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Learning from experience – Re-design of the course "Biomedicine for veterinary students"

Rikke Heidemann Olsen

Department of Veterinary Disease Biology, University of Copenhagen

Background and purpose of the project

The course "Biomedicine" was hold for the first time during the spring 2014 (2x8 weeks). It is a master course for veterinary students and compromising a full degree of biomedicine for veterinary students, equaling 26.5 ECTS. The course is very comprehensive, with not less than four course responsible and 34 different teachers involved. The course had five different themes, e.g. "cancer" and "lifestyle diseases", and the idea was that the course should be a continuous multidisciplinary learning process. Finally, the exam should allow the students demonstrate an overview of a large area, rather than very detailed knowledge of only a minor area. However, after completion of the course and the exams, it is obvious that a number of areas could be improved, especially between the intended learning outcome and teaching and learning activities. The project is divided into two parts; part 1 is an introduction part, and part 2 analyzing the major pedagogic challenges for learning in the course in the present form, and suggests actions to develop the course to be hold in the spring 2015. The analyses will be based on my own experience as a teacher, planner and censor at the course, student-evaluations and oral interviews with students.

Part 1 – Introduction

Background for the course

The course contains a full degree master for veterinary students, to whom the course is reversed for. The master level of the veterinary study education contains five different linages, one of them being "Biomedicine". The course presented in this project is the only course for the biomedicine linage, equaling 26.5 ECTS. Until 2014 the course was divided into two modules with separate exams (grades), in addition to a separate exam (pass/fail) in laboratory animal science to acquire a license to perform animal experiments. This has been the course-form of the lineage for six years, and generally there was a major satisfaction with the course from both teachers and students, which also reflected on outstanding exam performances of majority of the students. However, due to re-organization of the veterinary student program, we were imposed to gather the course from two modules to one module with one graded exam. The laboratory animal science part of the course remained unchanged and will not be discussed in this project.

Student motivation

The teacher of veterinary students should perhaps consider them more fortune than teachers at many other student directions, since the vast majority of veterinary students seem to possess an almost inherent motivation and eagerness to learn! Although very few lectures are mandatory, at least 80% of the students do frequently or always participate in the lectures/exercise. It should be mentioned that the admitting of students to the different lineages are not only based on the student's wishes. Rather, the 25% of the students with the highest average grade after completion of their bachelor of veterinary medicine are allowed to choose freely between the five lineages, the remaining students most make a priority list of their wishes. Then, if there are more students that wish a particular lineage than course capacity can hold, students are distributed to the different linages by drawing lot. Seven years ago, when the biomedicine lineage was offered for the first time, not many students wished to be admitted to this lineage. Perhaps since it was very different from that time's conception of a veterinarian, compared to e.g. the linages of companion animal diseases. Therefore, a number of students at that time were admitted to the lineage against their

will. Fortunately, the lineage (due to course construction, exams, future perspectives, ect.) became a great success among the student. This quickly rumored around the bachelor students, and this year, as far as I am orientated, all 33 students attending the course had choose this particular lineage as this first priority, despite the changes of the course structure. It is obvious that this lineage aims to provide the student with work-relevant competencies and qualification required in the broad field of biomedical research. As a PhD seems to be almost inevitable for a veterinarian to be successful in the biomedical field, the students have extensive focus on achieving high grades, and since this course compromise 26.5 ECTS points, this exam is the most important exam for the final result of the students grade point average. Conclusively, I found the students highly motivated and prepared to work hard on the course right from the first day of the course.

Table 9.1. Figures relating to the course "Biomedicine for veterinary students"

Overview of the course (spring 2014)			
Number of students	33 (course capacity 36)		
Number of teachers involved	34 (hereof 5 main course responsible, 4 associated course responsible)		
Average lecture/exercise hours per day during course*	4.75 hours (excluding one week assigned for poster-design)		
Lecture (% of teaching)	29		
Exercises (% of teaching)	71 (lab. and theoretical exercises)		
Exam results			
Passed/failed	30/3		
Avg. grade point	6,7 (7,3 if non-passed grade are subtracted)		

* Exclusive preparation

Structure of the course

The course includes modules of microbiology, genetics, experimental design (including statistics), in vivo pharmacology, histopathology as well as a range of laboratory exercise to complement theory taught in the lectures.

The exam is oral without aids. The exam compromise three parts: 1) A histopathological slide (which the students have been introduced to during the course), 2) A theoretical discussion of one of four "themes" taught during the course, 3) Discussion of a poster made during the course (the poster must be different from the poster made by the group of the student to be examined. To cover all parts of the exam three exminators and an external censor is necessary.

Curriculum

Since the course is a master course, we expect the students to be scientifically mature to take responsibility for their own professional development and specialization. Therefore, the course does not have a specified curriculum list. Instead, the students are guide by throughout and specified learning outcomes, e.g. "describe principles of housing, breeding and use of laboratory animals", or "describe inference methods and risk analysis".

Part 2 – The analysis

My observations during the course and exam

In this section, I have stated some of the most notable observation and the lack of constructive alignment. In the course description, 12 learning outcomes, 12 skills and 13 competences are expected of the students to acquire during the course are specified.

As described, the course were ideally planned to integrate different parts of biomedicine and not to be taught as a number of fragments areas. Some of this worked nicely, e.g. was microbiology combined in a practical exercise with genetics. One part of the course (the experimental science course), however, do represent a separate part with a separate exam. This part of the course was placed somewhat in the middle of course period, which seem to interrupt the remaining course. This could be solved by placing this part in the start of the course finishing with the exam for this part, and then run the remaining course as a continuous unit.

As can be subtracted by the stated, this course does contain a board spectrum of different areas within biomedicine, and one of the most common elements of frustration that I sensed among the students, were the fact that the students did no overview of what was expected of the to know the level of details excepted of the them to process within each area. This could meet by introducing a successive number of assessments/self-assessments during the course. Class room voting tools have been shown to improve learning, and e.g. could socrative (an online class room voting tool) be used for quick quizzes allowing the students to self-assess their insight in a particular topic, and in case the level of the quiz questions should be of the level we expect the students to be able to process at the final exam. The results of the students in the quizzes could also be used constructively for the

Table 9.2. Examples of descriptions of ILO/skills/competences from the course description.

Outcomes/skills/ competences	Assessment	Teaching / Learning Activities
Describe various animal methods for human diseases Comment: A clearly defined outcome	Only assessed at the oral exam Comment: Should also have been assessed during the course, since this is one of the main ILO of the course. Could be assessed through e.g. oral presentation of the students, through written reports or through mini-quizzes during the course	Lectures regarding different model Comment: Some of the models, we expected the students to be able to described are not covered sufficiently.
Be able to find new information/literature on topics within the area of biomedicine	A number of written reports and oral presentation by the students during the course. Based on the scientific level the students ability to find relevant literature to solve the questions was assessed. Comments: Since the course is very board and covers a large area, this kind of assessment of serve at a random sample at few confined areas.	Group work of specified assignments where the students were exceptedto find relevant literature of. Comments: To my knowledge, this course is the only course at the veterinary education, in which no exact curriculum is defined. Therefore, a single lecture dedicated to how we expect the students to study during the course would be worth considering
Analyze, evaluate and present results from simple diagnostic tests	Was not assessed Comments: given the extent of the course, all areas will not be able to be covered at the oral exam. However, since this topic was taught in lecture form for two consecutive days, a small quiz (e.g. using "*socrative*" software) would allow the student to self-asses their learning outcome.	Lectures on the topic

teacher to assess his/her teaching own teaching 2, leading to a contingent teaching(Draper & Brown 2004), which relies equally on both the teacher and student as to having to adapt the teaching to the correct level (Crouch & Mazur 2001).

The course is also based on a rather large portion of group work, most often followed by the students presenting their work in plenum for the other student. It is worth to notice that group work is not mentioned at all in the ILO/competences/skills of the course. Nevertheless, a total of six groups were applied throughout the course, and commonly the six group then worked with six different topics, and the intentions where that the

groups should learn from listen to the each other. However, students are not teachers!! Consequently, each group might have gain some information by doing their project/assignment, but the learning outcome from the other groups (working with different topics) of such presence seems to be very limited. One way to improve the learning outcome, is to let two groups be opponents on each other project. Then they would have to be actively and critically involved in the project of the opponent group in addition to their own project. Thus, all groups would not be expect to be present through all the groups' presentation, but only when the present themselves and when their opponent group present. However, all students should be handed out the research question of all groups. These research questions should of course be constructively aligned, clarified to the student what we expected to them to be able to describe within a particular topic. Also, groups should be applied only with an aligned purpose, not to relieve the pressure on the teachers' work burden! The teacher must take responsibility to design the project/assignment of the group work in a sense that the project/assignment would benefit more from being conducted in a group, than conducted one-by-one.

Although the average grade point for the students obtained at the exam must be considered relatively high (6.7) compared to other, comparable courses at the veterinary education, in my point of view there was a major gap between what the students expected to be assessed in, and we (examinators) expected the students to be able described (discussed further in the next section).

Evaluations of the course by the students

This section is based on the written evaluation by the students (unfortunately only 12 respondents filled out the online evaluation form), a brief in plenum discussion with the student at the end of the course (but before the exam), oral interview with four students all obtained the grade 12 at the exam and two students, which had both received the grade 02 at the exam. Finally, written interviews were conducted with additional four students randomly chosen from the list of participants.

The structure of theme was intentionally meant to be divided into five themes. However, although the students recognized the themes, there were a number of lectures and exercises that the students could not place into the described topics, adding to confusion and frustration. If we wish to keep the theme-structure of the course, it is necessary to have the theme well-defined

and have all teaching activities clearly aligned to one of the themes. The extensive amount of group was criticized by the most of the students. They all found that group work is rational under practical exercises (e.g. lab exercises). However, a number of the theoretical exercises were perceived by students, as initiatives suggested by the teachers to lower their own workload, not because group work served as the most optimal method to assist learning in a given topic. What we, as teachers, seem to have failed, was to create an alignment between the group work, the exam and "real-life". That is, almost all group work finished with an oral presentation of the results obtained by the groups. This is actually a great way for the students to practice their oral skills of presenting results in a scientifically substained manner with a high degree of freedom as to do this, which is actually exactly what is assessed at the exam, and definitely a valuable tool for everyday work life situation. After all, we do not want to educate student to do great on the exam (great if they do, of course), but to provide them with the optimal fundament of which the scientifically career should be build. However, then groupwork design must be optimized to be in alignment with the exam. An example of group work could be to describe the most important animal model for lifestyle diseases (one of the main themes), and discuss pros and counts with each of them. This is one of the main areas they will be expected to be able to explain throughout if the draw "lifestyle disease" at the exam, and therefore is much more constructively alignment compared to some of the group work assignments presented this year.

About 50% of the students stated that the ILOs and exam format were not clear from the start, which gave rise to some frustration. This is partly due to the challenges described in the introduction part, but also because the students are not used to use the course description sufficiently. In fact, much energy had been put into design and wording of the course description. How to use the course description could be included the "how-to-cope-with-this course"-lecture as suggested earlier.

Finally, about 41% of the students did not think that there was consistency of the exam with objectives of the course! This number is based on written evaluation, which unfortunately only had 12 respondents. However, during the extended evaluation through the written and oral interviews preformed in this project, the real number seems to be lowered, although this might be biased by majority of students that agreed to perform an interview were student in the very upper end of the grade scale.

Suggestions new pedagogic implementations for the course in 2015

Based on the analysis performed (my own experiences and student evaluations) the following suggestion to improve the level of constructive alignment of the course:

- The course plan and the exam format will be outlined before the beginning of the course.
- A course introduction lecture will be held. The focus on the lecture will be guidelines for the student, including how to use the course description effectively, how self-studies should be performed and how to study for the exam.
- The course should be launched with "experimental animal science" including the exam for this part.
- Group work will only be applied if it can be justified to promote the learning process and the type of assignment must by in alignment with the intended learning outcomes outline for the course
- All major parts of the course should be assessed, not only during the exam, but also during the course. This would help the students to recognize possible weak points and allow the teacher to continually evaluate the outcome of his teaching activities.
- The structure of the course being divided into themes should be retained, however, all disciplines taught should be included into one of the themes.
- All topics/areas of the course are expected to be performed either though lectures, practical or theoretical exercise with at least one other area of the course (e.g. microbiology and genetics).

All contributions to this volume can be found at:

http://www.ind.ku.dk/publikationer/up_projekter/2015-8/

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