# 4

# Student's perceptions of active versus passive learning in veterinary oncology lectures

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## Introduction and problem

There is no requirement of any formal "teaching" training before one can lecture on a course for veterinary students and hence, when starting to lecture as a very new graduate yourself, you may tend to use the same methods as experienced during your own university courses without questioning how well these methods actually work. For many, this would mean that they will lecture in the traditional monologue way with minimal student interaction and activation, because that is what they know how to do.

Personally, I started lecturing shortly after I graduated and has now taught yearly on the same course since 2013. Before starting the University Pedagogy course, I did not question how I lectured. Consequently, my lectures in veterinary oncology in the "Medicine, Surgery and Reproduction - companion animals" course have every year been delivered as a one-way monologue, where the I do more than 90% of the talking myself. It is well-known and well-described that only limited information is retained from this kind of lecturing (Hartley & Cameron, 1967; MacManaway, 1970). This becomes very apparent, as I have the same students again approximately 1.5 year later in the companion animal oncology clinic, where most of them appear to have forgotten the information from the lectures or struggle to apply it to actual clinical patients. Accordingly, with this final project I wish to change my teaching format from passive to active learning to hopefully increase the students' gain from my lectures. Active learning is described as student-centered teaching where the students are actively engaged in the learning process (Prince, 2004). Flipped classroom

is a pedagogical approach implementing active learning, where the students have prepared for the class at home using for example written material or videos and the face-to-face time with the students is spent with student-involved activities (Bergmann & Sams, 2012; Gilboy et al., 2015). Converting to a more active teaching environment has been advocated by many as the "*teachers would be able to actually teach, rather than merely make speeches*" (Prober & Heath, 2012).

However, for active learning to be effective, active student participation is crucial (Bonwell & Eison, 1991; Michael, 2006) and in large classrooms like in veterinary school (180 students signed up), it can be difficult to get everyone engaged. From our pre-project (Børresen et al., 2021) we learned that medicine students are generally fond of online multiple choice-style quizzes and consequently, this seemed to be an obvious foundation for a change to an active teaching format, which would simultaneously give the students anonymous real-time formative feedback (Hounsell et al., 2008).

## Context

The "Medicine, Surgery and Reproduction - companion animals" course is a 15 ECTS course in the 4th year for around 180 veterinary students. It is taught once per year and it is divided into clinical topics, where each topic is lectured during a week (2 afternoons). My lecturing topic is "oncology", and we have two afternoons (14-17.00) to cover everything relevant for companion animal oncology. The lectures are divided into 35-minute lectures, and I have 2 lectures: "non-surgical cancer therapy" and "malignant lymphoma and soft tissue sarcomas". The remaining oncology lectures are taught by my oncology clinic colleagues. For the rest of the week, the students have practical courses, which are very time consuming, and which require a lot of preparations and hence, they have very little time to prepare for the class lectures. My experience from previous years is that very few students have read the relatively extensive curriculum prior to the lectures.

The intended learning outcomes (ILOs) for the oncology part of the course focus on the students being able to apply oncological knowledge in a clinically meaningful way and reads: "to be able to form a meaningful diagnostic and therapeutic plan for patients with commonly occurring oncological diseases". The exam asks the students to both be able to show general knowledge by describing disease prototypes and a deeper under-

standing by explaining for example their diagnostic or therapeutic approach to a patient.

## Current knowledge

From previous student evaluations, I know that the students prefer the monologue lecture format and that when some of my colleagues have tried for example "flipped class-room"-styled lectures, the students have evaluated this very negatively. I also know that they prefer for all lecturing to be as "exam-preparatory" as possible and that they find it very difficult to find the time to prepare for the lectures (source: T.M Sørensen: course responsible).

## Aim of this project

The overall aim of this project is to change one of my oncology lectures to an active learning format and to evaluate how the students perceive their gain from this compared to a passive learning format. This is the project aim even though veterinary students have previously evaluated the interactive format negatively. There are two reasons for this: 1) the course ILOs ask the students to be able to *apply* knowledge, which an interactive teaching format will probably teach them better than a traditional lecture so it makes sense even to do this, even if the students do not approve, 2) I will strive to both give the students the best conditions for having a high gain from the interactive lecture, for example by producing compendiums, and I will make it very clear to the students why this teaching format is relevant both for their future as veterinarians *and* for their upcoming exam.

## Materials & Methods

To increase the chance that the students would have time to prepare for my lectures, short and concise notes regarding the topics that covered both the lectures were produced. These were a total of 12 pages including references and covered the three overall topics: non-surgical cancer therapy (lecture 1), malignant lymphoma (lecture 2) and soft tissue sarcomas (lecture 2). The notes were released on Absalon one week prior to the lectures together with

an Absalon announcement stating that the compendium with the notes had been uploaded and that this year one of the lectures would be changed to a case-based interactive format and why. Three days prior to the lectures, I made an appearance in the classroom prior to another lecture to give them an oral reminder to prepare for the upcoming lectures.

One lecture (lecture 1, non-surgical cancer therapy) was kept in the format of previous years, i.e. as a standard monologue with relatively little student interaction part from spontaneous questions from the students. The next lecture (lecture 2, malignant lymphoma and soft tissue sarcomas) was changed to an interactive format. Two cases were produced, one for malignant lymphoma and one for soft tissue sarcoma, which the students should then help diagnose and treat via anonymous online-based multiple choice (Sendsteps.me). The lecture started with an "expectation slide" to let the students know why the lecture format had been changed and to stress how this format was in alignment with the ILOs, their upcoming exam and what they will need to be able to do and know once they graduate as veterinarians. The cases and questions were made so that there was one correct answer and 3-4 distractors, however for a few questions, there was not one correct answer, but multiple, to illustrate to the students that in real life there is often multiple possibilities for each patient and what is "true" for one specific patient may not be true for another. After each question, I went through each answer possibility thoroughly describing why it was true or false. The lecture 2 slides with cases and answers were uploaded for the students following the lecture.

After the lecture, I uploaded a questionnaire regarding the notes and the lectures on Absalon together with an announcement telling the students about the questionnaire and asking them to complete it. The questionnaire asked the students whether they had prepared for the lecture, if not then why, how they liked the compendiums, whether they prefer compendiums or textbooks, whether they prefer standard monologue lectures or interactive lectures and to grade their gain from lecture 1 and 2 on a scale from 1-5 (5 is best). Also, a free text section was added to let the students write their opinions on compendium vs textbook curriculum and standard vs. interactive lecture types.

## Results

Questions and answers can be seen in Appendix A. Forty students filled out the questionnaire. About 80 students were present at the lectures (based on the Sendsteps multiple choice) giving an estimated answer rate of 50%. Of these 40, 60% (24) had prepared by reading the compendiums prior to the lectures and 40% (16) had not. Reasons for not having prepared for the lecture were: never prepares for lecture (33.3%), did not find the time (33.3%) and always reads following the lecture (33.3%).

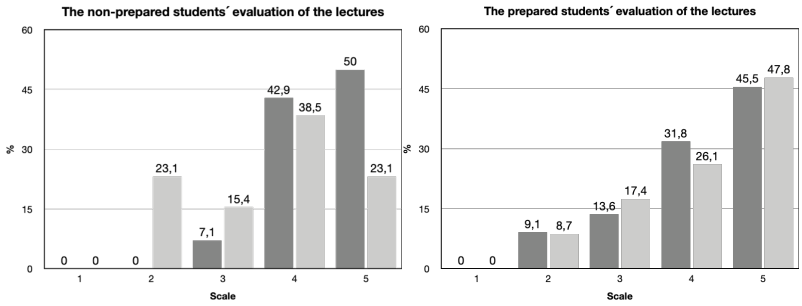


**Figure 1.** The students' evaluation of lecture 1 and 2.

The diagram on the left depicts those students that did not prepare for the lecture, the one on the right depicts those that had prepared for the lecture. Dark grey is lecture 1 (standard) and light grey is lecture 2 (interactive).

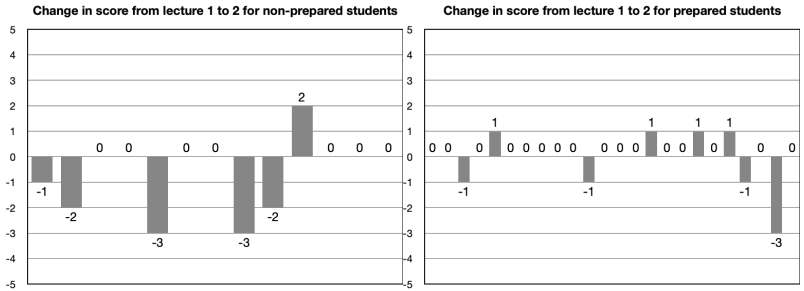


**Figure 2.** Change in score from lecture 1 to 2.

The diagram on the left depicts those students that did not prepare for the lecture, the one on the right depicts those that had prepared for the lecture. A negative score means that the student gave lecture 2 a lower score than lecture 1 and vice versa for a positive score.

The students generally preferred to have their curriculum as compendiums (89.7%) versus textbooks (10.3%) and most students gave the specific compendiums a high score of 4 or 5 (96.6%).

As it can be observed in Figure 1, those that did not prepare before the lectures tended to give a better score to lecture 1 (standard) than 2 (interactive) (score 4+5 92.9% for lecture 1 vs. 61.6% for lecture 2). For those students that had prepared for the lecture, lecture 1 and 2 was graded relatively equally (score 4+5 77.7% for lecture 1 and 73.9% for lecture 2). There were relatively few non-prepared students that thought they had a very high gain (score 5) from lecture 2 (23.1%) compared to the prepared group (47.8%). Also, there was a tendency for more non-prepared students to evaluate lecture 2 lower than lecture 1 (Figure 2), whereas many prepared students evaluated the two lectures equally or with minor differences (part from one student who really did not like lecture 2).

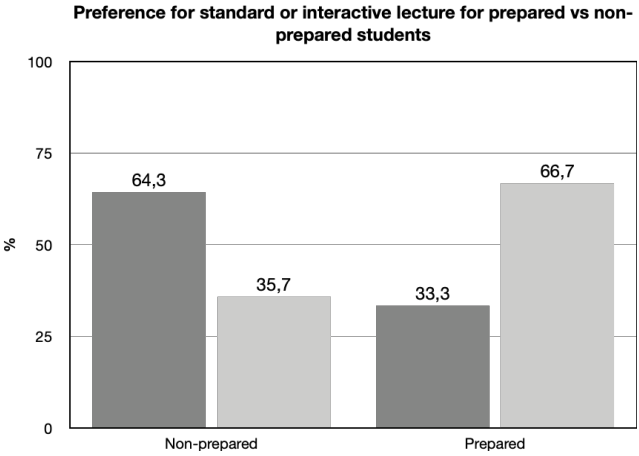


**Figure 3.** Preference for standard or interactive lecture type.

The left part of diagram depicts those students that did not prepare for the lecture, the right depicts those that had prepared for the lecture. Dark grey is standard lecture type, and light grey is interactive lecture type.

When looking at the whole group, there was a relatively even preference for standard monologue lectures (44.7%) versus interactive type lectures (55.3%), however when the group was divided into those that did not prepare versus those that did (Figure 3), there was a clear difference. Those that did not prepare clearly preferred standard lectures (64.3%) versus interactive lectures (35.7%) as opposed to those that did prepare, who preferred interactive lectures (66.7%) versus standard lectures (33.3%).

When evaluating the qualitative part of the questionnaire, where the students were asked to elaborate their opinions, some repeated themes were:

1) Some students preferred standard lectures because it can give a broad overview and more curriculum can be covered in less time.

   -"*Jeg føler man når mere af eksamenspensum igennem ved en standard forelæsning, og får det på en mere generaliseret måde (eks. generelle symptomer, og ikke bare de to symptomer en patient i en case havde)"*
   -*"Case er fede, men det tager ofte ALT for lang tid fra undervisningen"*

*-"Jeg vil hellere have normal forelæsning, da det giver en bedre oversigt over sygdommene"*

2) Some only thought interactive/case-based lectures were good, if they had time to prepare beforehand.

-"*Synes ikke jeg har tid til at forberede mig godt nok til at få nok ud af en ren case-forelæsning"*
*-" Foretrækker kun den interaktive forelæsning, fordi jeg havde forberedt mig"*
*-"Jeg foretrækker kun interaktiv forelæsning når jeg reelt har haft mulighed for at forberede mig grundigt"*

3) Some thought that case-based interactive lectures are good for activating the listeners, provoking them to think and to provide variation.

-"*Man får mere mulighed for at tænke over tingene selv i stedet for at få dem kastet i hovedet, og så hænger de bedre fast"*
*-"det er dejligt med noget afvekslende"*
*-"Man husker det meget bedre når man skal deltage i undervisningen"*
*-"Nr 2 fastholde min opmærksomhed meget bedre"*
*-"Jeg synes personligt det er meget mere fangende når man som studerende bliver "stimuleret" til at tænke selv, og svare på sendsteps spørgsmål mv :)"*
*-"Jeg foretrækker de interaktive forelæsninger da jeg på denne måde selv lige tænker over det jeg lige har lært og på denne måde husker jeg det meget bedre"*
*-"Jeg synes generelt man lærer bedre, hvis man kan være aktiv omkring det"*

4) Some students thought that a combination of a standard lecture first followed by an interactive lecture would be ideal.

*-"Jeg foretrækker generelt en blanding af de 2….. Jeg vil langt hellere have en forelæsning om de forskellige sygdomme, og så til sidst have cases"*
*-"Jeg vil gerne have en blanding ift. forelæsningsformatet, så vi først har standard gennemgang af emnet"*
*-"Kan godt lide at få gennemgået og forklaret det mest relevante som ved en standard forelæsning - dertil kunne man evt. tilføje nogle små cases for at støtte op om det forlæste"*

*-"Jeg synes at en kombination er ideel"*
*-"...foretrækker jeg at forelæsningen starter ud med "kort opsummering/oversigt" over emnet og bagefter gennemgang af cases"*
*"Jeg foretrækker interaktiv forelæsning men hvor der er forelæst først i emnerne og så samles op bagefter"*

## Discussion

Having the information from the course responsible (TM.Sørensen) that previous veterinary students have been very negative towards interactive lecturing and have a very high focus on exam-preparatory lecturing, it was not a surprise that a relatively high number of students still prefer standard lecturing (44.7%) despite the fact that they will may not remember much of the content. It was interesting however to see the difference between students that prepare and those that do not. Generally, the students that did prepare were much more in favor of interactive lecturing versus those that did not prepare. If you do not prepare for class, obviously your gain from a standard lecture where the curriculum is read out loud may seem to be higher compared to an interactive lecture, where you may not be able to keep up, because you lack the required knowledge to reply to the questions or to be involved in the discussion. To increase the chance that the students would prepare for the interactive lecture, they were supplied with short and concise notes, which most of them enjoyed. Also, to make sure that everyone understood the answers no matter if they prepared or not, all answer options were thoroughly described following each question. This is also something that was stressed to be important in our pre-assignment project (Børresen et al., 2021) and has been noted in previous publications (Mathiesen, 2015). Still, no students, no matter if they prepared or not, thought they had a much higher gain from lecture 2 compared to lecture 1 (max increase in score from lecture 1 to 2 was +1), which was a surprise. Importantly, however, what is measured in the questionnaire is the students' immediate evaluation of their gain from the two lectures and not their deep understanding or long-term memory of the information.

Previous publications have investigated how active learning affects academic performance in veterinary students. In one publication, the students were positive towards the flipped classroom approach, however students taught by a traditional classroom approach actually outperformed the flipped classroom students in multiple choice tests (Mofett & Mill, 2014).

In another recent publication, two cohorts of veterinary students were compared, one taught in the traditional didactical way and one taught using a flipped classroom-style approach (Dooley et al., 2018). Results from this study showed that flipped classroom students were more satisfied with their learning experience and did better in a written exam compared to the traditional group. Similar findings were seen in another recent study investigating active learning in the veterinary classroom (Berrian et al., 2021). And although it has been debated whether the active learning approach results in improved outcomes or not (Andrews et al., 2011; Michael, 2006), a meta-analysis from 2014 evaluated student performance in traditional lecturing publications (n=67) compared to active learning (n=158) publications and found that students in classes with active learning had higher examination scores and were less likely to fail (Freeman et al., 2014). Whether the students involved in the current project will do better in their upcoming exam, or even more important, will have better day-1 oncological competencies once they graduate, compared to previous years will remain unknown for now, as this project was not designed to test this. However, although the immediate evaluation from the students were not uniformly positive, especially for students that had not prepared, it seems likely that this active teaching method will have increased their learning outcome and ability to apply their knowledge in a clinically meaningful way nevertheless.

## Conclusions

Students that had prepared prior to the lectures were uniformly happy with both lecture formats (standard and interactive), but most preferred the interactive format if they had to choose. Conversely, students that had not prepared prior to the lectures preferred the standard format. Multiple students wrote in the free text section that they would prefer a combined format.

## Discussion of results with teaching colleagues

What was mainly discussed with my colleagues was how overwhelmingly satisfied the students were with the compendiums and how that is something we should probably consider producing for all oncology lectures. Also, we discussed the option of doing video lectures with standard lectures of the information in the compendiums to satisfy those students who

prefers a combined format (standard followed by interactive), as there is not enough lecture time to do both formats in class. Later this year, I will meet with more of the teachers from this course to disseminate the projects' findings and discuss whether a more active teaching approach can be generalized to the rest of the course.

## Future improvements to the course and lectures

Producing compendiums will probably be done for all the oncology lectures. Whether I will do video lectures to add to the compendiums next year is undecided at this point but will depend on discussions with the rest of the course teachers as well as contact to COBL to get information on what it will require.

## References

Andrews, T., Leonard, M., CA, C., & Kalinowski, S. (2011). Active learning not associated with student learning in a random sample of college biology courses. *CBE—Life Sciences Education*, *10*, 394–405.

Bergmann, J., & Sams, A. (2012). Flip your classroom: Reach every student in every class every day.

Berrian, A., Feyes, E., CJ, H., & Wittum, T. (2021). Mutimodal integration of active learning in the veterinary classroom. *J Vet Med Educ*, *48*(5), 533–537.

Bonwell, C., & Eison, J. (1991). *Active learning: Creating excitement in the classroom*. ASHE-ERIC Higher Education Reports.

Børresen, B., Kongsbak-Wismand, M., Skotte, N., Andersen, S., & Barington, K. (2021). Unpublished pre-project assignment.

Dooley, L., Frankland, S., E, B., & Tudor, E. (2018). Implementing the flipped classroom in a veterinary pre-clinical science course: Student engagement, performance and satisfaction. *J Vet Med Educ*, *45*(2).

Freeman, S., Eddy, S., McDonough, M., Smith, M., Okoroafor, N., Jordt, H., & Wenderoth, M. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences*, *111*(23), 8410–15.

Gilboy, M., Heinereichs, S., & Pazzaglia, G. (2015). Enhancing student engagement using the flipped classroom. *Behavior*, *47*, 109–114.

Hartley, J., & Cameron, A. (1967). Some obervations on the efficacy of lecturing. *Educational Review*, *20*(ue 1), 30–37.

Hounsell, D., McCune, V., J, H., & Litjens, J. (2008). The quality of guidance and feedback to students. *Higher Education Research and Development*, *27*, 55–67.

MacManaway, L. (1970). Teaching methods in higher education – innovation and research. *Higher Education Quarterly*.

Mathiesen, H. (2015). Digital voting systems and communication in classroom lectures. *Journal of Interactive Media in Education*, *1): 1*, 1–8.

Michael, J. (2006). Where's the evidence that active learning works? *Adv Physiol Educ*, *30*, 159–167.

Mofett, J., & Mill, A. (2014). Evaluating of the flipped classroom approach professional skills course. *Adv Med Educ Pract*, *5*, 415–25.

Prince, M. (2004). Does active learning work? a review of the research. *Journal of Engineering Education*, *93*(3), 223–231.

Prober, G., & Heath, C. (2012). Lecture halls without lectures — a proposal for medical education. *N Engl J Med*, *3;366(18):1657*.

# A Questions and answers

| Question and answer | Number | Percentage |
|---|---|---|
| | | |
| **Forberedte du dig til forelæsningerne?** | | |
| Ja | 24 | 60.0% |
| Nej | 16 | 40.0% |
| | Total: 40 | |
| | | |
| **Hvis du ikke forberedte dig til forelæsningerne: hvorfor? (vælg den der passer bedst)** | | |
| Jeg forbereder mig generelt aldrig før forelæsninger | 5 | 33.3% |
| Jeg havde ikke tid til at forberede mig | 5 | 33.3% |
| Jeg læser generelt altid først efter forelæsningen | 5 | 33.3% |
| | Total: 15 | |
| | | |
| **Hvis du brugte kompendierne til at forberede dig, fandt du dem i så fald brugbare og passende i indhold og længde? Skala 1-5 (5 bedst)** | | |
| 1 | 0 | 0% |
| 2 | 0 | 0% |
| 3 | 1 | 3.4% |
| 4 | 14 | 48.3% |
| 5 | 14 | 48.3% |
| | Total: 29 | |
| | | |
| **Ville du foretrække, at pensum i MKR i højere grad var baseret på specialskrevne kompendier som disse, eller foretrækker du lærebogen?** | | |
| Foretrækker kompendier | 35 | 89.7% |
| Foretrækker lærebogen | 4 | 10.3% |
| | Total: 39 | |
| | | |
| **Hvis du ikke forberedte dig, følte du så, at du fik noget ud af forelæsning 1 (ikke-kirurgisk cancerterapi)? Skala 1-5 (5 bedst)** | | |
| 1 | 0 | 0% |
| 2 | 0 | 0% |
| 3 | 1 | 7.1% |
| 4 | 6 | 42.9% |
| 5 | 7 | 50.0% |
| | Total: 14 | |
| | | |
| **Hvis du ikke forberedte dig, følte du så, at du fik noget ud af forelæsning 2 (case gennemgang lymfom/sarkom)? Skala 1-5 (5 bedst)** | | |
| 1 | 0 | 0% |
| 2 | 3 | 23.1% |
| 3 | 2 | 15.4% |

| | | |
|---|---|---|
| 4 | 5 | 38.5% |
| 5 | 3 | 23.1% |
| | Total: 13 | |
| | | |
| **Hvis du forberedte dig, følte du så, at du fik noget ud af forelæsning 1 (ikke-kirurgisk cancerterapi)? Skala 1-5 (5 bedst)** | | |
| 1 | 0 | 0% |
| 2 | 2 | 9.1% |
| 3 | 3 | 13.6% |
| 4 | 7 | 31.8% |
| 5 | 10 | 45.5% |
| | Total: 22 | |
| | | |
| **Hvis du forberedte dig, følte du så, at du fik noget ud af forelæsning 2 (case gennemgang lymfom/sarkom)? Skala 1-5 (5 bedst)** | | |
| 1 | 0 | 0% |
| 2 | 2 | 8.7% |
| 3 | 4 | 17.4% |
| 4 | 6 | 26.1% |
| 5 | 11 | 47.8% |
| | Total: 23 | |
| | | |
| **Foretrækker du formatet af forelæsning 1 (standard monolog forelæsning) eller forelæsning 2 (case-baseret studenter interaktion)?** | | |
| Foretrækker standard forelæsning | 17 | 44.7% |
| Foretrækker interaktiv forelæsning | 21 | 55.3% |
| | Total: 38 | |
| | | |