

# DIGITAL PEER FEEDBACK TO IMPROVE STUDENTS' LEARNING

Marieke van Geel, Marloes Lutikhuis

University of Twente  
The Netherlands

**Conference Key Areas:** *Future engineering skills; Niche & Novel; Engineering curriculum design.*

**Keywords:** *Peer feedback, large groups, PLN*

## ABSTRACT

Feedback can improve the learning process and enhance student achievement<sup>1</sup>. Assessing student work and providing feedback can be done by either teachers, students themselves, or peers. Due to an increasing number of engineering students, teachers lack time to provide students with sufficient feedback. On the other hand, students should acquire skills related to providing and receiving feedback. The implementation of peer feedback could therefore be a fruitful solution. Peer feedback is known as the process in which students evaluate their peer's performance based on pre-determined evaluation criteria<sup>2</sup>. When implementing peer feedback, students can get more, more frequent, and faster feedback as opposed to teacher feedback. Furthermore, peer feedback can enhance learning for both the assessee as the assessor.

In this study, twelve university teachers gathered in a Professional Learning Network to increase their knowledge and thoughtful decision making with regard to implementing digital peer feedback. Student numbers ranged from 20 to 250. Goals for teachers were both related to their own time (e.g. large group, feedback more often) as well as to students' learning (acquiring feedback skills, getting inspired by reviewing each other's work, better understanding of success criteria). Key features of the implementation were clarifying learning intentions and success criteria<sup>3</sup>.

Evaluation with teachers and students reveal that implementing peer feedback is a valuable learning experience for students. Teachers especially valued participating in a multidisciplinary PLN, hands-on activities, and sharing experiences with each other.

## **INTRODUCTION**

### **Peer Feedback**

It is well-known that feedback can improve the learning process and enhance student achievement<sup>1</sup>. Assessing student work and providing feedback can be done by either teachers, students themselves, or peers. Due to an increasing number of engineering students, teachers lack time to provide students with sufficient feedback. On the other hand, students should acquire skills related to providing and receiving feedback. The implementation of peer feedback could therefore be a fruitful solution.

Peer feedback is known as the process in which students evaluate their peer's performance based on pre-determined evaluation criteria [2]. When implementing peer feedback, students can get more, more frequent, and faster feedback as opposed to teacher feedback. Furthermore, peer feedback can enhance learning for both the assessee, the student whose work is assessed, as the assessor, the student who assesses the other student's work [4]. Peer feedback can lead to constructive reflection, more time on task, focus on the important elements in the assignment, more insight into success criteria and more responsibility and ownership among students [2].

Besides advantages for students, peer feedback can also be beneficial for teachers. For example, when implementing peer feedback, less and less frequent (written) feedback is required from teachers. Especially with large groups of students, implementing peer feedback can be a feasible solution in order to provide all students with sufficient feedback.

Peer feedback can be provided either on paper, oral or digital. A digital tool can facilitate the process of peer feedback because the digital tool will take away the logistical burden from the teacher. Assigning of assignments and feedback and distribution of the feedback will be done automatically and there are several options that facilitate the feedback process, e.g. anonymous or non-anonymous feedback, group-to-group feedback and feedback on the quality of the feedback. Another advantage for the teacher is that they easily gain insight in the feedback process and the results, and can use this for evaluation purposes.

In the current study, university teachers have been supported in implementing digital peer feedback in their education by joining a professional learning network. In this paper we present the evaluation of this intervention, including (perceived) effects on student learning.

## **METHODOLOGY**

### **Intervention design**

For professional development of university lecturers, a Professional Learning Network (PLN) in which lecturers together develop knowledge, and share insights and experiences, can be effective (e.g. [5]). The main goals of the intervention were to increase lecturers' knowledge with regard to peer feedback, and to support thoughtful decision making with regard to implementing digital peer feedback in their education by sharing experiences and developing good practices together.

The PLN gathered in total four times: two times prior to the quartile in which the lecturers will implement digital peer feedback, one time during the quartile, and once after the quartile. During sessions, theoretical knowledge was presented, experiences were shared, and lecturers developed action plans for implementing peer feedback in their own education, including clarifying learning intentions and success criteria (cf. [3,4]).

### Participants

Twelve university lecturers participated in the intervention, of which seven implemented peer feedback in their education in the third quartile of 2019/2020 (February – April). A very diverse group was composed, for example with regard to the number of students in the course (20 to 250), level of the course (from freshman to master), lecturer’s experience with peer feedback and teaching discipline.

Lecturers were asked to identify their own reasons for wanting to implement peer feedback. These reasons were both related to their own time (e.g. large group, feedback more often) as well as to students’ learning (acquiring feedback skills, getting inspired by reviewing each other’s work, better understanding of success criteria). Three out of seven lecturers had (some) prior experience with implementing peer feedback, of which three already had implemented *digital* peer feedback in previous years.

### Instruments & data collection

The effects of the intervention will be evaluated at the four levels from Kirkpatrick’s model for evaluating training programs (1960) 1 – reaction, participants’ satisfaction with regard to the training, 2 – learning, knowledge, skills and attitudes participants obtained during the training, 3 – behavior, how participants changed their practice based on the intervention, 4 – results, (perceived) effects of the implemented changes. See Table 1 for respondents and instruments in order to evaluate the intervention at each level.

Instrument	Respondents	Levels of evaluation				Background characteristics
		1.Reaction	2. Learning	3. Behavior	4. Results	
Questionnaire	Lecturers	X			x	x
Focus group	Lecturers	X	x			
Interview	Lecturers		x	x		
Questionnaire	Trainer	X	x			x
Questionnaire	Students			x	x	

### RESULTS

In general, participating teachers appreciated the intervention sessions. Sharing and discussing experiences, overall interaction and exchanging ideas and tips were highly valued, just as hands-on activities. Furthermore, participating teachers indicate the direct link with their own education was very relevant. However, not all participants were able to attend all sessions, there was too much time between the sessions, and two teachers were not teaching during the PLN period. At student level, teachers indicate providing and receiving peer feedback was valuable but also requires time and preparation – for both teachers as well as students. Students indicate that they especially learned a lot from providing feedback, and that providing feedback is an important skill.

## CONCLUSIONS & DISCUSSION

The current study was focused on evaluating the usefulness and effects of a PLN as a means for teacher professional development for implementing digital peer feedback in their education. Based on the evaluation results, it can be concluded that organizational aspects are crucial aspects for making a PLN successful. Timing of sessions and enabling all participants to attend all sessions and get to know each other, including the prerequisite that all participants are actually teaching over the course of this PLN seems essential for active participation, sharing experiences and being able to experiment in their own education.

The PLN in this study was composed of teachers from various faculties and disciplines, which was referred to as contributing to the learning experience.

At student level, both teachers as well as students indicate that the use of peer feedback is a valuable learning activity.

## REFERENCES

- [1] Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, 77, 81-112.
- [2] Topping, K. J. (2009). Peer assessment. *Theory into practice*, 48(1), 20-27.
- [3] Black, P. & William, D. (2009). Developing the Theory of Formative Assessment. *Educational Assessment, Evaluation and Accountability*, 21, 5-31.
- [4] Gielen, S., Dochy, F., Onghena, P., Struyven, K. & Smeets, S. (2011). Goals of peer assessment and their associated quality concepts, *Studies in Higher Education*, 36:6, 719-735, DOI: 10.1080/03075071003759037
- [5] Gast, I., Schildkamp, K., & Van der Veen, J.T. (2017). Team-Based Professional Development Interventions in Higher Education: A Systematic Review. *Review of Educational Research*, 87:4, 736-767, DOI: 10.3102/0034654317704306