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Improving teaching in a BSc Animal Science course through interactive classes

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Summary

This pedagogical project reports my experiences implementing interactive classes in a BSc Animal Science course, *Dyrs Ernæring og Præstation* (DEP), from January to April 2022. The DEP course requires that students present seven consecutive projects consisting of a comparative analysis of feed plans and nutrient metabolism for three animal species (01 ruminant, 01 monogastric, and 01 animal of choice). Although the students work in groups during the project preparation stage, the DEP teachers usually deliver the lectures based on a traditional content-oriented approach (PPT slides, etc.). This means that the teacher does most of the talking, and the students' attention is almost exclusively on the lecturer. This problem gives the educators an excellent opportunity to engage students with interactive classes to improve participation and create a more collaborative learning environment in the classroom. It is expected that the outcomes of this pedagogical project will have practical applications in the future development of the DEP course.

Keywords: engagement, motivation, interaction, discussion, reflection.

Background

I have been teaching ruminant nutrition in DEP since 2021, and my teaching experiences have been disheartening and frustrating, mainly due to the student's lack of participation and motivation. I used to advise my students

at the beginning of the class that I liked interactions and participation, and they were free to interrupt me to ask questions if they did not understand the subject. This strategy did not work at all. I used to talk for more than one hour, and the students did not ask questions during the entire time of my lecture. I focused my teaching on the intended learning goals, but why were the students not motivated to ask questions or participate in the class? Perhaps the monologues and the long PPT lectures, traditionally used in DEP for so many years, caused the lack of participation. I then decided to change my teaching methodology because I was at the center of the stage, and the students were given a peripheral role in the classroom.

This pedagogical project was developed to overcome those challenges and promote a shift from a content-oriented (teacher-centered) to a learning-oriented (student-centered) lecturing format. The general objective of this project was to implement interactive classes designed to increase students' learning, participation, and engagement in the DEP course. The specific objectives of this project were to:

1. Apply the traditional PPT format blended with activation (questions, quizzes, discussions) to make the class more interactive.
2. Create debates and group work to increase participation and engagement.
3. Demonstrate how these teaching strategies can potentially improve the learning environment of the DEP course.

Pedagogical challenges

One of the most significant problems of teacher-centered lectures is the unidirectional communication (usually monologue-based teaching), in which the students learn by seeing, hearing, and experiencing the teacher. The class in this traditional format exists because both teachers and students expect that the transmission of information will be effective through one-way communication, where the teacher does most of the talking, and the students' attention is almost exclusively on the teacher. This methodology often leads to students' passivity and limits the options to match the teaching goals to the individual. Two consequences of unidirectional communication are the impossibility of targeting the message and the tendency to structure the content based on disciplinary logic rather than participant logic (Dahl & Troelsen, 2015). In general, the students acquire the information directly

from the teachers and will typically depend on their overview and explanation to learn the subject. The students become the audience of the teacher's performance. The speaker's body language, tone of voice, and words are essential tools to catch the listeners' attention (Mehrabian, 1981). However, the attention of both students and teachers is not constant throughout the lecture. Students' attention is increased at the beginning, but a significant drop in concentration occurs after merely 20 minutes. Similarly, the lecturer's attention decreases gradually over time (Bligh, 2000). These facts demonstrate that pedagogical activities must be developed to improve attention span, participation, and engagement in the classroom.

According to Rienecker et al. (L. Rienecker & Ingerslev, 2015), the teacher can prepare introductory sessions that lead to or serve as a warm-up for the lesson or a single theme or problem. The students could work in pairs or groups to activate their cognitive skills and focus their attention on the class. However, creating a culture of acceptance and respect for everyone regardless of social and cultural differences and establishing clear and explicit expectations are of paramount importance for activities in groups to function appropriately (Christensen, 2011). Moreover, organizing group work and demanding students to collaborate with each other without any training is a challenge.

Students have different opinions and experiences of group work. While some students enjoy working in groups, others dislike it so much that they avoid study programs where it is required. Often, this aversion towards group work is caused by bad experiences in the past, e.g., group members were lazy or too dominant, or the group was flooded with problems to address and conflicts to solve. Despite these challenges, I believe group work can offer opportunities to develop the DEP course and increase learning, participation, and engagement. To change the DEP didactics towards a student-centered approach, the teachers need to free themselves from the ritual position of the traditional lecture and adopt the culture of developing interactive classes to motivate the students (Dahl & Troelsen, 2015).

To achieve that goal, I changed the DEP didactics by experimenting with a student-centered approach (group work, discussions) to improve teacher/student interactions and the learning experiences in the classroom. Two experiments were conducted on 27 students who were used to following traditional lectures in DEP. The feedback provided by the educational and departmental supervisors and the post-teaching reflections formed the basis for me to evaluate the effect of the changes on the teaching approaches and the learning environment.

Experiments

Experiment 1: "Optimal Rumen Function"

Group work and debates were new for me, but I was confident they could help me overcome my teaching challenges in DEP. The plan for the class was to shortly introduce the topic of "Optimal Rumen Function" for 30 min as a conversation and not as a monologue. After this initial talk, the idea was to divide the students into four groups to discuss the nutritional requirements (energy, protein, water) needed for ruminants (dairy cows and heifers) and monogastric animals (growing pigs and laying chickens). The students had 40 min for the group work. The formation of groups was based on the projects the students had already been assigned, meaning they were used to working with each other. I asked the students to present the differences in the nutritional requirements between species (ruminants vs. monogastric) and relate that information to the content of the class offered in the introductory session. Each group had 10 min to present the results. Twenty-four hours before the lecture started, I decided to distribute handouts to my students (e.g., PPT slides, papers). Herskin (Herskin, 2001) recommends giving students access to handouts before the lecture if it is a teaching situation. Still, the delivery of handouts in connection with lessons has long been a subject of debate. The advantages of handouts are that students do not have to spend time copying the lecturer's slides but can instead add their notes in the margins. The disadvantages of handouts are that the students do not learn to take notes and may pre-empt the lecturer's point by "reading ahead" (Rienecker et al., 2015).

Outcome of the Exp. 1: First Reflection

The introductory part of the lecture went very well. The students were activated with small quizzes, answering the questions correctly and confidently. These small assignments activated the students individually and gave me insight into their background levels. However, the group work did not work well, perhaps because I did not negotiate expectations before the group work started. When groups are formed, they need tools to structure their work process. Discussions of expectations and requirements for group work must happen before the group formation. Without clear instructions about what is wanted and how they must use the knowledge in the exercises and studies, the purpose of the group work may lose focus (Christensen, 2015).

I did not explain clearly how the students should present the group work results and how the quality of the presentations would be assessed.

Moreover, I should have asked the students to speak collectively while presenting the results instead of individually to ensure they understood the concepts. I also think the case used in the group work was too simple for the students to solve. It seems that they looked up the nutritional requirements on the internet without thinking about the applicability of that information in a real-world scenario. I also felt that including the monogastric animals was not helpful for the learning process because it did not help consolidate the lesson's topic, which was focused on the optimal rumen function. My supervisors and I concluded that the students needed to solve a case study related to a real-world situation. In this way, the students would think more critically about the case while working out potential solutions for a real problem.

Experiment 2: "Udder development, start, and maintenance of lactation"

My objective in this experiment was to improve what did not go well (e.g., instructions, discussions, and presentations) in the group work activity implemented in the first teaching session. The plan for this lesson was to introduce the general concepts of lactation (udder development and diseases related to lactation) (20 min) and then challenge the students to solve two real-world case studies (40 min). I divided the class into four groups, like in Experiment 1, and instructed the students on how to present the results at the end (10 min/group) and how the quality of the presentations would be assessed.

Outcome of the Exp. 2: Second Reflection

The introductory part of the lecture went very well, as expected. The students were activated with small quizzes and participated quite well. The group work also went well from the beginning to the end. I communicated the necessary instructions before the activity started. The instructions were clear, and the students knew exactly what they had to do. I noted that the students assigned specific tasks to each group member, e.g., each student had the opportunity to speak about the solutions of the case study. I also engaged the students with questions about their presentations and had an

excellent interaction. My supervisors and I assessed that the students understood the lecture content, solved the case studies by themselves, and, more importantly, learned how to apply the knowledge in a real-world situation. At the end of the class, one student approached me to ask questions about mastitis (a type of udder disease), showing interest in knowing more about animal health and milk quality. I value this after-class interaction because it is academically constructive, highly motivating, and constitutes direct communication between the student and teacher. Giving feedback to the student is a critical aspect of learning.

Future Directions

Despite the success of this student-centered lecture format implemented in DEP, one aspect that needs improvement is to increase the diversity of the answers of the group work in the case study. Next time, I will challenge the students to search for at least another research article to support their solutions because they used only the resources I recommended to read. The additional research articles or any other material of free choice will avoid similarities in the answers among the groups and improve the quality of the discussions during the presentation of the results.

Additionally, I want to integrate my teaching with research-based education approaches. This integration creates an actual connection between teaching and research, helping students network, discuss, and debate (Dohn & Dolin, 2015). Therefore, I will consider using a research-based approach in my future teaching blended with the tools employed in this pedagogical exercise to increase motivation for learning and promote longer retention of knowledge in DEP, which is not supported by traditional teacher-centered lectures.

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