

Course learning objectives, teaching activities and constructive alignment assessment in sensory and consumer science

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Purpose

It was my intention to assess the impact of Intended Learning Outcomes (ILOs) via student interviews overall for a Sensory and Consumer Science Course (course no. 270030), where my role is co-ordinator, and then in specific terms to look at ILOs for my own teaching in terms of teaching and learning activities (TLAs). Via this, I endeavoured to assess if the course was constructively aligned. In addition, I will touch upon the exam as a driving force to ILOs and students' perception of constructive alignment of the course.

The present investigation was inspired by Biggs (1996) and Biggs & Tang (2007), who indicate that to assess correctly if constructively aligned teaching and assessment exist there are four stages of assessment to be considered:

1. ILOs investigation
2. TLA with respect to ILOs
3. Assessment tasks (theory and project, about achieving ILOs)
4. Exam and grading (face-to-face, its importance to ILOs)

The following were then the aims in the matter of the interpretation of results in this project:

1. Alignment of course in itself – in students' minds and in coordinators' mind from focus discussions and questionnaires with students
2. Alignment within the total education (a comment will be made with respect to this and changes on the horizon in our course portfolio)

This was a very useful exercise concerning this course from my perspective, as our group has an ever expanding portfolio of courses at all levels and it is a continuing challenge to ensure that the newer courses and the older courses are aligned between and within themselves such that the totality of the sensory education at LIFE makes sense to students who dip in and take single courses or to those who take the courses consecutively, thus ensuring that overlap and repetition are kept to a minimum. Rather, anyone arriving for the first time can come up to speed in a reasonable amount of time, and a coherent education results in useful persons for the demands of the world of sensory science.

Individual project description

An initial problem definition, together with a preliminary project definition

- Assessment of existing overall course ILOs
- Assess ILOs from two main TLA techniques used, i.e., lectures versus active learning sessions
- Assess the course alignment overall

Formulate problem definition as a basis for structuring the working process

As course coordinator and having run this course for a number of years, I am very interested to understand the “success” of the course as it has been judged highly over the last few years by the students and academic teaching committee at LIFE. The simple questions are: Why is it judged successful? What is successful about it? and whether there is room for improvement in the achieving of ILOs via better constructive alignment.

Layer aim in relation to the present course

1. To determine overall if the ILOs in the course description as presented to the students are in fact met and to what degree - student interviews
2. What type of teaching method best contributes to ILOs of my own teaching on this course, thus a comparison of lecturing versus active learning will be made - student interview and group discussion

3. In addition, a commentary will be made with respect to whether the course is in fact constructively well aligned within itself and in broad terms, within the sensory study programme.

Required outcome

Each problem must contain a reasonable answer to the final problem definition with the involvement of relevant theory and circumstances. Thus, concerning guidelines for individual projects, the chosen project may, for example, discuss one or more (typically more) of the following topics:

- Intended learning outcomes and key elements of the course
- Reasons for the choice of the various teaching methods
- Student evaluation of the teaching
- Assessment of the students (exam)
- Alignment of the course

On the whole, it is not the intention of the project to achieve a wall-to-wall coverage of all aspects of your teaching. Rather, the intention is to focus on a problem which is in your opinion important to discuss.

Thus, I took two key issues into account: ILO/TLAs and to a minor degree the exam as a motivation for views on ILOs and TLAs in relation to understanding Constructive Alignment (CA) within the course.

Course background

Course objectives

The objectives of the course are to teach the students the basic principles of sensory theory and practice as well as consumer-choice behaviour. Moreover, it is a key objective of the course to give students a practical and applicable view of sensory and consumer science via a group project carried out across the course period.

The Sensory and Consumer Science course is a course for Bachelor students (earliest possible year after three years) and for Master's degree students, and it is taught by the Sensory Science group of the Department of Food Science at the Faculty of Life Sciences at the University of Copenhagen. All teaching takes place at LIFE, Rolighedsvej 30, 1958 Frederiksberg C.

Sensory and Consumer Science took place in block 2, which was from 15 November 2010 to the end of January 2011. Teaching took place every Monday afternoon and every Wednesday morning and afternoon for nine weeks (structure C). The course is worth 7.5 ECTS.

Course content and structure

Core competences achieved

According to the course description presented to the students online and in the course compendium, the following are the core competences the students will obtain from active participation.

Competences obtained within basic science:

- Knowledge of the different human senses and psychological concepts and theories
- Understanding of the basic anatomy and functioning of the human senses

Competences obtained within applied science:

- Comprehending theories of consumer choice behaviour
- Applying principles of sensory and consumer testing methodology
- Applying principles of experimental design and statistical evaluation of sensory and consumer data

These are generic and were assessed as part of the project: Did these make sense to the students and did they give them a clear idea as to the ILOs of the course?

Monday afternoons were dedicated to project work while Wednesday mornings were dedicated to traditional lecturing while Wednesday afternoons were focused on exercises and practical demos.

The course is structured in a holistic manner starting with lectures on senses, moving into the area of sensory methods; the data analysis of sensory data generated and how the senses are important in the consumer realm and in terms of sensory marketability. The course's holistic structure is underpinned by a practical project which practically underpins the course structure and the structure is also given context by lectures related to ongoing research and in industrial applications.

Specific subject areas of teaching/learning (ILOs)

The Sensory and Consumer Science course consists of lectures, theoretical and practical exercises as well as a group project which follows the course content closely. Thus, the students apply the theory in practice over the period of the course. In addition, excursions are included. In the lectures, introductions, overviews and demonstrations are given related to several areas. The following are the ILOs as they are presented to the students in the course description, also the project context of the lectures and exercises are presented:

- Philosophical aspects of sensory and instrumental measurements
- Anatomy and biology of the human senses
- Theories within experimental psychology and consumer behaviour
- Sensory science from a broader cultural, historical and societal perspective
- Methods for measurement of sensory properties
- Relationships to chemical and physical properties
- Consumer choices and affective evaluation/preferences
- Experimental design and statistical evaluation of sensory data for discriminative and descriptive testing as well as linking sensory, consumer and instrumental data.
- Examples of applying sensory and consumer methods in development of (healthy) foods in food industry

Theoretical and practical exercises include hypothetical sensory problems and testing of sensory methods in practice. Through the project work, students will learn how to apply sensory theories and methods. During the excursion, applications of sensory science in the food industry and research will be illustrated.

These were more specific definitions of ILOs and to give an idea of where the course can have an impact on students' total education and their working lives after university in general. This aspect was also addressed in the focus group and questionnaire in terms of a step in assessing alignment of the course within itself.

Assessment and exam

Before the students can take the examination, they must attend the theoretical and laboratory demonstration exercises. In addition, the project report must be completed and passed in a short oral project examination to qualify

for attendance at the final written exam. Thus, full attendance and involvement in the project group work over the course period is required.

The examination is a four-hour written examination and it takes place at the end of the course period. The relevance of the exam, in terms of the students' view on how ILOs were understood and how they should be presented, was in general terms addressed in relation to TLAs and overall alignment.

Literature

The course has a recommended text book: Meilgaard et al. (2007). It is a well established text book in the area and specific chapters are pointed out as related to specific lectures and exercises. Moreover, the book serves as a reference source for all the main issues in sensory and consumer science thus, it is pretty much an encyclopaedia that the students have in their hands at all times throughout the course. It is a valuable reference source for them during the lectures, exercises and project work.

In addition, a pensum list of articles related to specific lectures is utilized to supplement the book, which shows the course description in more detail in terms of ILOs, TLAs and alignment than presented on the LIFE homepage.

Finally, the lecture and exercise slides are placed online for the students as relevant to the exam. Additional materials can be found via library, project supervisors, science direct etc. and are at the students' discretion most relevant in relation to their project report.

Methodology

Students

In total 32 students from various nations, including Spain, Germany, Denmark, Russia and France, participated in the course. These students were randomly divided into project groups with four students per group. Of these groups two sets of four people were selected at random to participate in a focus interview. Prior to this, they were asked to fill in a questionnaire.

The students selected for the focus group interview were:

Group 1

- Informant DK1: Student from Denmark, female, Bachelor in Nutrition and Health
- Informant DK2: Student from Denmark, female, Bachelor in Food Science
- Informant Ger1: Student from Germany, Bachelor in Food Business
- Informant DK3: Student from Denmark, Bachelor in Nutrition

Group 2

- Informant SP1: Student from Denmark, female, Agricultural Engineering; Environment
- Informant Ger 1: Student from Germany, female, Bachelor in Nutrition
- Informant Ger 2: Student from Germany, Bachelor in Nutrition
- Informant Ger 3 Student from Germany, Bachelor in Nutrition

Questionnaire

The pre-interview questionnaire evaluated student background with regard to nationality and education. It identified student views on advantages and disadvantages of issues in relation to ILOs/TLAs and alignment, and evaluated the students' perception of the various topics by using rating scales from "strongly disagree" to "strongly agree" for the majority of questions and open answer possibilities for additional questions.

Focus group interview

A set of questions was worked out beforehand with the intent to have an interview build up as a conversation. In order to achieve this, I applied a certain degree of freedom to the order of the questions, to the wording and to leave out questions that appeared redundant during the conversation. I followed a few simple principles during the interview (Kvale; 1997; McCracken; 1988):

- Listen – I tried not to get involved and share our own experiences, because this might influence informants and they could use what you say to guess what you would like to hear, rather than what you need to hear.
- Pose short and clear questions – the interviewee may lose the point of the question.
- Remain neutral, enjoy the interview – look interested, smile and keep eye contact.
- Use probes and prompts – refer to elements of the interview
- Take a full record of the interview – the interview was recorded with a video camera

In order to fulfil the requirements of these principles, I structured the interview in the following parts:

Introductory questions. The students selected for the focus group interview were asked to briefly answer the following questions: “Where do you come from?”, “What is your education (bachelor/master)?”. I also informed them about the nature of the interview and the areas we would address during our discussion. The idea behind these introductory questions is to make the participants of the focus group interview more comfortable and to give them time to tune their mind to the next series of questions. The students will hopefully also understand that they are not going to be evaluated on basis of what they will answer. In order to emphasize this, I underlined that the information gained during the interview will be useful to improve the course constructive alignment at University of Copenhagen and that in the near future, other students will benefit from this.

Elements of the interview. To assess the students and gain information regarding our purpose and to verify our hypothesis, we decided to structure the focus group interview in three different elements: grand-tour questions, floating prompts and planned prompts. These elements were inspired by Leech (2002) who stated “In an interview, what you already know is as important as what you want to know. What you want to know determines which questions you will ask. What you already know will determine how you ask them.”

The focus group interview was planned to be of one-hour duration and aimed to cover the following three topics:

Learning objectives (ILOs). The aim was to determine what the learning experiences from the course were for the different students. I explored if they felt they were learning in general and if so why. In this respect, I asked about their understanding of what the concept of ILOs were in general and based on this: Did they understand the ILOs of the course per se? Then in specific terms the ILOs of the individual lectures and of the project. Moreover, in this respect, I asked if it was down to individual teachers’ style of lecturing, whether they presented ILOs up front or not that was a contributing factor to understanding and learning. Also, was the exam a motivation to determine what the ILOs were? Finally, how could ILOs be communicated better in the course?

Teaching and learning activities (TLAs). The aim was to determine if the students viewed the teaching methods employed in the course as useful in terms of giving them a sense of having achieved the ILOs. In this respect,

lecturing versus exercises were explored as well as the use of a parallel practical project.

Alignment. The aim with this aspect of the interview was to discuss with the students if they believed the course as a whole worked. In that, the ILOs were obvious from the TLAs employed. In addition, the aim was to determine if the students saw the course as aligned with their total education and if it fitted with what they viewed as job prospects after they had finished university.

Analysis and findings

State of the nation

The course evaluation process at IFV-LIFE involves an online questionnaire on Absalon for the students to assess the course, content, teachers and structure. This is collected by the coordinator, synopsised and discussed in an open session with the full class of students. The results of this process are written in a report and submitted to the study board who make a judgement on its content and recommendations for areas of improvement. For the last five years, the Sensory and Consumer Science course has run and each year has received the highest grade, an A rating.

In broad terms, all issues have been actively sought out and actively addressed in each subsequent year. However, I wished to learn more about why the course is considered good by students and how it can be improved even further. This came from the knowledge that the individual teachers' teaching techniques and abilities varied widely and aspects of the course structure could still be improved in terms of alignment with timing for learning as the course is progressive in its knowledge building.

Focus group interview questionnaire

In explanation of the analysis of the focus group interview and questionnaire, the focus group responses were analysed according to key responses in relation to the main aims of the project, namely ILOs, TLAs and other in relation to CA.

From the individuals in each group we derived demographic information on each student. More importantly, the questionnaire in reality was used to cross check the focus group answers with the general consensus via

questionnaire, thus, what one might refer to as an objective validation of the group's opinions used. In this respect, it was clear that the answers in objective terms matched those achieved in the more subjective surroundings of the focus group. After experiencing the interview and analysing the recording, we structured the analysis within the topics of A) ILOs, B)TLAs and C) Alignment.

The questionnaire

Key points about questionnaire would be the following based on the three key areas of focus.

(A) *Intended Learning Outcomes (ILOs)*. The ILOs were scored high for the course in general at four, but with an additional category five their appears to be room for improvement. In this respect, it appears that ILOs for and from the practical project is much higher than for the lectures on the course in general (Fig. 16.1). Thus, this is a major contributing factor to the overall less than perfect ILO score for the course. In addition, the individual teachers came under scrutiny with respect to their ability to communicate ILOs. Some were better than others, again a contributing factor to an overall score below full marks. Finally, it was clear that the pensum list could be improved with respect to ILOs, once it was understood what the ILOs were from the introduction, but the existence of many articles and papers in addition to the course book was not appreciated. They appeared not to see clarity in the intended learning possibility from the papers. It would be my guess that these students at their level are not used to reading research articles from the perspective of learning and as such cannot, figuratively speaking, see the wood from the trees, the wood, of course, being the ILOs. An additional question in terms of ILOs was in relation to recommended courses indicated as useful in the course description as good to have attended prior to the Sensory and Consumer Science Course. The majority indicated that this was a useful thing to have had prior to starting the course, and it is most likely a reason for a lack of understanding of ILOs for a number of students as in reality some have zero background and do not even understand the basic terminology used in the course. This is an unfortunate reality of education at LIFE; that it is not allowed to impose compulsory courses as a prerequisite. This is an unfortunate policy since those that have the background become frustrated at the pace of the course as we have to include the basics to bring all along. It does not make way for a level playing field to begin with, so to speak, but hopefully by the end

of the course, all are somewhat at least able to pass the exam, and what we in fact have found is that we achieve a solid distribution across the students each year with some excelling and some just passing with the majority in the mid-plus range.

(B) *Teaching and Learning Activities (TLAs)*. In general, the students scored the level of learning which they believed they were achieving. If they are as high in this respect, then the use of interactive TLAs is a better contributor than lectures. Also, it was apparent that the level of learning was very much related to the ability of the individual teachers in terms of their teaching skills in achieving a high understanding of the lecture ILOs (Fig. 16.1).

(C) *Alignment*. In terms of questions relating to the overall alignment of the course in the students opinion, the course scored highly. In addition, when asked about the course's alignment with the students' education in general, it was very high. This was not surprising as all students were in some way involved in food science, however, it was interesting that the majority indicated "nutrition" as a specialization which has only in the last few years become closely linked with sensory and consumer science. With this, I mean from the perspective that nutritionists now realise that no matter how "healthy" a product is perceived to be, it will not be eaten if it does not taste good – a simple but very true fact. People may eat something once or twice but what is needed to influence health with food is mass adaptation to products such that they become the new norm. Many students went as far as indicating that the course was part of the master plan they had for their education from the start. It has to be said that some disagreed totally with this also.

Finally, a point that is worth highlighting, after all is said and done, the students indicate that they liked the sound of the course very much, thus, it is a good idea in the course description to make courses sound good to get students to participate.

Focus group interview

In this section, I will present the key conclusions from the points made by the students in relation to the grand tour questions of the focus interview which shed light on ILO/TLA and Alignment. Furthermore, a link is made to the indications of the questionnaire (previous section) as reinforcement of "validity" in terms of an independent view versus an opinion in a group setting.

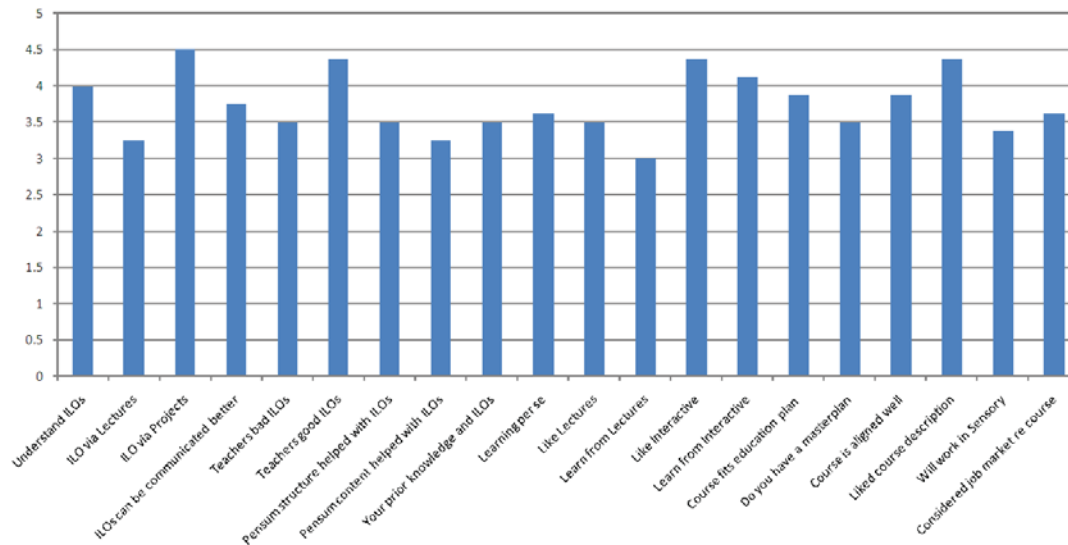


Fig. 16.1. Mean responses to initial questionnaire by focus group participants.

Most importantly, here also the students suggested methods based on their experiences of teaching as to how they believe any issues could be improved. This is, of course, important in that sometimes we as teachers cannot see the wood for the trees and the most obvious solutions can be missed.

I summarize the main conclusions as text and include quotes only where appropriate.

Note: The individual questionnaire is linked directly to the focus areas of the interview, in terms of objective scoring of key issues regarding ILO, TLA and alignment as discussed in previous section.

A. *ILOs*. Grand Tour Question, focus: clarity of learning goals. They were asked specifically why they chose the course, were they clear as to what they were learning and did they feel they were learning something? The following is a synopsis of the main points raised in the conclusion on ILOs:

- Structure: It is very well-structured
- ILOs about lecturing versus exercises, exercises work best, but they can see the merits of lecturing
- Project works well as an underpinning and focal structure for the learning across the course
- Timing: The course needs a little tweaking in terms of timing - early in the course some lectures did not fit closely enough with progress on report, there

was a slight lag in that they would have begun on the project with the issues that came two days later in the course. In previous years, this has not been noticed, but via this interview process it was clearly an issue. Particularly so for one third of the students who indicated that they did not have all the recommended courses prior to this course.

- Attention span: A critical issue linked closely to the previous “timing” issue discussed was a tweaking needed of the ordering of the daily schedule to ensure attention was not lost after a long day of class work on Wednesdays, where lectures and exercises mainly take place in the same room. This by default will also help with the lack of alignment of the course work in the first two weeks of the block with the progress on their practical project. Such that the lectures precede the project work, as well as there are no full days in the classroom. Project work is carried out in our various labs, but involves preparation, consumer testing etc. so it is very varied and interesting and a break from the classroom.

B. TLAs. Grand tour question, focus: reasons for lack of clarity in ILOs. Was it the individual teachers or the style of teaching? How to best improve any lack of clarity? Was the exam a driving force and did any lack of clarity cause frustration in this respect? Conclusions on TLAs:

- Teaching good overall, some better than others and this has implications, of course, for the clarity of the individual lecture ILOs – to improve, send guidelines to all teachers on how the ILOs of their lectures should be displayed.
- Also break down the lectures in the compendium in terms of ILOs, such that one has a full overview of each lecture’s ILOs linked to the main subject areas as presented in the course, plus a link to diagram of main course areas. Students indicated that it was a good idea to improve the compendium course overview.
- Teachers should focus on the point and not waffle all over the place. This was countered by the opinion that it is also nice to get the broader view. The first point was from a student who was exam-focused so it was no surprise also during the course that she asked about ILOs.
- Teaching formats; lectures are not as interesting as exercises and demonstrations, but in agreement with that fact comes through lectures, but understanding of the facts in many cases comes through linked exercises.

C. Students’ view of alignment of course. The aim here was to get the students’ view on the constructive alignment of the course such that I as a coordinator could make a judgement on its overall alignment. Again, to try to validate my interpretation with the views of the students. Thus, the linkage of ILOs and TLAs and course structure were the main focus of discussion. Grand tour question 1, focus: Do you feel that the course works well for you in its format? Do you feel it functions well in terms of its

make-up? Does it function well for you in your overall education now that you are doing the course? Do you know what type of job you might get afterwards? Can you see where sensory is important now? Has the course lived up to its interesting description?

Conclusions – alignment – students’ views

As already pointed out, the alignment about timing of initial lectures needs sharpening, but then the students indicated they were on a roll after two weeks and it all became good. This year (2010) was special as all were very quick in their project progress, more so than in previous years.

The ILOs and TLAs were okay for them, but, of course, they would like more activity and less classroom. Also, the project was a very effective frame to fit to the ILOs for them, in that way they could see what they learned work clearly in practice, i.e. how to train a sensory panel in theory, then do it in practice. An interesting exercise is to get the theory to work on real people in practice and it is not easy.

In terms of a discussion of whether this course part is part of a master plan and whether it fits in with their overall education: Some agreed, some totally disagreed. In conclusion, the students may have been a little young, as third-year BSc/first-year MSc (who may have a stronger view as to the course’s relevance) to really comprehend this question, but it was interesting to ask as it gave an idea of the motivation for choosing the course, such that we knew it was not just because they liked the sound of the description as was discussed previously.

As a conduit to the overall education fit, I asked if they had opinions on the type of jobs that they might get as a result of this type of course and focus in their education. It was clear that the Danes had very clear and precise views on this, the Germans were much less clear. However, all of them indicated that it was much too early to consider jobs seriously concerning their education as they were having so much fun at university. We all, of course, recall these happy go lucky times.

In terms of the overall question: “Has the course lived up to expectations?”, the response was very positive and the students indicated that they became more and more interested and drawn in as the course progressed. To the point now they indicated that are becoming annoyed to as dinner companions as they discuss the various sensory aspects of the food they are eating and the pros and cons of these with their dining partners. From my

perspective, we could not wish for much more in that we have converted them to the sensory path and this is, of course, where we will get our best PhDs from in the future.

Perspectives

Here is, to make an overall conclusion from the above, my view as coordinator of how well the constructive alignment of the course works based on the systematic analysis of the questionnaire and focus interview conclusions as determined.

Identification of some key issues:

1. Lecture is the standard in most countries and is accepted, but it is not “entertaining” enough. Is this a reasonable view, is education and learning about entertainment? To a degree for certain; the trick is to strike a balance between structure, information, teaching techniques and enabling learning. Thus, breaking the lecture up with a series of tasks, discussions and small exercises has proven to work very well for me on course teaching. It is nice now to know I do not have to talk for 45 minutes during a ‘lecture’; this was always a daunting task and the realization that this is perhaps not a good idea in itself was a welcoming relief.
2. Interaction is better than lecture, but do students really learn from one over the other? A clearly aligned combination with appropriate timing appears to be the best solution. The present course will benefit a lot from this information from the students.
3. ILO learning goals are reasonably well understood, but should be integrated better, across the course description and linked more clearly to the compendium and individual lectures and back via project.
4. Teachers should be more coordinated and have a standard format for their lectures in terms of ILOs up-front and make sure that these are clearly linked to the overview of the course in the compendium and initial lecture on course content given on day one. This will be an active issue for next time where we will send out a set of suggested guidelines with the constructive alignment idea described for the lecturers.
5. Alignment is very good in terms of a mix of lectures, exercises and practical project work. A slight rethinking of the focus of the days is needed due to fatigue, so one half day of lectures on Monday, one half day of exercises on Wednesday and afternoon Wednesday project work.
6. Timing of lectures needs rethinking in terms of when they are best presented. In relation to this, the reordering in point five would also help a lot in that they are lectured and do exercises just before they work on that part of the project,

most importantly, in the first two weeks of the course only, they find a balance after that.

7. The course book needs to be looked at in terms of lecture structure. The compendium's function now is papers linked to lectures, whereas it should be papers linked to exercises linked to lectures such that the alignment of the ILOs is clearer.

All contributions to this volume can be found at:

http://www.ind.ku.dk/publikationer/up_projekter/2010-3-1/

The bibliography can be found at:

http://www.ind.ku.dk/publikationer/up_projekter/kapitler/2010_vol3_bibliography.pdf/