

Increasing student activation by creating a safe learning environment and implementing dialogue based teaching

Pia Ryt-Hansen

Department of Veterinary and Animal Sciences
University of Copenhagen

Introduction

The course and objectives of the interventions

The final University Pedagogy (UP) project was performed in the course “Veterinary Paraclinics”, which is part of the curriculum during the master in Veterinary Medicine at University of Copenhagen. The course is part of one of four “rotations” during the 2nd and 3rd semester of the master program. During the rotations, the students are divided into four groups of maximum 45 students. One of the four groups of student will participate in the Paraclinics course in each block (half a semester) resulting the Paraclinics course running four times per year with four different groups of students (1). The Paraclinics course is divided into two overall parts; one on Clinical Pathology and another part on Infection Microbiology, which includes three days (18 hours) of Virology. The Virology part was the basis for the interventions applied in the present final UP project. The three days normally include a mix of lab-exercises, lectures, casework and flipped classroom teaching.

The objectives of the UP project was to implement changes to create a safe learning environment during the three days and to transform one classical lecture into a dialogue based teaching format with the aim of increasing student activation and ultimately enhance the learning. As the course runs several times per year the interventions were applied during two different courses (3915-B4-4F23; Veterinary Paraclinics – block 4, 2023 and 3915-B1-1E24 Veterinary Paraclinics, block 1, 2024), now referred to as “the 1st intervention” and “the 2nd intervention”. The two interventions were not identical as the results of the first intervention led to alterations in the second intervention.

The theory

Creating a safe learning environment

For the students to feel motivated to actively participate in a given teaching session they need to feel comfortable and know that it is safe to share their knowledge and/or opinion (2). The physical frame for the teaching are also important, but for this project the focus was to enhance the sense of a safe space for sharing and actively participating. Several implementations that can be executed by the teacher to create a safe learning environment has been proposed (3). These include, for example learning the names of the students, welcoming the student to the class every morning, spending time with the students in an informal manner and creating a positive atmosphere, where all comments/discussions are welcome.

Dialogue based teaching

When having a dialogue between teacher and students, the students are encouraged to apply critical thinking and are invited to participate actively in the teaching session (4). Previous studies have tested the hypothesis that active- compared to passive teaching formats increase the learning (5) and the subsequently performance at exams (6) and confirmed the hypothesis. Interestingly, the first study (5) conversely showed that the perception of students on what they learned was lower in the active teaching sessions, possibly due to the increased cognitive effort that was put on the students to actively participate and understand/work with the material. This is potentially also the reason why students are prone to evaluate passive teaching as superior compared to active teaching even though it probably does not correlate to the level of learning (7). However, the classical passive lecture format only provides a one-way communication, where the students are passive and their attention span is often challenged as a clear drop in concentration have been observed after 20 minutes of lecturing (8). On the contrary, dialogue based teaching is centered around a two-way communication format where discussions are encouraged. During the dialogue-based teaching format the student should be seen as a conversation partner and not just a passive receiver of information supplied by the teacher. This form of active learning consequently results in the students reaching a higher

cognitive state according to the revised version of Bloom's taxonomy, where the students understand, analyze, evaluate and create (9) compared to the lower cognitive state of remembering and knowing. In addition, a dialogue based teaching format aid in keeping the attention of the students, promote critical thinking, let the student learn for each other and provides the teacher with an insight into pitfalls and levels of learning obtained in the specific topic (7). Some obstacles for implementing active teaching are however present, as this form of teaching challenge the creativity of the teacher to plan the session. In addition, active teaching is most often dependent on student preparation, which, if not fulfilled, might result in the teacher being on unsteady grounds where improvisation is needed (10).

Methods

The 1st intervention – implementation of dialogue based teaching

The teaching session (1 hour) was normally presented as a one-way lecture on the topic of *swine influenza A virus and vaccines* including one short case, where the students were to discuss four case questions in smaller groups (2-4 persons) for ten minutes and share their answers in plenum. To transform the lecture into a dialogue based teaching format for the first intervention, the student were asked to prepare for the session at home by reading highlighted parts of the scientific paper "Influenza A virus vaccines for swine" (11) and make three questions on the topic, to bring for the subsequent dialogue based teaching session. To emphasize the importance of the preparation for the session the students were both reminded of this through an announcement on Absalon the day before the session, and similar information was available in the course page (several weeks prior to the course) describing the three course days in details. In addition, the students were verbally reminded of this by the teacher at first course day.

The session started with a short introduction using one Power Point slide to explain how the session would progress by the students voluntarily asking questions about the topic of the paper, and the teacher

answering the questions and potentially showing selected slides that could aid in explaining. Several slides were prepared by the teacher prior to the session to include figures and details on the different topics that the paper included. A white-board were also available for drawing etc.

After the session, slides that was normally prepared for the classical lecture was uploaded on Absalon and a multiple choice questionnaire made in the program Survey-Xact (Ramboll, Denmark) was shared with the students to evaluate the intervention. The questions asked were the following and three answers were available (yes/no/to some extent);

1. Did you prepare 1-3 questions for the session?
2. Did you learn something new about swine influenza and vaccines?
3. Did you enjoy this form of teaching?
4. Did you find it motivating to discuss questions that you asked yourself?
5. Would you have preferred a classical lecture about swine influenza and vaccines?

In addition, the overall course evaluation of the Paraclinics course was available a few weeks after the intervention.

The 2nd intervention – creating a safe learning environment and implementing dialogue-based teaching

Based on the outcome of the 1st intervention the second course was adjusted to accommodate some of the issues observed with the dialogue-based teaching, including lack of preparation by the majority of the students and limited student activation.

During the 2nd intervention, the implementation of dialogue-based teaching was again in focus. However, during the course days more emphasis on creating a safe learning environment was made. This was done by making it more evident on Absalon in advance that active teaching would be applied during the course. In addition, the teacher was present every morning to welcome the students when they arrived, and personal anecdotes were shared during the teaching during all three course days. In addition, the teacher interacted with the students during the breaks and generally tried to create a calm and positive atmosphere,

where questions were appreciated by positive reinforcement. Finally, both to improve the level of preparation for the session, and to make the students feel safe and encouraged to participate in the dialogue-based teaching session, time was allocated in-class for preparation including both times to read the paper and prepare minimum one questions per person in smaller groups prior to the dialogue bases teaching session.

The session was carried out as follows; a short introduction was initially given on how the session would progress including a short description of the scientific benefits of active teaching. In addition, the students were introduced to ten overall themes that they could ask questions too. The students were told to make at least one question per person in the groups since the objective of the session was to obtain 90 % student participation. The students were also made aware that if they did not ask questions voluntarily, the teacher would throw a ball around indicating who should ask the next question. The students were given one hour to read the paper and prepare questions in groups of 2-4 persons prior to the session. The next 50 minutes would proceed by the students voluntarily asking questions to the teacher, and similar to the first intervention slides were prepared in advance that could be presented. To obtain more dialogue than just “question-answer”, the teacher tried ask questions back to the other students when appropriate.

After the session, slides that were normally prepared for the classical lecture was uploaded on Absalon and the students were asked to evaluate the session trough a questionnaire made in the Power Point Add-in program SendSteps. The questions asked were almost identical to the first intervention, and included the following seven questions, where three answers were available (yes/no/to some extent). For the seventh question, free writing was allowed.

1. Did you prepare questions in the groups?
2. Did you prepare at least one question per person in the group?
3. Did you enjoy this form of teaching?
4. Did you learn something new about swine influenza and vaccines?
5. Did you find it motivating to discuss questions that you asked yourself?
6. Would you have preferred a traditional lecture on swine influenza and vaccines?

7. If you would have preferred a traditional lecture please give some comments on why?

To further evaluate if the active teaching format contributed to enhanced “long term” learning, a subsequent questionnaire was sent out to four randomly selected students who agreed to participate at the last course day. The questionnaire was answered three weeks after the specific course day and included six questions related to the topic of the session (Appendix 1). The questions were specifically designed based on the discussions raised during the session. It was made clear to the students that they were not evaluated based on their answers, and that they should answer the questions based on their intuition and it was clearly stated that no aids/help was allowed.

Outcome

Results of the 1st intervention

In total, 25 students were present for the first intervention and 22 answered the survey. The answers are presented in Figure 1.

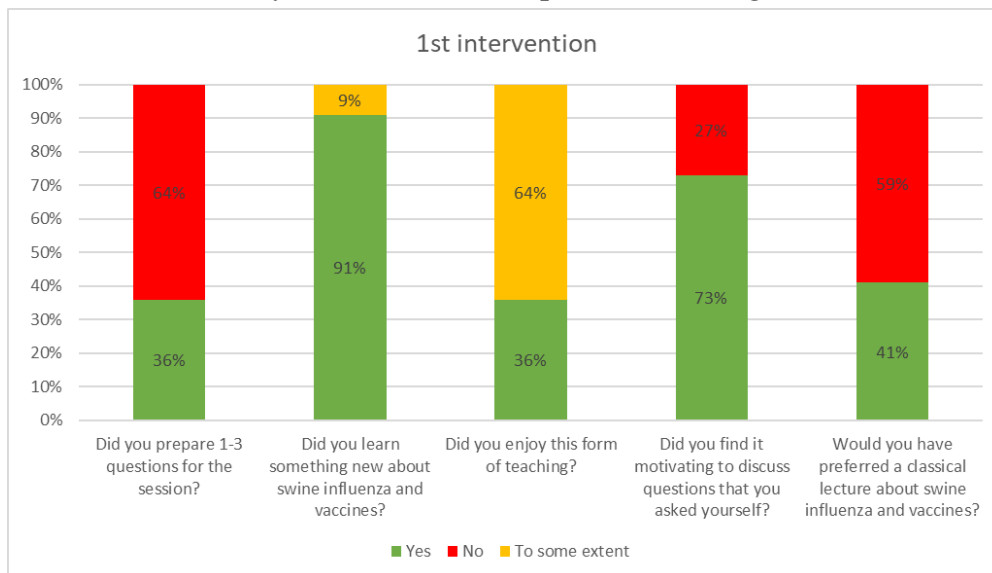


Fig. 1. Feedback from students on the 1st intervention.

Briefly, it was noted that very few students prepared for the dialogue-based teaching sessions and that a large proportion (41 %) of the students would have preferred a classical lecture. However, it was also evident that

the all the students stated that they learned something new on the topic and that the majority of the students enjoyed this form of teaching and found it motivating to ask questions themselves.

In addition to the survey, an evaluation of the entire Paraclinics course was made based on the traffic light method; green box for good things, yellow box for things we should pay attention to in the future and red box for problems that should be solved before the next course (Appendix 2). From the green box some comments on the Virology part were made that could be considered relevant for the focus of the interventions of the UP project including “A lot of interaction, casework and a general nice atmosphere”. And from the yellow part “avoid repetition during 45 minutes lectures”.

The feedback from the department supervisor highlighted that many good discussions were held during the session, but that mainly 6/25 (24 %) students were asking questions and participating in the discussions. It was suggested that a ball could be thrown around between the students to indicate who should ask the next question or that the students could upload their questions anonymously online, for example by using the program Padlet and from there questions could be raised by the teacher if no more questions were proposed by the students. In addition, it was made clear that it would be a good idea to get more feedback from the students on why many of them would have preferred a classical lecture.

Results of the 2nd intervention

In total, 33 students were present at the sessions and 31-33 students answered the different questions. The answers to questions 1-6 are presented in Figure 2.

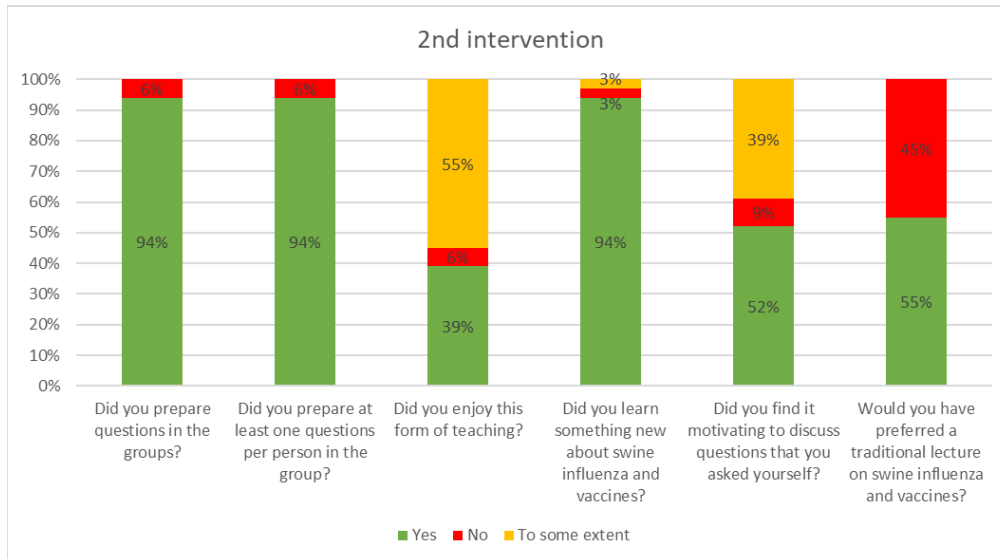


Fig. 2. Feedback from students on the 2nd intervention.

Briefly, it was noted that the preparation for the dialogue-based teaching session almost reached 100 %. In addition, it was again observed that the majority of the students enjoyed, at least to some extent, the dialogue-based teaching format and almost all students (97 %) learned something new. Again, most students found it motivating to ask questions themselves. However, still 55 % of the students answered that they would have preferred a classical lecture.

The comments that students gave to Question 7, where they could elaborate on why they would have preferred a classical lecture, are available in Appendix 3. Overall, the comments could be divided into positive and critical comments regarding the teaching session. Of critical comments the themes were mainly related to a lack of structure during the session (14 of 33 comments), too long preparation time/preparation in-class (10 of 33 comments), lack of basic knowledge for understanding the paper (3/33 comments), the student wanting to have the slides in advance (3/33 comments) and the students being afraid of missing out important aspects (2/33 comments). One student pointed out that she/he likes the classical lectures because it is predictable and she/he can hyper-focus, but that it was fun to try the active teaching. Even though Question 7 was mainly asked to the students that did not prefer active teaching performed during the session several positive comments were also made. These included that it was fun, and that they learned more this way and

that they could skip the basic part that they already knew, and focus on what they thought was relevant. One student very nicely pointed out that her/his nervous system would have preferred a classical lecture but that she learned more with the active teaching. In addition to the survey, an evaluation of the entire Paraclinics course was available made based on the traffic light method as described for the 1st intervention. Similar comments to the survey were made in the general evaluation focusing on the course being fun and interactive, but also on the long preparation time for the dialogue-based session (Appendix 4).

The questionnaire to test the “long-term” learning was answered by all four students three weeks after the course day. The detailed answers are available in Appendix 5. In general, it was very encouraging to read the answers filled out by the students. All four answered correctly either all or 5/6 questions, and seemed to have grasped some very complex processes regarding swine influenza and vaccines. It was particularly interesting that the answers related to the sixth question, where the students were to explain a highly complex term, all referred to an example given by the teacher, where considerations of vaccinating her own daughter were shared and all four students managed to explain the term.

The comments from the pedagogical supervisor highlighted the dilemma of preparation before or in-class, as a long time was used for in-class preparations, and as different students did not spend the same time reading the paper. However, a higher degree of active participation was observed compared to the first intervention as over 50 % of the students actively participated and some really advanced questions were raised and discussed. In addition, it was highlighted that even more dialogue could be applied trying to get the other students to answer instead of the teacher, and that the teacher should avoid looking solely at the student who asked the questions when answering so to try to include more students in the discussion. It was also noted that this way of working with a scientific paper in small groups was a good method.

Discussion and reflections

As mentioned in the introduction, studies have presented several benefits of student activation ultimately stimulating enhanced the learning (4–7). During the interventions performed in this study it was noted that over 90 % of the students answered that they had learned something new and also the majority of the students answered that they found it motivating to ask questions themselves at least to some extent. However, still 41–55 % of the students included would have preferred a classical lecture on the same topic. This dilemma could of course highlight that the sessions were not planned in an optimal way, but it also illustrates the point that other researchers have made regarding the safety and predictability of a classical lecture, which does not formally require preparation or active participation from the students (5,8). However, the dilemma is that even though the students might prefer it, it is probably not the best method for teaching and learning. Even though no control groups were available in this UP project, it was highly intriguing to read the results on the “long-term” learning following the 2nd intervention. Here it was observed that the students remembered the majority of topics/terms that were discussed during the dialogue-based teaching, and that even the more complex concepts were described by the student. Especially it seemed that personal examples to explain highly complex matters aided in the understanding of the students, which correlates well with previous studies finding that storytelling can contribute positively to learning (12). These observations support that actual learning was achieved using the applied methods in the second intervention even though 90 % student activation was not achieved. For future interventions it could be interesting to further enhance the dialogue not just between student and teacher but also between students, with focus on the students asking each other questions instead of the teacher. It has been shown previously, that a risk when using the dialogue based teaching format is that the teacher tend to still maintain somewhat of a “monologic discourse” (13), where the response of the teacher is in focus. Therefore, students teaching each other with the help of the teacher in correcting misunderstandings could be an interesting way to proceed with the dialogue-based teaching format.

Another obstacle that the dialogue-based teaching format encountered was the significant impact of student preparation for the session, where opposed to the classical lecture, a lack of preparation impacts the success of the session. Difficulties in obtaining high levels of student preparation were well documented in the first intervention, resulting in a modification of the second intervention including time for preparation in-class in smaller groups. This highly increased the level of preparation of course but also the number of actively participating students (from 24 % to over 50 %), which could in-turn potentially enhance the learning (5–7). However, a great proportion of the students were unsatisfied with the amount of time spent on preparation in-class during the 2nd intervention. Again a dilemma was raised; the dialogue based teaching require some level of preparation but is also impacted if a large proportion of the students are not willing to prepare for the session and also refuse to spend in-class time for preparing. Therefore, a compromise could be that a smaller level of preparation at home was expected (such as reading the paper) with subsequent in-class preparation of questions. Interestingly, a Danish study (14) has revealed that students will accept that they can only participate in the physical class if they have prepared, as long as the rationale behind it was clear and that a respectful teacher-student relationship was in place. Therefore, an even greater intervention could be emphasizing the teacher-students contract, where clear expectations of the students are made, and only prepared students are allowed to participate in the in-class session in order to enhance the learning. However, the risk is that many students will feel intimidated and not show up for class.

Another observation made during the interventions was that some students were afraid that they missed out on key information, as the topics discussed were not predictable but based on the questions of the students. To mitigate this, it should have been made clear that the learning objectives of the dialogue-based teaching sessions, were not unique to the swine influenza topic, but were related to the overall learning objectives of the course, where an understanding of virus vaccine challenges were in focus.

In the applied form of dialogue teaching of this UP project, the teacher was very exposed and the topics for discussion were unpredictable. These

two factors might exclude some teacher from applying the dialogue based teaching format. Therefore, it is important that the topic chosen for the dialogue based teaching session is one that the teacher feels highly comfortable and experienced in. In addition, the preparation of slides in advance provided some comfort for the teacher. A major issue raised by the students were the lack of structure in the session, which is a risk with this form of teaching. To solve this, the questions could be directed according to the ten overall themes presented by the teacher during the 2nd intervention and raised one-by-one. However, there is a risk that some more advanced follow-up questions might be missed when applying limits on the discussions. During the project the teachers experience was that this teaching format was very different, fun and motivating, as the teacher realized that the many students actually have a great understanding of the topic and are capable of discussing advanced themes. In addition, time was saved on going through the basics, and a certain degree of unpredictability was intriguing and put responsibility on the teacher to stay up-to-date on the topic. In conclusion, several points could be improved to enhance the success of the dialogue based teaching format, but a general misconception of the students on the outcome of active learning and the lack of predictability might lead to many critical comments, that should not lead to the maintenance of solely old-fashioned teaching cultures including one-way passive lecturing.

References

- Det Sundhedsvidenskabelige Fakultet. 2009-studieordning for kandidatuddannelsen i veterinærmedicin ved Det Sundhedsvidenskabelige Fakultet ved Københavns Universitet, Skolen for Veterinærmedicin og Husdyrvidenskab [Internet]. 2009. Available from: <https://sund.ku.dk/uddannelse/for-studerende/studieordninger/veterinaermedicin/Veterinaermedicin-KA-2009-2024-25.pdf>
- Ní Raghallaigh M, Cunniffe R. Creating a safe climate for active learning and student engagement: an example from an introductory social work module. *Teach High Educ* [Internet]. 2013 Jan [cited 2024 Oct 24];18(1):93–105. Available from:

<https://www.tandfonline.com/doi/abs/10.1080/13562517.2012.694103>

- Rienecker, Lotte; Jørgensen, Peter Stray; Dolin, Jens; Ingerslev GH. 2.3 Teaching environment. In: University Teaching and Learning. 2015.
- Howe C, Hennessy S, Mercer N, Vrikki M, Wheatley L. Teacher–Student Dialogue During Classroom Teaching: Does It Really Impact on Student Outcomes? *J Learn Sci* [Internet]. 2019 Oct 20 [cited 2024 Dec 3];28(4–5):462–512. Available from: <https://www.tandfonline.com/doi/abs/10.1080/10508406.2019.1573730>
- Deslauriers L, McCarty LS, Miller K, Callaghan K, Kestin G. Measuring actual learning versus feeling of learning in response to being actively engaged in the classroom. *Proc Natl Acad Sci U S A* [Internet]. 2019 Sep 24 [cited 2024 Oct 29];116(39):19251–7. Available from: <https://pubmed.ncbi.nlm.nih.gov/31484770/>
- Freeman S, Eddy SL, McDonough M, Smith MK, Okoroafor N, Jordt H, et al. Active learning increases student performance in science, engineering, and mathematics. *Proc Natl Acad Sci U S A* [Internet]. 2014 Jun 10 [cited 2024 Oct 29];111(23):8410–5. Available from: <https://pubmed.ncbi.nlm.nih.gov/24821756/>
- Rienecker, Lotte; Jørgensen, Peter Stray; Dolin, Jens; Ingerslev GH. 4.5.1 Activities in and between teaching sessions. In: University Teaching and Learning. 2015.
- Rienecker, Lotte; Jørgensen, Peter Stray; Dolin, Jens; Ingerslev GH. 4.1 Lecturing. In: University Teaching and Learning. 2015.
- Anderson LW and K. A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom’s Taxonomy of Educational Objectives. Ilyn & Bacon. Boston, MA (Pearson Education Group); 2001.
- ERIC - ED336049 - Active Learning: Creating Excitement in the Classroom. 1991 ASHE-ERIC Higher Education Reports., 1991 [Internet]. [cited 2024 Oct 24]. Available from: <https://eric.ed.gov/?id=ED336049>
- Vincent AL, Perez DR, Rajao D, Anderson TK, Abente EJ, Walia RR, et al. Influenza A virus vaccines for swine. *Vet Microbiol* [Internet].

- 2017 Jul [cited 2018 Jul 2];206(Sp. Iss. SI):35–44. Available from: <http://linkinghub.elsevier.com/retrieve/pii/S0378113516307027>
- McDrury J, Alterio M. Learning through storytelling higher education: Using reflection & experience to improve learning. *Learn Through Storytell High Educ Using Reflect Exp To Improv Learn* [Internet]. 2003 May 1 [cited 2024 Dec 17];1–199. Available from: <https://www.taylorfrancis.com/books/mono/10.4324/9780203416655/learning-storytelling-higher-education-maxine-alterio-janice-mcdrury>
- García-Carrión R, López de Aguilera G, Padrós M, Ramis-Salas M. Implications for Social Impact of Dialogic Teaching and Learning. *Front Psychol*. 2020 Feb 5;11:500061.
- Herrmann KJ, Bager-Elsborg A. Når forberedelse er en pligt, og undervisningen er et privilegium: et casestudie af universitetsstuderendes forberedelsespraksis. *Dansk Univ Tidsskr* [Internet]. 2018 Mar 8 [cited 2024 Dec 17];13(24):37–54. Available from: <https://tidsskrift.dk/dut/article/view/96841>