

# **Increasing the framing of a demonstration exercise in the Veterinary Anatomy course**

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## **Introduction and Justification**

The Veterinary Anatomy course at the University of Copenhagen is an integrated part of the Anatomy and Physiology course (AF1 and AF2). Traditionally the course has a strong classification as one of the basic courses providing prerequisite knowledge for subsequent courses (Bernstein, 2000). The TLAs in the Anatomy AF2 course consists of lectures, macroscopic demo-exercises and histology exercises, and the students have to pass running module tests and a final practical-written exam without aids.

The students are first year students, the majority are females often with high grades from secondary school. Typically, they are conscientious and very internally motivated. A challenge of learning anatomy is the load of learning by heart, which may encourage a superficial rote learning approach rather than more meaningful deep learning (Entwistle, 2009). The intervention chosen for this report took place in a demonstration exercise in “the heart”. The ILOs in the heart module are described in Appendix A, and shortly speaking is acquisition of knowledge about the 3D nature of the heart and the Latin names and function of its structures.

The macroscopic demonstration exercises gives an opportunity for the students to interact directly with the tissue. The close up visual examination on their own and the tactile element when examining and cutting the tissues includes a comprehension of color, texture, strength, nature of surfaces, dimensions and more. These exercises potentially holds a rich opportunity for creating an active deep learning environment stimulating learning at higher levels in Bloom’s taxonomy (Andersen &

Krathwohl, 2001). However, the physical frames for the exercise are challenging because 180 students are joined together in one location and supported by only one teacher and 2-3 TA's, which offers very little time for personal student feedback. My experiences from previous exercises are that many of the students are not focused enough, waste the time and opportunity to interact with the material and therefore they lag behind. The reason why some of the students are unfocused and not unhesitatingly interact with the tissue might be, that this kind of teaching is new for the students with all that it entails, and that some existing personal boundaries have to be crossed.

The aim for the intervention was to examine if increasing the control by giving a more specific assignment would increase the activation of the unfocused students, thereby increasing the quality of the group work giving the students a better learning outcome. Secondly, to include a student generated product in the exercise providing the students with a possibility to document, evaluate and revisit their work. Finally, the aim was to examine if introducing a simple form of peer feedback would be an option to compensate for the low teacher/student ratio.

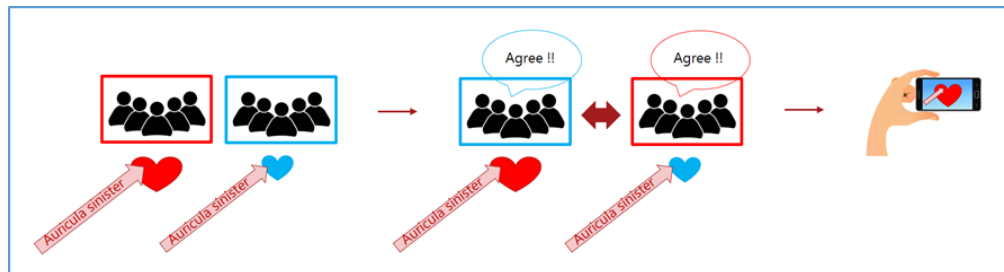
## **Design of Intervention**

The students were introduced to the intervention two days in advance of the exercise at the introduction lecture to the module. Students preparation, consisted of a PDF menu of anatomical structures and a video sequence of 15 min located in the learning platform Absalon.

In total, 18 groups of 10 students were allocated to one of two teams. Team Menu represented the conventional way of conducting the exercise and consisted of 9 anatomy groups which were equipped with a printed menu of the anatomical structures to be identified. Team Label represented the intervention group and consisted of the rest of the 9 anatomy groups. Team Label groups were equipped with the same anatomical structures to be identified but in a laminated label format with direction indicators.

The exercise started with a relatively short demonstration of the right side of the heart. A camera positioned in top of the demonstration

live casted a close-up view to several screens available at the students tables, and then time was allocated group work. Each anatomy group of 10 students had two fresh hearts, a big one from either a cow or a horse and a smaller one from a swine or a small ruminant, hence, the students were asked to cooperate 5 persons per heart. A session of peer feedback was planned for Team-Label, thus, the two groups of five students within each anatomy group evaluated each others hearts with labels pointing at the anatomical structures. The students were encouraged to take pictures of their hearts equipped with labels for later revisits. Demonstration and group work were repeated for the left side of the heart, see time schedule (Appendix B) and a model of the workflow for Team-Label (Figure 1).



**Fig. 1.** Model of the intervention within each anatomy group

## Strategy for evaluation

Finally, the students evaluated the exercise by a questionnaire downloaded from a screen casted QR-code on their mobile phones (Appendix C). In total, 118 students answered the questionnaire and the answers were imported into Excel spread sheet and analyzed. Quantitative data using the 5-point degree scale from “very low degree” to “very high degree” were converted to continuous numbers from 1 to 5 and analyzed by mean, stddev, at T-test. After the exercise, the three teaching assistants were interviewed by a written questionnaire (Appendix D).

## Outcome

The students engaged positively in the teaching experiment from the beginning of the lesson. During the group work the students discussed with each other and requested help if needed. The demonstration was split in two in order not to give the students too much information from the beginning. In the students evaluations the short introduction followed by “do it yourself” was appreciated in the answers to qn.6:

“It was nice to get hands on the hearts and examine the structures ourselves. Dividing the lesson in right and left side of the heart like demo-practice-demo-practice was a good structure...”

“the short but very effective demonstrations followed by do-it-yourself, so cool with the separation of right and left side..”

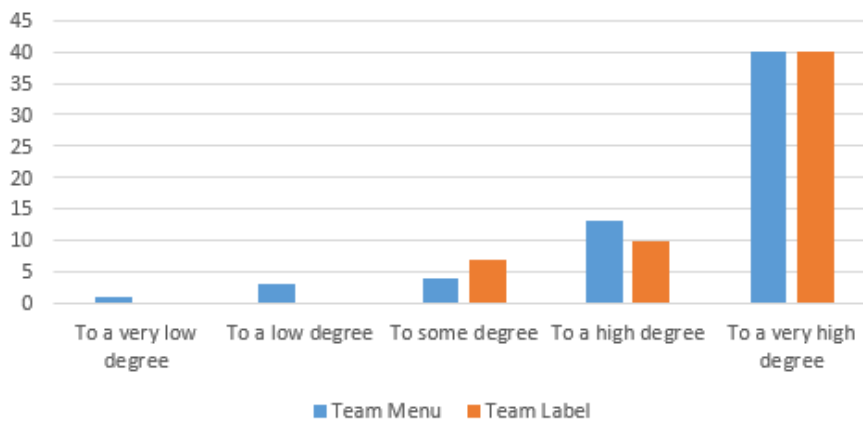
Generally, the majority of the students emphasized the hands-on element as the main well working element:

”we were allowed to cut and touch a lot..”

“we were allowed to mess about so much”

”that you could inspect and touch the things you have just learned about”

This is supported in their answers of their own initiative of having hands-on (Figure 2).



**Fig. 2.** Students perception on degree of having “hands on”.

Students from all anatomy groups were very active taking pictures of their specimens. A couple of anatomy groups in Team Menu adopted the method from Team Label and made their own labels from the PDF menu to be placed on the hearts for a photo session, which shows students voluntarily adopting the label method. About 2/3 of the students in both teams reported they had taken some useful photos during the exercise.

The anatomy groups belonging to Team Label obviously had a more demanding assignment clearly displayed during the group work by the number of labels not placed on the anatomical structures. The assignment was clear for the intervention group, and the intention of taking more control over the group work succeeded as expressed by the TA's:

”On Team Label there was a better discussion about the nomenclature, location of areas, origins, vessels and more” (TA no. 1)

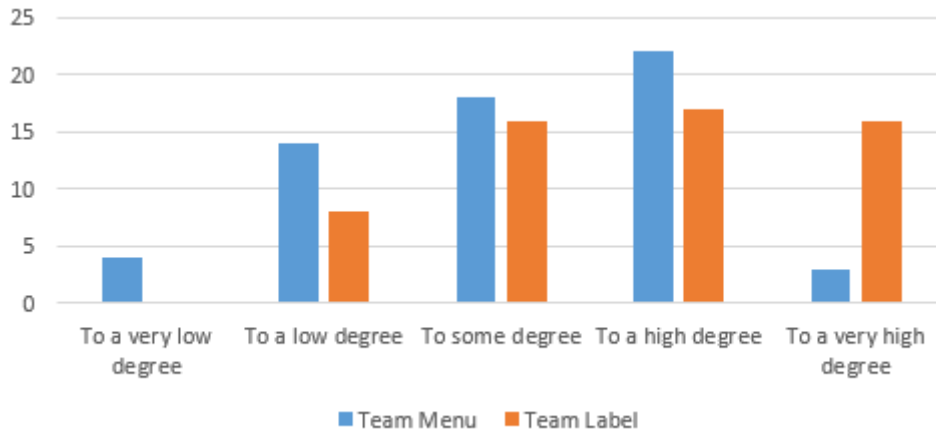
” There was obviously more concentration and anatomy talk in the Team Label groups” (TA no. 2)

“ the students seemed to get more out of having specific labels with name of structures to be placed on the specimen...they could visually see the e.g. the 5 labels left, which they had not placed yet. This in contradiction to a list of structures where it is easier to overlook some anatomical structures..” (TA no. 2)

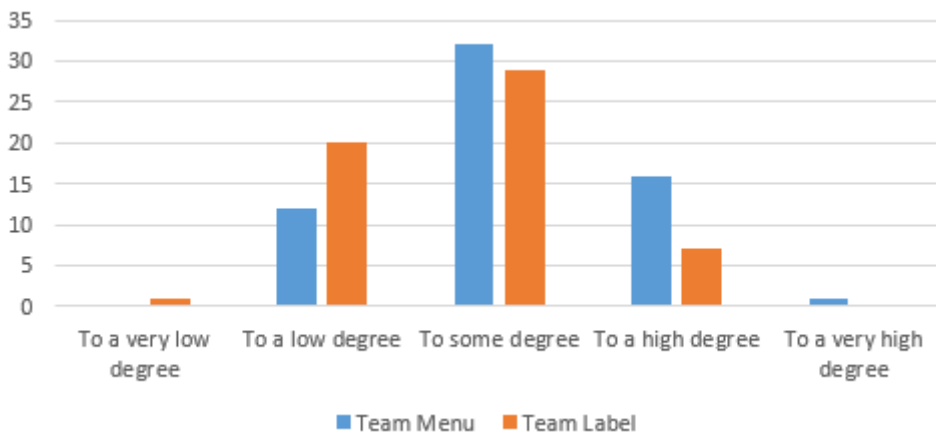
” I think it is more difficult to skip some of the challenging anatomical structures, when these are written on a label to be placed, in contrast to the structures being a part of a long menu...” (TA no. 3)

However, the more challenging assignment in Team Label compared to Team Menu also resulted in more hesitation among the students. Two of the three TAs experienced more request for TA-help in Team Label, and this was confirmed in the student evaluations, thus, the students in Team Label felt a higher need for TA feedback (mean=3.7 (1.0)) compared to the students allocated to Team Menu (3.1 (1.0), (p=0.001) (Figure 3).

Interestingly, the students view of achieving the ILOs were also different between Team Menu and Team Label. Students from Team Menu had a higher mean score of 3.1 (0.7) compared to Team Label 2.7 (0.7), ( $p < 0.01$ ) (Figure 4).



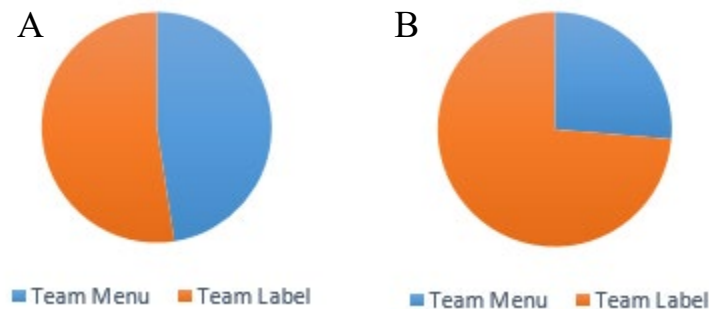
**Fig. 3.** Students opinion on the degree of need for feedback from teacher/TA.



**Fig. 4.** Students view on achievement of the intended learning outcomes.

Thus, the student from the intervention group felt more far from achieving the ILOs than the conventional group of students. This could be caused by the Label method being more confusing or a less good method for learning anatomy, however, it could also be explained by an increased awareness among the students on Team Label, about when they

had not identified all the anatomical structures, compared to Team Menu where missing structures to be identified was more obscure. This latter explanation is supported in the students answers about which team they would like to be on for the next demo exercise, where the majority wanted to continue with the label method (Figure 5). Thus, students who had a more challenging assignment, felt more unsecure and felt they had achieved the ILOs to a less extent than their “conventional studying” peers, but anyway seemed convinced (72% of the students) that the label method was preferable in this type of exercise.



**Fig. 5.** Students from Team Menu (A) and Team Label (B)’s preference for method for the next exercise.

In the students free comments, the argumentation for the label method included 1) maintaining focus, 2) giving a better overview and 3) a motivation to identify the same structures in multiple specimens:

” I think it was nice to have the labels so that you would not forget some of the structures on the heart”.

”It was good with the labels and you could see the same structures on different specimens”

”... a good initiative which gave me a better overview”

”.. the way of conducting the exercise was good, because useful pictures were taken”

The most striking challenge was lack of time for group work in relation to the amount of anatomical structures to be identified. Hence, the peer feedback session in the anatomy groups on Team Label did not work properly. It was revealed that the video sequence for student preparation on the learning platform Absalon had not been accessible for the class, which could explain some of the time constraints. The lack of time was mentioned in the free comments (qn. 7) in about  $\frac{3}{4}$  of the students in Team Label and in about half of the Team Menu students. Based on the comments, the students were very aware that some of the time rush could have been alleviated, if they had been more prepared regretting the missing video on the learning platform:

“it was far too rushed. It went too fast and we had too little time, especially because we did not have access to the video before the exercise”

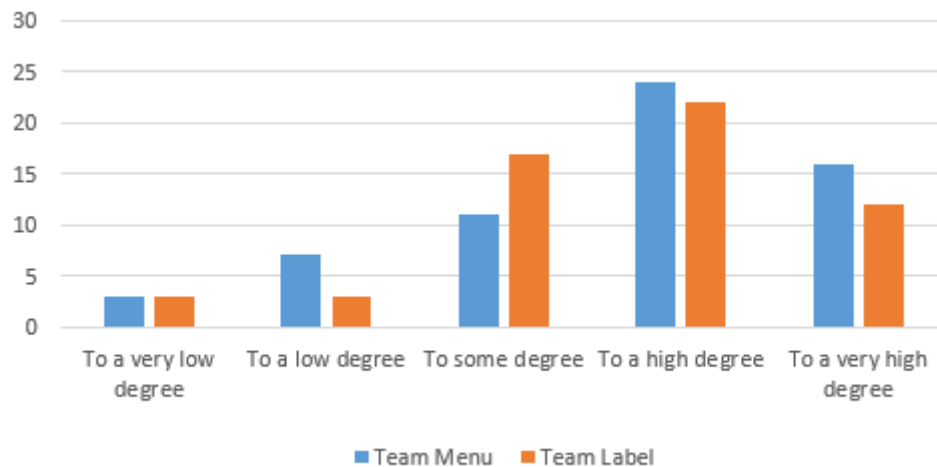
”we would have liked more time, we didn’t make it and talk with each other about our findings”

”..we could have spent much more time. It was really exiting, we got engulfed in it. We could have spent three hours more..”

“We were not enough theoretically prepared, thus, we spent too much time locating and recalling what it was..”

In contrast, a few students on Team Menu mentioned “plenty of time” as a positive thing about the exercise, which underlines the fact that the conventional group of students had a less demanding assignment compared to the intervention group. Some of the students requested a key figure, so they could check their label locations, reflecting a need for formative feedback. Despite the troubled peer feedback session in the intervention group the student reported a high degree of useful feedback from their peers (Figure 6).





**Fig. 6.** Students view on useful feedback from their peers.

## Discussion

The present strategy was to increase the control in the assignment for group work by including physical labels to be placed on the hearts. The outcome was an increased activation recognized by the TAs as an increased concentration and discussion in the Label groups. Furthermore, it became very clear to the students in the intervention group when they had (not) reached the ILOs. An increased awareness of the level to reach is very important, however, a drawback can be that if the students perceive themselves as more far from achieving the ILOs, some of the students may fall out of The Zone of Proximal Development (Vygotsky, 1978) losing incentive. Hence, from my point of view as a teacher there is a discrepancy in wanting the students to have a feeling of success in learning and on the other side uncovering the level to reach. A high pace combined with a crowded curriculum and lack of feedback may encourage a surface learning approach (Bowden & Marton, 2004) which results in feeling undue pressure and worries (Entwistle, 2009). Performance anxiety and stress among students in the veterinary program is a growing problem and well described (Skandov, 2004; Langebæk et al., 2012). Therefore, it is important to consider how to alleviate time constraints. Many of the students expressed they had been too unprepared for the exercise, thus a better theoretical knowledge before conducting

the exercise would support deep learning and alleviate time constraints. More e-learning activities should be included between the lectures and the exercise, e.g., short demonstration videos and quizzes urging the students to analyze figures of the anatomical structures. With more prepared students flipped classroom could be an option thereby saving even more time for the students group work.

The simple kind of peer feedback introduced in the exercise potentially contributes to learning because giving feedback require understanding of the substance to a higher extend than doing the assignment (Maugesen & Lauvås, 2004). A prerequisite for using peer feedback is student generated products. In this exercise it consisted of labeling anatomical structures with correct names, and a photo session was included for the students to document and save their work. Such products are not too time consuming for the students and could in future course descriptions be included in a portfolio and serve as an object for running evaluations. Furthermore, creating a product supports the active process of learning (Piaget's constructivism). The students in this intervention jumped into the label method and the encouragement for taking photos. I think the peer feedback would also have been well conducted if enough time had been available, because the students reported a high usability of the feedback from their peers in the questionnaire.

## **Conclusion**

Increasing the framing of a veterinary anatomy exercise resulted in more student activation. The elements of introducing a "product" and a simple version of peer feedback have strong perspectives to increase students learning. However, time constraint was a larger problem compared to the low teacher/student ratio and should be alleviated by measures such as increased student preparation, more exercise time and "flipped classroom". The results from the intervention holds important information to consider in future course planning.

## References

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## Appendix

### A)

The Intended Learning Outcomes for the demonstration exercise in “the heart”:

- Describing the hearts functional anatomy and topography including describing the blood flow through the heart and its compartments, valve system, transmission system and own nutritive blood supply, and identifying the relevant structures in illustrations, photographs and tissues.
- Identifying the heart sac and describe its construction and function

### B)

Time schedule for the exercise:

Introduction		20 min
Demonstration of the right side of the heart (teacher)		
Team A	Team B	
Students group work (30 min)	Students group work <i>with annotations</i> (20 min) followed by peer feedback (10 min)	30 min
Demonstration of the left side of the heart (teacher)		10 min
Students group work (20 min)	Students group work <i>with annotations</i> (15 min) followed by peer feedback (5 min)	20 min
Evaluation of the day with questionnaire by QR-code		10 min

C)

Students questionnaire:

**Evaluation of the HEART demo-exercise 2024**

1. Which team were you on for the HEART demo-exercise today?

Team A (Menu)

Team B (Label)

2. To what degree do you now feel able to orient yourself in a heart and name the anatomical structures on a scale of 1 to 5? (where 1 is "to a very low degree" and 5 is "to a very high degree")

1 2 3 4 5

3. To what degree did you have your "hands on" the specimens today (blood on the gloves)? (where 1 is "to a very low degree" and 5 is "to a very high degree")

1 2 3 4 5

4. To what degree did you get useful feedback from your fellow students today? (where 1 is "to a very low degree" and 5 is "to a very high degree")

1 2 3 4 5

5. Did you get some good photos you can benefit from later when you have to read up on the subject?

Yes

No

Maybe/don't know

6. What do you think worked well in the lesson today and why?

Enter your answer

7. Was there anything that worked less well and that you would have liked to have done differently?

Enter your answer

8. To what degree did you need help/feedback from teaching assistants or teacher during the demo exercise today? (where 1 is "to a very low degree" and 5 is "to a very high degree")

1 2 3 4 5

9. If you had the opportunity to choose, which team would you like to be on at the next demo exercise?

Team A (Menu)

Team B (Label)

Submit

D)

Teaching Assistants interview:

How did you experience the student interaction with the specimens on Team Menu and Team Label, respectively?

How did you experience the students use of each other on Team Menu and Team Label, respectively? Was there any difference in concentration, interaction with the specimens or the amount of anatomy talk?

Where was the request for help greatest? Team Menu or Team Label?

Which elements were especially difficult for the students?

To what extent do you think the students get to take advantage of the demonstration exercises? Please explain.

What do you perceive as the biggest challenges with demo exercises, from a learning perspective?