Improving the learning outcome of peer-feedback sessions

Stine Harloff-Helleberg

Department of Pharmacy
University of Copenhagen

Background

This work is based on an elective course at master level qualifying for 7.5 ETCS. It comprises 32 lectures, 64 hours of class instruction, and 110 hours allocated to preparation *e.g.* group work. Here, the students work in groups of three to prepare three deliverables throughout the course *e.g.* 1) oral presentation of a case-study, 2) 2-3 written laboratory journals including presentation hereof, and 3) poster presentation on their case. The students give and receive formative peer-feedback on each deliverable e.g. oral feedback on deliverable 1 and 3, whereas they receive both oral and written peer-feedback on deliverable 2. In addition to the peer feedback, the students also receive feedback in plenum from the course responsible. Course capacity is 60 students, with an average of 20 students enrolled per course. The exam is based on a continuous assessment by the course directors. This year, only 9 students participated in the course due to unforeseen circumstances. I share the role as course director with a college, with whom I designed and planned this course in 2018. Each year, student feedback is used to further develop the course striving at increased learning outcome.

Peer-feedback is seen as one of the most powerful influences on learning and achievements , and results in a positive learning outcome for 50-83% of the students (Hattie & Timperley, 2007), thus enforcing the learning outcome (Nottingham & Nottingham, 2017). By supporting student centered learning, peer-feedback allows students to share thoughts and decisions, believe in their capacity to lead and allows them to learn from each other (Nicol et al., 2014; Nottingham & Nottingham, 2017). However, for

peer-feedback to be effectful the conceptualization hereof is key (Hattie & Timperley, 2007). Nicol and Macfarlane-Dicks have described seven principles for good feedback practice (Nicol & Macfarlane-Dick, 2006). The principles highlights, among other things, the importance of well-defined feedback criteria's for the feedback to be successful. Moreover, the principals addresses that a dialogue between teacher and students on learning including student self-assessment in learning is crucial. The principles described have successfully been included in a restructuring process of a course in Econometrics II by Tabor and von Müllen (Tabor & Von Müllen, 2020), where the students showed a higher work effort, increased learning outcome, higher grades at the final exam and increased total number of students passing the exam. *Thus, the aim of this project was to evaluate how I as a teacher facilitate the peer student feedback sessions to maximize student learning outcome.*

Interventions

In spring 2021, I gave class lectures before and after laboratory experiments in the compulsory bachelor course, while receiving supervision on my teaching as a part of my enrollment in the course on teaching and learning in higher education. During those lectures, the students were asked to provide and receive oral peer-feedback on their written laboratory reports prior to handing them in to me for pass/not pass assessment. Together with my supervisors, we identified a clear gap between potential and actual learning outcome from the peer-supervision sessions. To further understand why this was the case, I created an integrated questionnaire in the following lecture. I learned to my own surprise, that the students had a very diverse perspective on why to provide student peer feedback, hence a highly varied learning outcome. From the poll it was clear, that a high number of students saw the purpose of providing student peer feedback as to "find the highest number of errors in the laboratory reports provided by fellow students" and "to figure out who was the most right". Based on the poll, I had a discussion with the students on how to provide peer feedback, which subsequently sparked a peer feedback session with highly motivated students.

Understanding the student's motivation for peer-feedback

Based on experiences from the bachelor course, I found it highly interesting to further explore how and why peer-feedback deliberately affects the

student motivation to engage in the feedback process. Thus, to specifically target this gap I defined three overall themes to be addressed by interviewing the three student groups from the elective MSc level course described in the background section above. The three themes were 1) peer-feedback in general, 2) students' perspective on teaching outcome of peer feedback, and 3) how does students perceive peer feedback.

Conceptualization and translation of peer-feedback into classroom practice

With inputs from the focus group interviews, a lecture was prepared. The primary goal of this lecture was to increase student motivation hence learning outcome from the peer-feedback by addressing the following learning outcomes 1) what is peer feedback? 2) why is peer-feedback important? 3) what can you learn from peer-feedback? 4) framing how to do peer-feedback in this context, and 5) what peer-feedback can be used to outside the classroom (Appendix A).

Evaluation

To evaluate whether the teaching intervention improved student learning outcome from the peer-feedback session, the students were asked to reflect on whether the peer-feedback received and especially provided helped them to further improve their case work, if it was useful, which criteria they find the most useful and if the criteria could be adjusted to improve learning outcome. The reflections were shared and discussed in plenum on the following course day *e.g.* 5 days after the peer-feedback session, followed up by group interviews. In addition to this, this intervention was supervised and evaluated by my department supervisor and co-course director.

Results and discussion

Understanding the student's motivation for peer-feedback

The interviewees all had previous experiences with peer-feedback, yet no one perceived it as either motivating or as a tool to increase own learning. Instead, they experienced it as time consuming, demotivating and without any learning outcome. The interviewees were enrolled in different study

programs, hence with varied experience on which format of peer-feedback they have experienced. In study program "A", previous experience was based on peer-feedback on oral presentations, where they were asked to read a paper on forehand. From study program "B", previous experience was based on giving and receiving peer-feedback on written laboratory reports, written scientific reports together with oral presentations. When asked about previous experiences, the interviewees said, that "*people are often asking simple questions when forced to ask something*" and explained further "*it would be better with questions that keep the discussion going. The teacher has a broader overview, ask better questions and can go into more details*". Common for all interviewees was, that they put more effort and work into products delivered to a scientific staff member. Simply, if the product did not count in the final assessment, it was not prioritized. As for the group composition and size, all interviewees preferred a group size of 3-4 and to choose group members themselves. The misbelief amongst students regarding the qualification of peers to provide valuable feedback is further discussed by Tabor and von Müllen (Tabor & Von Müllen, 2020), and related to one of Nicol and Macfarlane-Dicks seven principles *e.g.* feedback must deliver high quality information to students about their learning (Nicol & Macfarlane-Dick, 2006). Yet, relating critically to received feedback is in itself a source of learning, as it requires the students to take a critical stance and reflect upon the feedback in relation to own stance (Nicol et al., 2014). In other words, students must plan an active role in peer-feedback processes by connecting the feedback received with prior knowledge, hence constructing a meaning by analysis, discussion and clarifying questions (Nicol et al., 2014).

Another interviewee added "*it is demotivating when you are not opponent or presenter. The opponent groups always take up all the time, leaving no time left for others to ask questions…the workload is often two high, when there are many groups to prepare for*". Regarding initiatives to improve teaching outcome, the interviewees mentioned "*explaining the exact purpose would be a benefit, not just that it is compulsory*". Interviewees from study program "B" similarly stated, that "*the feedback is very different from group to group. Often, people do more a grammar check than scientific content*" and "*people are focused on finding mistakes, not constructive criticism on what could be improved*". Clarifying what a good performance is, is listed as principle number one according to Nicol and Macfarlane-Dicks (Nicol & Macfarlane-Dick, 2006). In the context of course setting, assessing a good performance is directly linked to learning outcomes from

the course description (AarhusUniversity, n.d.; Dolin, 2017). Thus, the assessment criteria must be clearly defined to the students prior to providing peer-feedback, preferable conceptualized via dialogue with the students rather than one-way information (Nicol et al., 2014).

From study program "B", the interviewees additionally had experience with formative peer-feedback on written laboratory reports including summative decision making on whether the reports were accepted or not. In this context, the interviewees said "*I would never ask my friends to hand in a report a second time. We approve each other's reports, and then we just use the time to talk and drink coffee*". For peer-feedback on scientific reports, they have used a rubric structure. From the rubrics, a certain number of points were required for the report to pass. But "*if the report did not have enough points to pass, we just went through it again and found somewhere where we could add a bit more. We will not fail our friends*". Statements suggesting that peer-assessment is a vulnerable topic, from where it might prove difficult to obtain a high learning outcome. This is further supported by the literature, where a previous study have reported that students do not feel comfortable and are reluctant to give marks to peers due to lack of expertise and the fact that their assessment can highly affect the non-contributing students. Thus, summative peer-feedback should be avoided as it is not likely to be accurate and fair in the assessment (Nicol et al., 2014; Sridharan et al., 2019).

No interviewees used the feedback received to revisit their written reports or reflected upon the feedback received. Not even, if the opponent group disagreed with the results and scientific content in general due to "*lack of time, I will look at it when I am studying for my exam. I am already engaged in a new laboratory exercise, so I don't care about the ones completed*". From a lecturer's perspective, it appears as a wonder that the interviewees did not utilize the opportunity to reflect upon and learn from peers. Yet, being a student myself, enrolled in the pharmaceutical science program in 2004, I clearly remember the busy schedule with several overlapping courses hence deliverables. Thus, when barely having sufficient time to complete the reports, prepare for new classes etc., it is relatable why the interviewees did not prioritize to revisit the reports after receiving feedback, when not obliged to hand in.

Conceptualization and translation of peer-feedback into classroom practice

From the interviews it was clear, that the students did not see the purpose nor learning perspective in peer-feedback. Also, it was unclear how to provide peer-feedback. To address this, five learning outcomes for the lecture on peer-feedback were identified (as described above), and a 45-minute lecture prepared (Appendix A). The content was centered around and an adapted version of the seven principles as described by Nicol and Macfarlane-Dicks (Nicol & Macfarlane-Dick, 2006). To further emphasize the relevance of peer-feedback not only in academic settings but also in future jobs, a job description from a current relevant job opening was included. It was further highlighted in the presentation, where the learning outcome from peer-feedback feeds directly into this job position. After the lecture on peer-feedback, the students were given 45 minutes to prepare for the peer-feedback session and 45 min to prepare for feedback on feedback. The idea was to give the peer-feedback group time to reflect on the assessment criteria and in groups discuss the paper provided on forehand from the presenting group. The time allocated to prepare feedback on feedback group was used to reflect on this role, and what good peer-feedback is.

To guide the students on the peer-feedback, a template listing peer-feedback criteria was developed (Appendix A) and introduced to the students during the lecture. According to Race (Race, 2001), applying assessment criteria in the feedback process results in a much deeper learning experience in itself compared to just being informed about assessment artefacts. Moreover, it has shown to be valuable to include students when defining the assessment criteria (Tabor & Von Müllen, 2020), and the rubrics structure might be a useful in this context (Dolin, 2017). Thus, the developed peer-feedback scheme included feedback criteria directly related to learning outcome and pass/non-pass criteria as described in the course description. Additionally, some boxes were left open with a question mark, where students were encouraged to reflect on new assessment criteria for their feedback. Moreover, it allows students to appropriately challenge the pre-defined goals, hence being involved in establishing the ongoing learning process (Hattie & Timperley, 2007). Besides receiving and providing peer-feedback on the scientific content, the students were also asked to provide peer-feedback on presentation techniques. To prepare the students for this, a lecture was given on presentation techniques, including selected videos of various speakers focusing on this particular (Duarte, n.d.; Forbes,

n.d.). Showing examples of a good performance helps to illustrate, iterate and highlight the criteria towards the students (Tabor & Von Müllen, 2020). *E.g.* the second principle on good feedback practice according to Nicol and Macfarlane-Dick (Nicol & Macfarlane-Dick, 2006), to facilitate development of self-assessment in learning.
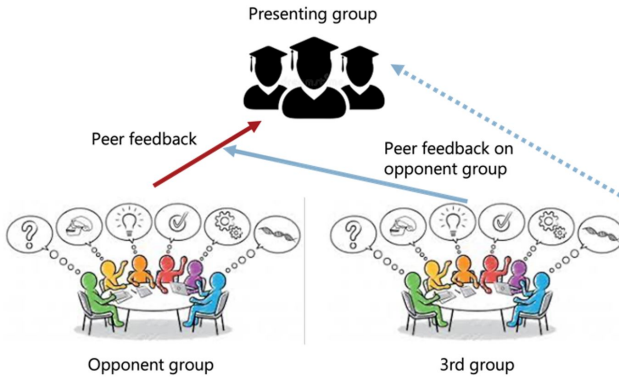
Figure 1. Feedback structure.

Some interviewees identified lack of motivation during peer-feedback sessions, when they were not actively engaged as presenters or opponent group. Therefore, the third group was asked to provide peer-feedback on the opponent group according to Figure 1. An additional column was added in the review sheet for the observer group (3rd group).

Evaluation

The students found the teaching intervention *e.g.* lecture on peer-feedback to improve their learning outcome. The interviewees stated, that "it is important to know the criteria and why to do peer-feedback. It has a huge impact on the learning outcome", "it makes more sense now", "I was skeptical before, but there were good questions and it was more engaging", "a much better session" and "now I understood what I was expected to do, when relating the peer-feedback to the learning outcomes of the course". And in relation to the peer-feedback template, the interviewees said, "good with specific points to address", "worked well" and "it gave me a structure on

how to do it, it was nice". Addressing the seven principles on peer-feedback by Nicol and Macfarlane-Dicks (Nicol & Macfarlane-Dick, 2006) promote student metacognition in regards to the peer-feedback process (Tanner et al., 2012), hence student motivation (Molin et al., 2020).

When asked about specific learning outcome(s) of the peer-feedback session, the interviewees mentioned "discussion with peers on how to focus the scope of our case work for next deliverable", "it was interesting to discuss with peers from different study programs, as we all had diverse perspectives" and "giving peer-feedback allows me to relate to and reflect on my own work". Additionally, all interviewees mentioned specific feedback received on presentation techniques that they intend to implement for future presentations. Those findings further support the work by Nicol and Macfarlane-Dicks (Nicol & Macfarlane-Dick, 2006), as the interviewees found the peer-feedback to facilitate reflection on own learning, providing an opportunity to close the identified gap between current and desired learning outcome.

As for further improvements on the teaching intervention, some students found it stressful to be obliged to ask questions to peers and suggested "It would be nice if we could have 5 minutes in the opponent group after the presentation to discuss our peer-feedback before delivering it". Interestingly, the highly motivated students said, "it helps to relieve the burden on my shoulders as to always being the one to ask questions, when this responsibility is shared with my peers" and "peer-feedback serves the basis of a better discussion, as everyone is actively engaged". Only limited studies focuses on the effect of peer-feedback on student stress levels (Nicol & Macfarlane-Dick, 2006). Yet, a correlation was found between peer-feedback inducing a higher stress level particularly amongst female students, while at the same time improving summative performance tasks (Nicol & Macfarlane-Dick, 2006). Some interviewees did not like the feedback-on-feedback format, as they did not see the learning potential hereof. Thus, this is object for further improvement. As a last remark, the interviewees unitedly found the template to be objective for further improvements, as should be converted into bullet point format with clear-cut criterions. Only one new assessment criteria was suggested by an interviewee, being "time-management and prioritization during presentations".

Conclusion

The overarching aim of this study was successfully achieved, as the teaching intervention on conceptualization and translation of peer-feedback into classroom practice improved student learning outcome. Obviously, there is room for improvements. First aspect is to further develop the feedback template, and continuously work on a metacognitive level to help the students reflect on and understand the learning potential of peer-feedback. Especially, the feedback-on-feedback aspect could be further developed. Number of students attending the course significantly impacts a feasibility of the described format. Having said that, the students highlighted, that the small class size was highly motivating. Thus, the format of the peer-feedback session needs to be carefully considered in relation to number of students participating.

Perspective

This project has addressed the importance of understanding the learning outcome of a giving teaching activity on student motivation. The knowledge derived could be utilized in other courses using the peer-feedback. In particular, it could be relevant to consider a red thread throughout the pharmaceutical educational program, where the students continuously use peer-feedback in different contexts, always subsequent to introduction and carefully described peer-feedback criterions.

References

AarhusUniversity. (n.d.). Peer feedback i undervisningen [accessed December 2, 2021).]. http://educate.au.dk/fokusomraader/peer-feedback-i-undervisningen

Dolin, J. (2017). What is the learning potential of peer feedback? [accessed December 2, 2021).]. https://video.ku.dk/video/20370248/jens-dolin-peerfeedback-seminar-englishm4v

Duarte, N. (n.d.). The secret structure of great talks [accessed December 12, 2021).]. https://www.ted.com/talks/nancy_duarte_the_secret_structure_of_great_talks?referrer

Forbes. (n.d.). Barack obama's 3 best public speaking tips [accessed December 13, 2021).]. https://www.youtube.com/watch?v=HKv9wYO5a9s

Hattie, J., & Timperley, H. (2007). The power of feedback. *Rev. Educ. Res*, *77*, 81–112. https://doi.org/10.3102/003465430298487.

Molin, F., Haelermans, C., Cabus, S., & Groot, W. (2020). The effect of feedback on metacognition - a randomized experiment using polling technology. *152*. https://doi.org/10.1016/j.compedu.2020.103885

Nicol, D., & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Studies in Higher Education*, *31*(2), 199–218.

Nicol, D., Thomson, A., & Breslin, C. (2014). Rethinking feedback practices in higher education: A peer review perspective. *Assess. Eval. High. Educ.*, *39*, 102–122. https://doi.org/10.1080/02602938.2013.795518.

Nottingham, J., & Nottingham, J. (2017). Challengging learning through feedback. https://books.google.dk/books?hl=en&lr=&id=Hgv1DQAAQBAJ&oi=fnd&pg=PP1&dq=nottingham+peer+feedback&ots=cPFmvCEUfs&sig=wy3EzDGf9kZMcdxbe9tRs%20DN-mss&redir_esc=y#v=onepage&q=nottingham%20peer%20feedback&f=false

Race, P. (2001). A briefing on self, peer and group assessment.

Sridharan, B., Tai, J., & Boud, D. (2019). Does the use of summative peer assessment in collaborative group work inhibit good judgement? *High Educ*, *77*, 853–870. https://doi.org/10.1007/s10734-018-0305-7.

Tabor, M., & Von Müllen, R. (2020). Et statistikfags succesfulde omstrukturering – fokus på alignment og god feedbackpraksis. *Dansk Univ. Tidsskr.*, *15*, 51–70. https://doi.org/10.7146/dut.v15i28.113457

Tanner, K., Molin, F., Haelermans, C., Cabus, S., & Groot, W. (2012). Promoting student metacognition. *11*, 113–120. https://doi.org/10.1187/cbe.12-03-0033.

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Slide 13

Peer feedback in "the real world?"

Job description

En stor del af dit arbejde vil omhandle **OPTIMERINGER AF ARBEJDSGANGE OG PROCESSER, KOMPLEKS PROBLEMLØSNING SAMT SPARRING** og support til såvel interne som eksterne produktioner. **REVIEW** af batchdokumentation, instruktioner, ændringssager og afvigelseshåndtering........opgaver sjældent rutinepræget og skal ofte **LØSES TVERFAGLIGT MED KOLLEGER BÅDE INDEN OG UDENFOR AFDELINGEN.**

Qualifications

Som kollega er du først og fremmest en **TEAM-PLAYER,** kun sammen kan vi lykkes! Du har et godt humør og med initiativ, fleksibilitet og selvstændighed, tager du ansvar for nye opgaver. Du tager på arbejde med den indstilling, at vi I **TEAMET OG AFDELINGEN SPILLER HINANDEN GODE.**

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Slide 14

Why is peer feedback important?

- One of the most effecting learning tools
- Helps the student to understand the learning outcomes and assessment criteria's
- Helps the student to understand where he/she/they are in the learning process
- Helps the student to understand the scientific content (terms and processes)
- Helps the student to identify next learning step
- Motivates and stimulates metacognition e.g. awareness of one's own thought processes and patterns behind them

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Slide 15

What can **YOU** learn?

It engages students in the learning process and develops their capacity to reflect on and evaluate their own learning and skill development

- Working cooperatively
- Thinking critically
- Giving constructive feedback
- Learning from critical appraisal received from others
- Managing one's own learning autonomously
- Developing interpersonal skills and
- Developing an awareness of group dynamics

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Slide 16

What can **YOU** learn?

It engages students in the learning pro capacity to reflect on and evaluate their development

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- Working cooperatively ✓
- Thinking critically ✓
- Giving constructive feedback✓
- Learning from critical appraisal received from others✓
- Managing one's own learning autonomously ✓
- Developing interpersonal skills and ✓
- Developing an awareness of group dynamics ✓

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Slide 17

Feedback and peer review

https://www.youtube.com/watch?v=a1PJRIQrqTo

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Slide 18

How do you provide peer feedback?

Presentation techniques
- Language
- Body language
- Content
- Support material
- Stress

Scientific communication
- Is the case description clear?
- Did the group justify their aim and hypothesis?
- What is the scientific impact of the suggested case?
- "what is in it for me?" "how" "why"
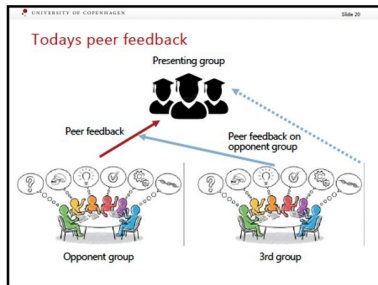- Does it meet desired learning outcome?

Formative feedback
- Identify strengths and weaknesses
- Looking forward (how could it be improved?)

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Slide 25

Reflections on feedback

- Did it help you to understand how your deliverable should be improved?
- Could you use the peer feedback?
- Did the peer feedback improve your learning outcome?
- Which feedback criteria(s) were the most useful?
- Could the criterias be adjusted to improve your learning outcome?
- Other thoughts?

Consider those points in your groups this afternoon for further discussion in plenum next Monday

Slide 26

Learning outcome: peer feedback

- What is peer feedback?
- Why is it important?
- What can **YOU** learn?
- How do you provide peer feedback in todays context?
- What should you use the feedback to?

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