive for higher education, which divides the learning objectives in three subgroups covering knowledge, skills and competencies (European Commission 2005). In the 2015 course, some minor changes

were made in order to support the interactive element. Some lectures were replaced by exercises and traditional one-way feed-back where commentaries are passed from the learned lecturer to student was replaced by a peer-to-peer response on the two written essays.

## **Student evaluations of the NLP course**

The following is based on (1) the KU-Science course evaluations conducted by the students in 2014 and 2015 with response rates of 35 % (9 out of 26 students) and 41 % (7 out of 17), respectively; (2) oral evaluations conducted in class with participation of 20 (2014) and 17 (2015) students, respectively (NLP Course evaluation 2014; 2015). The evaluations were both conducted before the students had handed in their last essay and, thus, before exam.

It appears from the written student evaluations that most are pleased with the course. The involvement of many external lecturers with input from real life is assessed positively. The same applies to the work with cases from 'real life' and the perception of group work, which is estimated to provide continuity and enhanced learning in the course. In general, the perception is that working on cases together with others can make complex issues more concrete and manageable. Also, most are satisfied with the part-passing of projects, so difficult material becomes rounded and evaluated along the way (NLP Course Evaluation 2014; 2015).

At the same time, only few (totally) agree in having achieved the course learning objectives (33 % in 2014, 29 % in 2015), many stating 'neither/or' (44 % in 2014, 71 % in 2015) or even partly disagreeing (22 % in 2014) (NLP Course Evaluation 2014; 2015). This is complemented by one third (2015) of the students finding the level being too high. At the same time, a majority did (totally) agree that there was a good relationship between the teaching elements (67 % in 2014, 71 % in 2015), i.e. aligned, but they call for less reading and more practical examples of the application of the theory (NLP Course Evaluation 2014; 2015).

The students' rather skeptical (self-)evaluation of whether they have achieved the course learning objectives is in contrast with fact that the students ended up passing exam with an average grade of 8.3 (2014) and 9.2 (2015) respectively (Boon, 2014b; Clausen, 2015b). This indicates that at the stage of evaluation, the students are quite uncertain about their own competencies.



Overall, the evaluation reflects different needs that challenge the teaching: Students lack confidence in their own abilities to make research on the problem (finding newspaper articles, debates etc.) as well as the structuring of the essays. Ambiguity also exists towards the problematizing approach which is characteristic for the course. Some are really happy with the 'culture of debate', while others prefer to see it minimized, because they feel it is unclear what is right and wrong in accordance to the understanding of a theory (Boon, 2014a). Similarly, calls for time to go deeper into things are expressed and the term 'superficiality' is repeated (Boon, 2014a; Clausen, 2015a). This relates to the amount of topics on the subject and range of many external lecturers which, apart from being appreciated, makes it difficult for students to orient themselves. It is however also related to the study program as a whole and the amount of subjects which are not considered to be clearly inter-linked. What really seems to tie things together is the use of real life cases. As an alternative to the diversity of the topics raised at the NLP course it is suggested by the students to reduce subject-circuit from 10 to four topics and go more in depth with them (Clausen, 2015a). In relation to the oral examination some students express that they feel they do not have enough time to cover the curriculum (Clausen, 2015a).

The students responded positively to the more interactive/collaborative approaches that had been introduced in 2015 in order to increase student centered learning. For instance, a peer-to-peer approach was introduced in order to let the students comment on each-others projects – an approach evaluated positively based on arguments that it made them reflect more carefully on the meaning and inter-relatedness of themes (Clausen, 2015a). Thus, it was suggested by the students to have more peer-to-peer feedback into the course – and at an earlier stage. Also, they would like more influence on the choice of topic for their case work, and it was suggested to place the excursion earlier in the course in order to draw on the inspiration from the amount of policy problems presented here.

## **Barriers and opportunities for deep learning through constructive alignment**

In the following we will relate our experiences to the five principles of curriculum design described by Meyers and Nulty (2009) in order to evaluate on the students' deep learning of nature- and landscape politics as we (1) look at existing initiatives taken in order to achieve deep learning and (2)

consider future initiatives inspired by principles and theories on deep learning. Throughout our analysis we will pin-point some of the dilemmas of and potentials to achieve deep learning.

### **Authentic, real world and relevant**

The NLP course includes different initiatives to make the content authentic and relevant. The use of real life policy cases, the inclusion of a wide range of external lecturers, who base their lectures on existing real-life issues, the excursion and the encouragement of the students to relate issues (for instance participation or democracy) to the students' own personal everyday life and related experiences represent a way whereby authenticity is thought into the teaching situation. Similarly, the professional dimension is brought into the course by encouraging the students to think as future professionals in their approach to the exercises.

These initiatives to create authenticity and relevance could be further strengthened. For instance the policy cases should be renewed on an annual basis to ensure their timeliness and relevance. Also the relevance of topics to the students' future work as professionals and/or their everyday life could be integrated more directly in exercises and written assignments – and how they are formulated. For instance we (as teachers) could deliberately ask students to approach a problem from the perspective of being (a future) professional with a practical policy problem to be solved, rather than the traditional, analytic (pan-optic) researcher perspective. The same approach could be used to bring students' everyday life into play. Also, role-play could potentially take up a larger part, since empathetically 'stepping into the shoes' of stakeholders could contribute with a deeper understanding for the complexities at stake. Finally, when using external lecturers there is a risk that the learning objectives are not achieved, due to insufficient coordination or misunderstandings. The risk could be reduced and alignment be improved by choosing guest lecturers specifically on the basis of the topics that the students concretely work with – including the possibility of letting students influence on who to invite and give lectures.

### **Constructive, sequential and inter-linked**

Following a natural science tradition the course is pieced together by "blocks" to ensure that the students are introduced to some main policy

topics and affiliated theories. This provides some 'safety in structure', but it can also be so 'sequential' that the items do not inter-link in a natural way. It therefore rests much on the teacher to create the interrelatedness between topics – for instance by reminding students about approaches from the previous lecture and through the use of group based essays centered on the same case throughout the course, hereby "tying things together".

An alternative could be to take a hermeneutic approach, working with the same topic but at increasing levels of complexity. This would require a focus on less main themes (e.g. power) which the other themes would then only serve as input to. This could give a different "flow" to the teaching of curriculum, but also new challenges of articulating the relevance of the selected topics and sub-topics in relation to each other, and in relation to the students' future profession. Also the constructive (i.e. interactive) dimension could be strengthened. If students are invited to influence the course through their evaluation this, in itself, is an important influence. Therefore, more awareness about this influence could be created. Similarly, students could be more explicitly encouraged to select the cases for their group work essays themselves, and get inspiration by scheduling the field trip early in the course (cf. above).

Finally, parts of lectures could be replaced with student driven activities. An example could be to ask students to interpret and discuss an important graph or legal paragraph in the Nature Protection Act, rather than presenting it as a 'truth fact' in a lecture. In this way we could systematically go through the curriculum and consider which parts might be suitable as student activities, and something, 'we examine together'. Similarly the integration of more peer-to-peer activities into the course could help students convert their knowledge into practice, e.g. by applying peer-to-peer feed-back on the students' case-projects. The teacher function would then become the one of facilitating the peer-to-peer process. Whilst, the open approach to learning suggested above may also raise uncertainty and anxiety among some students, creating a barrier to learning. It is therefore important as a teacher to continuously provide the students a sense of direction of learning at a meta-level, also during, 'we examine together' sessions.

## **Require student to use and engage with progressively higher order cognitive processes**

As outlined above, the NLP course faces the challenge of having to introduce social science in an otherwise natural science dominated NRB curriculum. This is also recognized as a challenge in the student evaluations, and has been worked on throughout the history of the course. But as the recurrent low student scores on 'having achieved the learning objectives' indicate, there is also a need for a clearer communication with the students about the learning objectives and what students in their way of working and thinking can take as indications of actually having achieved them. We therefore turn our focus towards the objectives of the course:

The central learning objectives are that the students (1) demonstrate (reproduce) knowledge of policies related to nature management (e.g. related to nitrogen emissions, water conservation or biodiversity), as well as theories with which to analyze them (2) Apply theory to real life policy cases, and (3) Compare and discuss the relevance and implications of applying different theories and methods to a selected policy case.

As regards policy analysis, one approach has been to implicitly teach the course within the positivist tradition, applying policy analysis in a way that does not fundamentally challenge this view, e.g. a rational choice policy approach, with emphasis on quantitative analyses of 'facts' and cost-efficient ways to achieve policy goals. A second approach has been to address the political nature of not only decision-making but also implementation and evaluation, but without explicitly addressing the underlying ontological and epistemological differences. A third approach has been associated with the desire to challenge also the students' understanding of theory of science, making them aware that there are different ways to acquire knowledge and use knowledge, and that there may also be competing forms of knowledge on the same issue, rather than one true knowledge.

Acknowledging that the course has duration of only nine weeks, the following advantages and disadvantages of the partially different aims have been considered:

Remaining implicitly within a positivistic tradition leaves time to go into the substance of concrete policies - such as for instance policy formulation, implementation and evaluation of policies to reduce nitrogen emissions. The downside is that the 'political' aspect of politics is not addressed neither are the underlying theory of science issues, so the students' preconceptions are not challenged in that way. However, in order to familiarize

the students as upcoming professionals, to navigate in the political reality, it can in fact equip them to the extent that "numbers count". The advantage of addressing the political nature of politics is, as above, that students are equipped with skills to navigate in the political reality of nature and landscape management, not only as 'science' professionals, but with a view to the different interests, stakeholders and participation strategies applied. The advantage of addressing also the underlying epistemology and ontology is that the students acquire a more fundamental understanding of 'the political', the fundamentally different beliefs and values - both at the political level, but also into the very core of science, their own education, and therefore of what they come to represent themselves. The downside is that nine weeks are neither enough to cover both the 'policies' related to nature and landscape nor to enable the students to reach a deep recognition of the nature of 'the political'.

The solution to this challenge so far has been that both dimensions are present while they have also been the subject of a priority. One such prioritization is that policies only serve the purpose as examples. Accordingly, students need not achieve a detailed picture of the current, main policies, but only the related principles. A second priority has been to select specific aspects of a policy process and related methods of analysis, with a consideration to the possible tasks the graduates will be working with in their professional careers. For example, insight into different steering instruments, implementation and evaluation is considered relevant for graduates becoming public managers in their professional life. A third priority has been to give relatively more weight to approaches which propose an instrumental use of policy analysis 'in the service of the public administration' as compared to approaches that deconstruct what is at stake in order to uncover mechanisms of (dis-)empowerment.

In order to improve alignment in the future we propose: (1) To explicitly prioritize among the above mentioned approaches to the course, as a basis for the adjustment of the course contents; (2) To relate the epistemological questions more profoundly to students' own life experiences, as citizens and as future professionals, hereby making complex problems more present; (3) to include a lecture that focuses on the differences between natural and social science paradigms, even it is time consuming. The experience from introducing it in 2015 and students' evaluations thereof suggest that it help the students to better understand differences and similarities.

## **Aligned teaching and learning activities and the desired learning outcomes**

Over the years, several changes have been made in order to align the TLA's and the ILO's in the NLP course. For instance the amount of reading material has been cut. Also, based on students' evaluations, the teachers proposed the students to work in reading groups as a replacement of some lectures. The students however declined this offer, arguing that understanding course topics was better achieved through lectures than through students' common reflection. This reflects the paradox between on the one hand being an introductory discipline where practical methods must be acquired, and on the other hand aiming at enhancing students' reflective learning - two quite different levels of competences. Supervision have also been scheduled in order to urge the students to actually use the teachers as supervisors in the group work, and weekly reading manuals for the texts have been sent out in good time.

In order to further strengthen alignment a suggestion could be that we go more deeply into developing the framework so that the students themselves relate key points and arguments from one part of the course to another. Perhaps clearer rules give more opportunity to actually participate in the game and seen from this perspective the rules might not have been clear enough in the course?

## **Provide challenge, interest and motivation to learn**

In general the NLP course is considered challenging, interesting and motivating. As it appears from the evaluation, the challenge of achieving an inner logic of a course seems to increase when teaching concerns the teaching of one discipline, such as the epistemology and ontology of social science, to another, for instance natural science (Dich, Hansen, Christiansen, Kaltoft, and Sandøe, 2005; Gjerris, 2006). Thus, the challenge is no longer "only" to get alignment between learning outcome, teaching methods and assessment, but also that the skill level, knowledge, learning capacity of the course participants are alien to the subject being taught in the course. One of the more striking consequences is that people trained in the natural sciences tend to give the technical or scientific part of a problem attention whereas people trained in the humanistic tradition tend to be more interested in getting a broader perspective on the problem and see it as

connected to other problems (Gjerris, 2006). The didactic challenge in this connection is mainly to be able to make students interested in subjects, methodologies and ways of thinking and arguing that they usually do not concern themselves with (ibid.). As teachers in NLP we aim to make natural resource management students interested in and capable of grasping rather complex philosophical and sociological concepts such as »actor«, »structure«, »democracy«, »participation«, »power«, »empowerment« and »discourse« and somehow include them in their argumentation. Finally, it is also worth considering whether it is relevant to adjust the exam. A written exam could imply a better opportunity to get around the subject in a way that helped visualize the students' deep learning.

## Conclusion

In this paper we have analyzed the barriers and opportunities for strengthening deep learning through improved alignment of the course in Nature and Landscape Politics, within the education Natural Resources Bachelor, at the Faculty of Science, University of Copenhagen. Student evaluations revealed that the students were uncertain whether they had actually achieved the competencies of the course. Part of the explanation could be that the evaluation was conducted while the students were busy writing their essay and before starting to prepare for exam. Still, the evaluation revealed a need to align the course so as to ensure that the students gradually through the course build up an inner sense of efficacy related to the competencies that the course is aimed at providing them. Following Meyers and Nulty (2009)'s five guiding principles, we outlined measures already being taken to allow for deep learning, but we also suggested a number of improvements that could ideally be implemented. We also made a critical assessment of the feasibility of these, considering the framework conditions of the course. We are now planning for the course running again in September-November 2016, and we integrate our suggestions for improvement as far as possible.

## References

- Allan, G. (1999). Getting Students to Learn about Information Systems Project Management: An experiment in student-centred learning. *Research in Post-Compulsory Education*, 4(1), 59–74.
- Biggs, J. (1987). *Student approaches to learning and studying*. Melbourne: Australian Council for Educational Research.
- Biggs, J. (1999). *Teaching for Quality Learning at University* (1st ed.). Society for Research into Higher Education and Open University Press.
- Biggs, J. (2003). *Teaching for quality learning at university* (2nd ed.). Buckingham: Society for Research into Higher Education and Open University Press.
- Biggs, J. & Collis, K. F. (1982). *Evaluating the quality of learning: the SOLO taxonomy, structure of the observed learning outcome*. London: Academic Press.
- Biggs, J. & Tang, C. (2007). *Teaching for quality learning at university* (3rd ed.). Open University Press/McGraw Hill.
- Biggs, J. & Tang, C. (2012). Aligning the curriculum to promote learning. In N. M. Seel (Ed.), *Encyclopedia of the sciences of learning* (pp. 198–199). Boston, MA: Springer US.
- Boon, T. E. (2014a, October). Mundtlig evaluering. Natur- og landskabspolitik (Oral evaluation).
- Boon, T. E. (2014b). *Natur- og Landskabspolitik LNAB10015 2014*. Evalueringsnotat fra kursusansvarlig. [Note on evaluation of the Nature and Landscape Politics course, by the course responsible].
- Boud, D., Cohen, R., & Sampson, J. (2001). *Peer learning in higher education*. Kogan Page.
- Boulton-Lewis, G. M. (1998). Applying the solo taxonomy to learning in higher education. In B. Dart & G. Boulton-Lewis (Eds.), *Teaching and learning in higher education* (pp. 145–176). Camberwell.
- Bowden, J. & Marton, F. (2004). *The university of learning: Beyond quality and competence*. RoutledgeFalmer.
- Clausen, L. T. (2015a, October). De studerendes evaluering af kurset. [Oral evaluation].
- Clausen, L. T. (2015b). *Natur- og Landskabspolitik LNAB10015 2015*. Evalueringsnotat fra kursusansvarlig. [Note on evaluation of the Nature and Landscape Politics course, by the course responsible].
- Dich, T., Hansen, T., Christiansen, S. B., Kaltoft, P., & Sandøe, P. (2005). Teaching ethics to agricultural and veterinary students: experiences



- from denmark. In M. Marie, S. Edwards, M. Gandini, M. Reiss, & E. Von Borell (Eds.), *Animal bioethics. principles and teaching methods*. Wageningen: Wageningen Academic Publishers.
- Entwistle, N. (1981). *Styles of Learning and Teaching; an integrated outline of educational psychology for students, teachers and lecturers*. John Wiley.
- Entwistle, N. (2009). *Teaching for Understanding at University – Deep Approaches and Distinctive Ways of thinking*. Palgrave MacMillan.
- Gjerris, M. (2006). Breakfast at Milliways – The didactic challenges of bioethics. *Dansk Universitetspædagogisk Tidsskrift*, 1(2), 45–52.
- Marzano, R. J. (2007). *The Art and Science of Teaching*. ASCD Publications.
- Meyers, N. M. & Nulty, D. D. (2009). How to use (five) curriculum design principles to align authentic learning environments, assessment, students' approaches to thinking and learning outcomes. *Assessment and evaluation in Higher education*, 34(5), 565–577.
- Pedersen, E. O. & Toft, P. (2004). Positivism: Erfaringsbaseret viden formuleret i en logisk sprogform. In P. Fuglsang L. & Bitsch Olsen (Ed.), *Videnskabsteori i samfundsvidenskaberne. på tværs af fagkulturer og paradigmer [theory of social sciences. across the professional cultures and paradigms]* (pp. 55–78). Roskilde Universitetsforlag.
- Ramsden, P. (1992a). *Learning to teach in higher education* (2nd ed.). Routledge.
- Ramsden, P. (1992b). *Learning to teach in higher education* (1st ed.). Routledge.
- KU-Science. (2014 - 2015). Natur- og Landskabspolitik [Nature and landscape politics]. *Science*. Retrieved from <http://kurser.ku.dk/course/lnab10015u/2014-2015>
- KU-Science. (2015). Natur- og Landskabspolitik [Nature and landscape politics]. *Science*. Retrieved from <http://kurser.ku.dk/course/lnab10015u/2015-2016>
- Sivan, A., Leung, R. W., Woon, C., & Kember, D. (2000). An Implementation of Active learning and its Effect on the Quality of Student Learning. *Innovations in Education and Teaching International*, 37(4), 382–389.
- Ulriksen, L. (2014). *God undervisning på de videregående uddannelser* (1st ed.). Frydenlund.



# Improving University Science Teaching and Learning

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Lars Ulriksen  
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The aim of the series is to provide insight into the kinds of educational tasks and problems new teachers are facing, and to show how they manage them in inspiring ways.



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# Contents

## **Preface**

*Frederik Voetmann Christiansen* . . . . . vii

---

## **Part I Student activation and active learning**

---

<b>1 "Flipped classroom" – tidsforbrug, barrierer og præferencer</b>	
<i>Mads Fiil Hjorth</i> . . . . .	3
<b>2 Brug af videoer og online quizzes til histologiøvelser i veterinær anatomi</b>	
<i>Esben Østrup</i> . . . . .	13
<b>3 Kan en enkelt forelæsning befordre en aktiv og samskabende læringsproces?</b>	
<i>Louise Kruse Jensen</i> . . . . .	23
<b>4 Forsøg på at sikre 'Intended Learning' med simple ændringer i undervisningen på et fagintegreret kursus</b>	
<i>Howraman Meteran</i> . . . . .	35
<b>5 Developing new teaching material for a BSc course: Student activating lectures</b>	
<i>Kathrin Rousk</i> . . . . .	47
<b>6 Using problem-based active learning strategies in large classes</b>	
<i>Camilla Hartmann Friis Hansen</i> . . . . .	57

**7 Building a collaborative learning environment with the aid of new technologies**  
*Camilo Franco* ..... 71

---

**Part II Course design and redesign**

---

**8 Design af kurset “Statistical Analysis of Spatial and Observational Ecological Data in R”**  
*Michael Krabbe Borregaard* ..... 83

**9 Redesign af kursus i Biogeography of Species Interaction Networks**  
*Bo Dalsgaard* ..... 93

**10 Studenter-undervisning: At flytte de studerende til den aktive rolle giver motivation og øget læring**  
*Joachim Møllersøe Vinther* ..... 105

**11 Udvikling af kurset Basal Ernærings-patofysiologi til uddannelsen i Klinisk Ernæring**  
*Lena Kirchner Brahe* ..... 117

**12 Pedagogical benefits of a new student exercise**  
*Pia Snitkjær* ..... 135

**13 Involving teaching assistants in the design of large courses**  
*Morten Arendt Rasmussen* ..... 165

**14 Aktiverende, tværfaglig og case-baseret undervisning til Naturressource-studerende**  
*Kristian Holst Laursen* ..... 175

**15 Investigating and adapting the student interactions and student activating teaching methods of the course ‘Veterinær retsmedicin og dyrevelfærdsvurdering’**  
*Malene Kirchner* ..... 195

---

**Part III Research based teaching and teaching based research**

---

<b>16 Om at uddanne til job i forskningsbaseret undervisning</b>	
<i>Søren Jessen</i> . . . . .	203
<b>17 ”Teaching-based research” as a triple-win: Student learning, partner benefits and research advancements</b>	
<i>Maya Pasgaard</i> . . . . .	213

---

#### **Part IV Constructive alignment in course design**

---

<b>18 Meta intended learning outcome alignment in experimental course planning</b>	
<i>Sebastian Marquardt</i> . . . . .	223
<b>19 Constructivism and learning</b>	
<i>Knud Dideriksen</i> . . . . .	237
<b>20 Extreme alignment</b>	
<i>Rebecca Rutt</i> . . . . .	249
<b>21 Teaching as promised: constructive alignment of the course “Plant Animal Interactions – an Evolutionary Approach”</b>	
<i>Haris Saslis-Lagoudakis</i> . . . . .	259
<b>22 Developing the course Nature and Landscape Politics with a focus on deep learning</b>	
<i>Laura Tolnov Clausen &amp; Tove Enggrob Boon</i> . . . . .	271

---

#### **Part V Teaching heterogenous groups of students**

---

<b>23 Reflections about challenges of constructive alignment amongst heterogeneous masters’ students</b>	
<i>Paul Stacey</i> . . . . .	289
<b>24 Activating more students through blended online and in-class discussions</b>	
<i>Aske Skovmand Bosselmann</i> . . . . .	297
<b>25 The international classroom – a resource</b>	
<i>Christine Hallgreen</i> . . . . .	311

---

**Part VI Improving feedback to students**

---

**26 Microscopy in Veterinary Clinical Pathology: Attempts to increase feedback**  
*Signe E. Cremer* . . . . . 323

**27 Development of an assessment scheme for laboratory exercises in pharmaceutical education at KU**  
*Andreas Kretschmann* . . . . . 353

**28 Planning learning and teaching activities**  
*Elena Tavella* . . . . . 369

**29 Evaluating the impact of peer feedback on student presentations**  
*Barbara Plank* . . . . . 381

---

**Part VII Student motivation and learning**

---

**30 Om jura, ønsker, drømme og håb og om at walke the talk**  
*Lasse Baaner* . . . . . 393

**31 How much reality is enough for students to learn?**  
*Natalja Genina* . . . . . 403

**32 Teater som undervisningsform på universitetet**  
*Nadia Glæsner* . . . . . 409