

## Aligning expectations in a course taught by many teachers

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### Introduction

This KNUD project is based on the course “Computational Chemistry” that is held at the Department of Chemistry and taught by seven different teachers. All teachers are present during the final oral exam. During past editions of the course I experienced that students might arrive at the exam without knowing exactly what kind of questions they will have to answer. Moreover, the teachers were surprised that the students were not aware of their own level of preparation. I can see this originating from two causes:

- Students may not be used to have a course taught by different teachers.
- Teachers may not be used to teach only a small part of a course.

These two facts can have a series of consequences, like:

1. Students are timorous to approach (scarcely encountered) teachers outside teaching hours in order to ask for extra explanation of their subject.
2. Students are timorous to ask a different teacher for explanations about a previous subject.
3. Teachers have limited/no time to spare assessing/re-explaining the material taught by their colleagues.
4. Students get more distracted by different ways of teaching other than enriched by different points of view.
5. Different teachers have different expectations about the level of understanding of the course in general and the various subjects (their own or others) in particular.

6. Teachers do not have the possibility to assess the students' understanding of their subject before the final exam.

The course evaluation sheets (see Appendix A) do not easily evidence this series of problems. Nevertheless, it is interesting to read in the 2012 evaluation:

“It's hard to evaluate a course with so many different lecturers each with their own approach”.

Since so few comments are left in the course evaluation, this one could be symptomatic of some issues with having so many teachers. It could be that there is not alignment between students' and teachers' expectations for the course (Biggs & Tang 2007).

In order to analyze this problem and, possibly, improve the students learning experience and the overall course quality, I took three actions:

- I provided the students with a short questionnaire before the start of the course, to test their feelings and expectations towards the course itself.
- I created two tests on the course arguments so that the students could self-evaluate their knowledge (formative assessment) (Gibbs & Simpson 2002, Yorke 2003, Nicol & Macfarlane-Dick 2006). These tests were held one between Block 1 and 2 and one at the end of the course, but well before the exam.
- After the first test, I interviewed a few students in a focus group, (Berg 2001) to check if they changed their general feelings with respect to the starting questionnaire and to probe their response to the test, i.e. if they found it effective in detecting their possible deficiencies in the course matters and/or to understand what will be required of them at the exam.

The interview's contents constitute the base for the main reflections and conclusions of this project.

## **The course Computational Chemistry**

The course “Computational Chemistry” (CompChem) is held at the Department of Chemistry throughout block 1 and 2 and is divided into modules. Each week corresponds to one module, which in turn loosely corresponds to one chapter of the reference textbook (Jensen 2007). Seven different teachers impart this course. Each week a different argument is treated, with theoretical lectures and computer based exercises. Each teacher is in charge of

one to three weeks of teaching, often not contiguously. I taught two of these modules, Optimization Techniques and Basis Sets. Typically each week, Tuesday mornings are dedicated to lectures, while Thursdays are full days of computer based exercises. During the Thursday session it is common to review and complete some aspects of the Tuesday lecture. On average 15-20 students attend the course. The course is aimed at master level students, but often also PhD students attend it. Twenty-four students were initially registered to the course. All students have to prepare a final project in order to pass the course, but PhD students are not requested to defend it during an oral exam. Eleven students participated to the final oral exam. The course was given in English since non-Danish students attended it.

## Methods

The course expectations questionnaire and its answers are reported as Appendix B. The questionnaire consisted in three yes/no questions, four multiple-choice questions and an open field for comments. The questionnaire was sent to the students, through Absalon<sup>1</sup> before the start of the course. Nineteen students answered the questionnaire.

At the beginning of the course, I asked all the other teachers to provide me with five questions relative to their arguments, together with right and plausible but wrong answers. These questions constituted the two tests I sent out to the students mid-way through the course and at the end of it. The tests were created in Absalon. The questions were mainly multiple-choice questions, even if there were a few open questions and some of other kinds (e.g. put terms in the right order). The first test was about the arguments covered during block 1 and consisted of forty-three questions. The second test was about the arguments of block 2 and consisted of twenty-seven questions. In each test the questions were grouped according to the course modules. Twelve students took the first test. The first test was made again available at the end of the course and this time four students took the test. Seven students took the second test. At the end of each test the Absalon system immediately gave the students the results of all their answers, minus those to the open questions. Afterwards I sent the students a set of good enough answers to the open questions.

After the first test I asked the students if they were interested in participating in an interview about their experience with the test and the course in

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<sup>1</sup> Absalon is the online system for all courses at the University of Copenhagen.

general. I was able to interview three students in a focus group. The interview was articulated more as a conversation rather than a series of questions and answers. Nevertheless I prepared ahead a series of questions which I wanted the students to talk about, to guide me through the interview. Figure 17.1 reports the guideline questions.

- When you signed up for the course, were you aware that so many teachers taught it?
- Did you previously attend other courses with so many teachers?
  
- How is your general feeling towards the course midway through it?
- Do you miss a reference figure, i.e. a teacher who is present to all/most of the activities?
- Do you think such a figure would be necessary/beneficial or counter-productive/useless?
  
- Did you expect more benefits or disadvantages from this situation? (i.e. many teachers)
- Is the course living to your expectations?
  
- Did you find the mid-block test useful?
- Did your level of confidence towards the final exam increased or decreased after taking the test?
- Do you think will it be useful to have a similar test also at the end of the course?

**Fig. 17.1.** Outline of the questions used during the focus group interview.

## Findings

### Course expectations questionnaire

From the answers to the questionnaire (Appendix B) sent to the students before the start of the course it is apparent that most of the students were aware that the course was taught by many teachers. Even if for some of the students this was going to be the first course with so many teachers, the majority were quite confident that the teachers would be coherent and that they would benefit from different points of view. Nevertheless, around half of the students anticipated problems in asking extra explanations about

a previous lecture to a different teacher. The students showed an average confidence in the exam. The only comment left is positive and about having greater opportunities of learning given the multitude of points of view.

### **Interview**

All three interviewed students had taken the test at the time of the interview. Two of the interviewed students were from the minority who was not aware of the number of teachers before signing up for the course. For one of the students this was the first course with so many teachers.

When talking about the differences between courses with only one or two teachers and courses with many teachers, the students had mixed feelings. They had no clear preference for one or the other type of teaching.

“I’m neutral”, “I had good experiences with both structures”.

They expected some lack of continuity because the course is very broad, but since the modules are (quite) self-contained, there is no explicit need for continuity.

“[In CompChem] some teachers are better than others, especially when you have so many teachers, [but] for this course in particular I don’t think [continuity] is a big problem because every week the material stands for itself”.

The students highlighted some good aspects of having a course with many teachers. For example:

“If there is one teacher and the teacher is bad, then you have a bad course, if there are seven teachers and two of them are bad, then it’s still ok.”

“If there is a bad teacher and is going to teach for [. . .] half of the course, then you simply are just not coming to the lectures, because spending the time on the book is better. [. . .] You don’t do that here [in CompChem], you come every time because there is someone new.”

In particular they considered a strength having different points of view on the same argument:

“Sometimes we talk about the same arguments [. . .] and the fact that we have had different teachers [. . .] adds something to the course, because we see different points of view, [. . .] we talk about the same topic in different lectures.” “It’s a strength.”

“A good teacher can change everything because can make you understand all the other things that you didn’t understand before”.

While talking about the possibility for a responsible teacher taking a more central role, one of the interviewed students reported his experience with another course where there are many teachers as guest lecturers presenting their current research. In such a course it is good that the teacher responsible for the course is present, because he or she can ask questions to the guest, in order to help the students to put the lecture in the perspective of the rest of the course. The students agreed that this would not apply for CompChem, since each module is about a known methodology or theory. But one of the students pointed out that:

“I think the course would only benefit if there was a more central person in charge [...] just to make sure that we covered everything, because right now nobody can be sure that we had that, the right knowledge”.

Afterwards we started to talk about the test that they took and its usefulness.

“I found it useful, because [...] it’s hard for me to look in the book to know ‘I have to be able to explain that’. The questions are my guideline.”

“It was nice we had the chance to prove our knowledge. This test cannot cover everything, but it gives me a feeling about what I know [...] and what I need to revise. Some teachers said explicitly ‘These are the kind of questions you could be asked during the exam’, but not all of the teachers have done it. [The test] is a good thing.”

“I think it is super good. [...] Every course should have something like this, you have to know the answer to these questions before you go to the exam.”

“I think it is a very good way to re-evaluate yourself “ “especially in this course because there is so much information [...] and the book is giant.”

“I found it important in this course to have those kinds of questions because the exercises we do are not really theoretically based, it is more like practical ‘how we do this computation’ and not really ‘why we do this’. We only get that from the lectures. The book is [terrible], so we got pretty much the lectures and the notes we get in the lectures, which is not a good basis.”

“I’m basing my studying only on the notes that I take during the lecture, because the book is hard to get in.”

To the question if they felt that their level of confidence increased after the test the students answered:

“Yes.” “Confidence is a good word, because you know you have a way to validate yourself, you know you’ll be able to find where you need to focus right before the exam. It’s a good safety net.”

This answer raised my doubt that the students might decide to learn by heart only the answers to the test questions, but they answered:

“No no, I see that the questions have an area, so if I get the questions wrong I should probably study that area.”

From the technical point of view, they found that the test should have had all questions in one page to scroll, rather than each question on a separate page. The students appreciated to receive the correct answers after completing the test and a good enough answer to the open questions.

The students also said that they would like to have the lecture notes before the lecture so that they can prepare themselves before the lecture. For this reason the notes themselves should be a written summary of the lecture argument, not a copy of the slides that will be used during the lecture. The students appreciated as well the usage of instruction videos.

In conclusion the students felt that the usage of a formative assessment based test coupled with clear lectures notes would be highly beneficial to the course.

“If this course would be completely perfect there would be questions after every week for each subject and every teacher would write their own notes for every week.”

After the exam, two of the interviewed students were briefly asked about the usefulness of the test in light of the exam results. They stated that they still thought the tests have helped them with their studies and would recommend having them also for next editions of the course.

“Possibly any course should have a self-checking test like these ones”.

## Reflections and Conclusions

Thanks to the interview it is possible to draw some (qualitative) conclusions on how the course is perceived by the students and the effects of the tests I provided them.

Regarding points (1) and (2) in the list reported in the Introduction, not so much can be done to encourage timorous students, given the format of the course. Nevertheless it has to be noted that the course is aimed to master students, who should be already confident enough not to worry to ask anything to any teacher at any time.

Regarding point (3), from the interview it is apparent that, without knowing it, different teachers are already re-explaining parts of the course given by their colleagues, even if they are not formally doing any formative assessment. The students consider this situation as a strength of the course. They really like the possibility of having different points of view (point (4)), since one of them may shed light on all the others.

The students can see advantages and disadvantages of the format with a single teacher and many teachers, but they do not seem to have a preference for either. Given the nature of the course and its arguments, there seems not to be any indication that the format with many teachers is inherently bad.

The students sounded positive about the tests and their value. They felt the test they already took increased their level of confidence towards the exam. The students knew better what was supposedly expected from them at the exam in terms of level of knowledge for the various modules. They seemed able to use the test to do self-assessment, in order to check which arguments needed to be revised.

Since the teachers provided the questions, the tests represent the essential knowledge expected at the exam. In this way the students indirectly know what is the least that is expected of them.

The tests represent a tool also for the teachers, not only the students. For example, at the exam all teachers were able to examine the set of questions, in order to understand what to expect from the students in terms of knowledge outside the arguments they taught and calibrate accordingly the exam questions. This would address point (5) of the list. Moreover, the teachers have access through Absalon to the full set of answers given by the students, so that they can get which arguments have been better understood and which ones were more difficult. In this way they can improve the quality of their teaching for the following year and, in case of serious difficulties, maybe send the students some extra material or organize some kind of extra teaching. Even if it is not the perfect solution, still also issue (6) is addressed by using the tests.

Finally, the students' interview highlighted some need for a stronger coordinator figure, mostly as a person checking that the entire required curriculum is actually taught. The tests questions, as based on the actual arguments covered during the lectures, together with the students' answers provide a tool for the course responsible to check on what the colleagues have been doing. If needed, the course responsible could intervene to suggest modifications to the contents of the lectures to better conform to the course intended learning outcomes.



In conclusion, through the usage of the tests a better alignment between teachers and students expectations has been achieved. This better alignment is based on material (the tests on Absalon) that is easily available to both parts. Through Absalon the tests can be easily re-used also for next editions of the course, while being carefully updated and revised as necessary. Following the interview and the exam results I would highly recommend using these tests again next year. Possibly, a similar format could also be extended to other courses with many teachers.

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All contributions to this volume can be found at:

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