Implementing mini-case to meet the intended learning outcomes

Sandra Stolzenbach Wæhrens

Department of Food Science
University of Copenhagen

Background

The course Sensory Evaluation of Food (7.5 ECTS) is offered by the Faculty of Science at University of Copenhagen. This course has been taught for the last 20 years but format and course title have changed several times. In 2016, the course changed to a bachelor course, and it is now compulsory for second year students doing the specialisation in "Sundhed og Ernæring" under the bachelor study programme "Fødevarer og Ernæring". Due to this, the course content and intended learning outcomes (ILOs) were adjusted.

A particular problem regarding the stated ILOs in the course description has been identified. One of the ILOs states that students achieve the skill "Ability to set up and perform basic sensory tests in a scientifically valid way". In the field of sensory science, it is of crucial importance to know and be able to perform two types of sensory tests, namely discrimination tests and descriptive tests. In the last 2 years, the course has been running, the students have got lectures in both types of tests. However, the students only had a practical exercise in discrimination tests, and thus the students did not achieve practical skills in the ability to set up and perform basic descriptive tests in a scientifically valid way. This is a major concern as descriptive test is an important tool to be able to manage for those working with sensory evaluation of food.

Aim

The aim is to develop and implement practical exercises covering the different steps in descriptive tests in order to fulfil the ILOs regarding "ability to set up and perform basic sensory tests in a scientifically valid way" and hereby improve the student's understanding of the curriculum regarding descriptive tests. These exercises should be implemented without major changes in the lecture plan and without increasing the student's work load.

Methods

Development of exercises: mini-case

A descriptive analysis is a comprehensive method consisting of several steps including: vocabulary development to describe the sensory product characteristics, training of a sensory panel in describing the products, profiling of the products using the sensory panel, data analysis and presentation of data. Due to these many steps it was decided to develop a mini-case including 4 linked exercises dealing with these steps. However the training of a sensory panel in describing the products was left out due to time restrictions. The exercises were spread out over the course and among all the exercises (in total 13 exercises in the course) such as the students worked with the exercises after they were presented with the theoretical framework.

The mini-case consisted of

- Exercise 4: Sensory vocabularies and reference standards
- Exercise 5: Profiling test
- Exercise 12: Data analysis – Own data from profiling test
- Exercise 13: Movie-presentation of sensory data

Students worked in team of approximately 6 students.

In the development of the exercises, several considerations were made regarding relevance, constructive alignment, student learning, engagement, teaching materials, teaching tools, workload and feedback.

Relevance and constructive alignment

The most important criterion for the mini-case was that it was found relevant for the course. The mini-case was created and integrated in the course

such as constructive alignment between the curriculum and student learning was obtained through relevant learning activities. Problem-based learning (PBL) was used i.e. students themselves worked with real food products and the conditions for setting up a descriptive analysis was as close as possible towards how to do in real life. Hereby, achievement of the desired learning outcomes was supported (Biggs, 2002).

It was important that the link between the different exercises resulting in the mini-case was clear to the students. The exercises were set up such as the learning from the first exercise was integrated into the next exercise etc. The overall framework of each exercise followed the theory of didactic situations (TDS) such that the students could express themselves by working independently (in teams). Example is given for Exercise 5 (Profiling test).

Devolution: The teacher presented the students for a general overview of important considerations within collecting of data using sensory descriptive analysis.

Action and formulation: The students, in teams, used their developed questionnaire from a previous exercise (exercise 1: setting up the sensory descriptive analysis) to collect data. The students prepared an actual tasting session and had fellow students from the course evaluate their food products. Hereby, the students could reflect - which is central for their learning - on issues related to both organisation of a tasting session and participation in a tasting panel.

Validation: Summing up on the exercise with the teacher. See more in the section: Formative feedback to the students.

Institutionalisation: The movie-presentation (Exercise 13) combined all the exercises and the students' presentation and discussion of methods allowed for generalisation of the topic.

Student learning and engagement

As engagement stimulates learning, the mini-case should engage the students. The student must think that the mini-case taught them something that they did not learn from the lectures and the other exercises. By having linked exercises on the same food product throughout the course, it was aimed that the student would feel a personal ownership motivating them to take responsibility in solving the exercises and consequently increase their learning.

Teaching materials and tools

The teaching materials, including the guidelines to the exercises, must be well-described. Herein, the level of instructions in the guidelines was evaluated. As this course is for second year bachelor students, it was decided that the guidelines in how to conduct the exercises should be precise and detailed but the student themselves should deal with and conclude from the results. The level of openness in the exercise can therefore be classified as level 1 according to the Table 7.1 of Tamir (Tamir, 1989).

Table 7.1. Levels of openness in teaching in the laboratory

Level	Problem	Ways and Means	Answers
0	Given	Given	Given
1	Given	Given	Open
2	Given	Open	Open
3	Open	Open	Open

Adapted from Tamir (1989)

In the end of the guidelines, a list of questions was given allowing the students to reflect upon the exercise.

In order to ensure that the guidelines were clear from a student perspective, a student assistant from last year's course proof read the guidelines.

Traditionally, the students summarise project work by preparing a written report and give an oral presentation in plenum followed by feedback from teacher and fellow students. However, this is a substantial workload for the students to do and for teachers to give feedback on. Furthermore, it is experienced that the students lose attention during the many similar plenum presentations. Consequently, a new initiative in reporting the mini-case was implemented. Each team should prepare a maximum 6 min the video-presentation of the mini-case and upload this on Absalon.

Workload

The work load for the mini-case must not be a burden to the students. They should think that the preparation for the exercise should not be too much and the time to work on the mini-case was sufficient. Work overload was tried eliminated by having the exercises integrated in the lecture plan, such as they were conducted just after the theoretical framework was presented. Hereby, the students were provided with basic knowledge for each step in

a sensory descriptive analysis instead of asking them students to apply all theory simultaneously to solve a particular problem (Tamir, 1989). Additionally, the presentation of mini-case using by video instead of written report should also reduce the workload. In order to have room for the mini-case in the lecture plan, a few exercises not working well in the previous years were taken out of the lecture plan.

Formative feedback to the students

Formative feedback is considered as an effective teaching–learning environment (Hounsell, McCune, Hounsell, & Litjens, 2008). Thus, it was important that the students got feedback from the teachers during each exercise, after each exercise and on the final presentation of the mini-case. In order to ensure sufficient feedback to the students during the exercises several teachers were available for interaction and feedback to the students. Each exercise was validated in plenum by summing up on the exercise using the questions given in the end of the exercise guidelines e.g. what was difficult? What have you learned? Reflections were shared and the teacher played an active role in discussing the issues with the students. Lastly, feedback was given to the mini-case-video presentations, partly from the students and partly from the teacher. The students were asked to provide written feedback on Absalon for minimum two teams. The teacher watched all the movie-presentations and prepared a power-point presentation to be presented in plenum with general comment and examples for different findings/statements allowing for generalisation of the mini-case. The students were told that if they wanted specific comments on the movies, they were welcome to contact the teacher afterwards.

Evaluation

Evaluation of the teaching is crucial in order to understand if improvements are needed (Ulriksen, 2014). The mini-case was formatively assessed midway by observing the students' engagement during each exercise. Oral and written summative assessments were conducted in the end of the course. The oral evaluation was held in plenum in connection to the course evaluation set up by KU. The written evaluation was set up on Absalon and covered the different aspects considered as important for studying if the mini-case had succeeded. Herein, the students rated their

agreement/disagreement in different statements for relevance, constructive alignment, student learning, engagement, teaching materials, teaching tools, workload and feedback. The written evaluation was announced on Absalon after the examination as evaluation of the relevance of mini-case in relation to the course was one of the focus areas. However, a risk of low response rate exists as the students might already focus on other activities such as new courses (Ulriksen, 2014).

Summative evaluation of the mini-case

Oral evaluation

In total, 88 students were signed up for the course. On the last course day, course evaluation was done in plenum with 64 students present (73% of the students). The course responsible and the students went through the online KU course evaluation and the students were able to give comments. Additionally, focus was given to the mini case. In Table 7.2, comments on the mini-case from the students are listed.

Table 7.2. Students evaluation of the mini-case (oral)

Overall	• the mini case was really good • keep for next year • great to get the overall picture • helps out to understand the curriculum • the time to work on the exercises was okay • deadlines okay
Leaving out an exercise about training of a sensory panel in describing the products	• panel training exercise would have been nice to have. However, it is fine the way it is as we can see the importance of panel training by not having it • learning outcome would be same if we have had the panel training
Movie presentation	• movie presentations were much better than having oral presentations in class • good to keep the feedback to 45 minutes update/sum up in class • good to have to comment on the other movies
Practical issues	• it was difficult to be a panel leader due to the noise • more rooms should be available for the exercises • as the different teams have to help each other in the evaluation of the food product, it would be nice with signs for the different teams such as the other teams are easier to find

Written evaluation

In total, 10 students out of 88 students gave written feedback on Absalon accounting for 11% of the students (see Table 7.3). This is a very low

response rate but this is expected as stated by Ulriksen (Ulriksen, 2014). However, the students' replies on Absalon should be seriously considered.

Table 7.3. Written Feedback on the mini-case from 10 students

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
In my opinion, the mini-case was relevant for the course				2	8
In my opinion, it was necessary to prepare for the exercises in the mini-case			5	4	1
In my opinion, the level of instructions in the exercise guidelines to the mini-case was good				8	2
In my opinion, I was engaged in the exercises for the mini-case				3	7
In my opinion, the link between the four exercises in the mini-case was clear			1	6	3
In my opinion, the teachers interacted well with me/the students during the exercises in the mini-case			5	3	2
In my opinion, the video-presentation instead of oral presentations in class worked good			2	1	7
In my opinion, feedback (online discussions and oral session) on the mini-case was sufficient	2	3	2	2	1
In my opinion, the time to work on the mini-case was sufficient		1	1	5	3
In my opinion, the mini-case learned me something that I did not learn from the lectures and the other exercises			1	5	4

Additional comments:

- The problem with the feedback on the movie presentation was that we got it so late in the process so you could not use the feedback properly. And also a lot of people didn't give feedback at all. Mine group didn't receive any feedback. I really like the mine case because you got to use all your knowledge that you have learned in the class. So I definitely think that you should do it again next year, just with some improvements. Maybe start the cases before in the course, so that it isn't the last thing that you do, because then all you think about and read on is the exam.
- It would have been nice to get feedback from a teacher about the video-presentation. Only 3 students gave feedback to our group and it wasn't that precisely. Since we put a lot of work into it, it would be nice to get better feedback:-)
- I´d like to have feedback for teachers and from classmates, because there were some details that would have been good to know if they were good or right on the video previous to the exam.

Discussion

The students gave very positive feedback on the implementation of the mini-case. Overall, the students found the mini-case very relevant for the course and supported their learning outcome. However, evaluation of whether the mini-case results in an improvement of the students' learning outcome with regards to descriptive test compared to previous years is very difficult.

The students were very happy about reporting their mini-case using the movie-presentation instead of writing a report. But some students found that the feedback on the movie presentations insufficient. This can be explained by students are motivated to achieve individual feedback that facilitate their own learning outcomes (Higgins, Hartley, & Skelton, 2002), especially because the exam was imminent at the same when the feedback was given. Individual feedback was not provided in terms of teacher-to-team feedback with specific comments. Instead, the teacher gave overall feedback on all the movie-presentation by presentation of general comments to the work. Additionally, specific examples from some of the movie-presentations were given to highlight points. However, students were told that if they wanted specific comments on the movies, they were welcome to contact the teacher afterwards. But, none of the students took this opportunity. Even though the students wanted to achieve feedback many of the students did not take the time to provide feedback to the other teams. To ensure more feedback from fellow students for the next year course, it will be mandatory for the students to provide feedback to fellow students in order to go to the exam. With respect to the teacher feedback, the format chosen allowed for generalisation to all students at the same time and it will be kept unchanged. However, more examples from the movie-presentation will be included such as all students find the feedback relevant for their specific work.

Some practical issues also need to be solved for next year. Complaints about the noise level in the lecture during the exercises were expressed by many of the students. One student suggested that an additional room should be available. Actually, one additional room was booked for the exercises but it needs to be more clearly informed next year. As the teams had to help each other with evaluations (profiling) of the food products, the logistics with respect to indicate who belong to which team need to be improved. This will be done by placing signs with team numbers on the tables in the class rooms.

Conclusion

Implementation of the mini-case was a success as the students showed high engagement and the mini-case helped them to better understand curriculum. However, minor adjustments regarding practical issues logistics and feedback procedure will be made for next year course.

References

Biggs, J. (2002). Aligning the curriculum to promote good learning. In *Constructive alignment in action: Imaginative curriculum symposium, ltsn generic centre* (Vol. 4).

Higgins, R., Hartley, P., & Skelton, A. (2002). The conscientious consumer: Reconsidering the role of assessment feedback in student learning. *Studies in higher education*, *27*(1), 53–64.

Hounsell, D., McCune, V., Hounsell, J., & Litjens, J. (2008). The quality of guidance and feedback to students. *Higher Education Research & Development*, *27*(1), 55–67.

Tamir, P. (1989). Training teachers to teach effectively in the laboratory. *Science Education*, *73*, 56–69.

Ulriksen, L. (2014). *God undervisning på de videregående uddannelser* (1st ed.). Frydenlund.