Chapter 12
Reciprocal Student–Teacher Feedback: Effects on Perceived Quality of Cooperation and Teacher Health

Jan-Erik Schmidt and Caterina Gawrilow

Abstract High lesson quality in schools is, in addition to other factors, the result of good cooperation between teachers and students. The long history of research on offer-use models of lesson quality and student–teacher relationships documents this interaction. Feedback focused on expressing the quality of cooperation can lead to higher quality of cooperation. The fact that feedback is reciprocal, from teacher to student and vice versa, helps to avoid effects of perceived injustice and rejections of feedback which otherwise are severe obstacles to the efficient use of feedback. High-frequency applications of feedback allow for the timely detection of (positive and negative) critical fluctuations of cooperation between individuals and groups and for the monitoring of processes of adaptation, as shown in other areas of applied psychology. This chapter describes the theoretical parameters of such a feedback method for students and teachers, and outlines results of an empirical study on the effects of the reciprocal method on (1) perceived quality of cooperation and (2) teacher health. Results show that, subsequent to a three-month period of reciprocal feedback, the quality of cooperation as perceived by both students and their teachers increases significantly and teacher health scores improve significantly. Reciprocal feedback techniques should be considered in teacher education and teacher training as a way to help teachers to initiate processes of improvement of lesson quality.

Keywords Feedback · Student–teacher interaction · Cooperation · Co-regulation · RCT

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1 Introduction

One of the most general definitions of feedback states that feedback is "information about the gap between the actual level and the reference level of a system" (Ramaprasad, 1983, p. 4). Going beyond this general definition, there is a need for a structured overview of the many different forms of feedback which have been suggested for fostering development in schools. For this, the five main characteristics of each kind of feedback should be made clear: (a) the source of feedback, (b) the recipient, (c) the topic, (d) the method, and (e) the frequency of the feedback (Hattie & Wollenschläger, 2014; Kluger & DeNisi, 1996; Mikula et al., 1990).

The most common form of feedback in the educational field is when a teacher provides feedback to a student about academic results or about their techniques of problem-solving and self-regulation in school (Hattie & Timperley, 2007). Giving feedback in the other direction—from students to teachers—seems to be an important aspect too (Hattie, 2009). Furthermore, providing feedback in both directions simultaneously could be even more powerful. This is because the teacher and student are both actors in the learning in school and both benefit from information about the transaction they create. The questions of (a) what contents and topics teachers and students should receive feedback on and (b) what kind of information is reliable are matters of intense research and are addressed in several chapters of this book, for example, Chap. 3 (Röhl and Rollett), Chap. 4 (Bijlsma), Chap. 5 (van der Lans), and Chap. 7 (Göllner et al.). This chapter refers to one specific feedback topic—the quality of cooperation between teachers and students as a class—and provides information about the views of students about their teacher and vice versa. More specifically, we also refer to a certain type of feedback—reciprocal feedback—where teacher and students send and receive feedback at the same time. Thus, the interaction between teacher and students and the dynamics of interaction can be addressed via a feedback process. The rationale and theoretical background of this kind of feedback is explained in the first part of the chapter, followed by a description of the research method used in our study. The third part presents results of a first empirical study on the effects of this form of reciprocal feedback.

1.1 Feedback Frequency

A question which—to the best of our knowledge—has so far drawn little attention from researchers is: How frequently should reciprocal feedback be provided in order to trigger practical consequences? Some research on frequency has been done in occupational settings (Ilgen et al., 1979; Kluger & DeNisi, 1996; Kuvaas et al., 2017; Park et al., 2019) and on the feedback from teachers to students (Guo & Wei, 2019; Pinter et al., 2015; Tamara et al., 2004). Also, strong support for the use of high-frequency feedback has been documented in the field of psychotherapy (Schiepek et al., 2016). However, there are no empirical studies addressing the effectiveness of

feedback frequency in the student-to-teacher direction. Furthermore, although dyadic regulation processes have already been investigated in some areas of psychology, there is no such research on the association of self-regulation and dyadic regulation processes in classroom scenarios.

The feedback introduced in this chapter is applied weekly and has been shown to be easily manageable (Schmidt, 2018). A higher frequency—e.g., daily—may be even more effective, as primacy and recency effects would be reduced. On the other hand, this would also be more difficult to realize. Weekly application thus seems a good compromise to foster co-regulation processes in the classroom between students and teachers—frequent and timely enough to be both effective and still manageable.

1.2   Interpersonal Facets of Feedback

Interpersonal facets of feedback such as "credibility" and "sender intentions" as perceived by the recipient play an important role in the acceptance and use of feedback (Umlauft & Dalbert, 2012). Those interpersonal facets can determine whether feedback information is well received and elaborated upon or is rejected. Important characteristics of persons giving feedback are their perception of being legitimated, being seen as credible, and by their motivation and intention to support the person receiving feedback. Feedback givers must also display the ability to interact in a friendly manner so that feedback information is likely to be elaborated upon. Depending on the recipient's self-esteem and appraisal strategies, feedback carries the risk of causing negative emotions and outcomes such as lowered self-esteem and reduced effort (Leary & Terry, 2012). Feedback can be potentially perceived as unjust, and such a perception of injustice causes a variety of unwanted results, including (1) rejection of the feedback, (2) feelings of being excluded from a group, and (3) higher delinquent behavior (Mikula et al., 1990; Umlauft & Dalbert, 2012). All reported findings above focus on feedback given from instructors to their students. These mentioned risks can, however, be potentially reduced if students are involved and asked to give feedback from their perspective. When students are asked to provide feedback on cooperation with their teacher, they are implicitly addressed as competent professional partners and thus highly validated. Additionally, as teachers and students are asked to provide feedback, it is implicitly acknowledged that the views of students and teachers can differ without one being wrong or right, and that both views must be considered. Thus, perceptions of injustice could be avoided. Therefore, we see strong reasons for considering a reciprocal construction within feedback on aspects of lesson quality.

1.3   Cooperation—A Basic Ingredient for Lesson Quality

Cooperation between teachers and students addresses the fundamental characteristic of lesson quality as a transactional phenomenon, meaning that both, teachers and students, have to contribute certain activities to create a lesson. Evidence implies that feedback given from students to teachers concerning student perceptions of lesson quality can contribute to teaching effectiveness (Bill & Melinda Gates Foundation, 2012; Helmke et al., 2009; Pianta et al., 2008; Raudenbush & Jean, 2015). Still missing in this base of research is a focus on the transactional and complex character of teaching and learning (Brophy & Good, 1984; Pianta & Hamre, 2009; Pianta et al., 2003). Helmke introduces his *Angebots-Nutzungs-Modell (Offer-Uses Model of Lesson Quality)* by stating that "Good lessons are a coproduction between teachers and students" (Helmke, 2007, p. 63), suggesting that lesson quality is the result of an offer made by the teacher—as well as the result of acceptance and use of this offer by students. Moreover, the subsequent offers by the teacher are influenced by the use which students may have made of former offers. This view of teaching processes is characterized by reciprocity, irreversibility, and non-linearity as characteristics of living systems (Orsucci, 2006; Schiepek, 2009).

In other areas of psychology (as compared to educational and school psychology) the focus has changed from mere (self-) regulatory to dyadic (co-)regulation processes. Importantly, in social and health psychology, the strong claim is made that being accepted by a group and being part of a group (Forgas & Fiedler, 2020) leads to better health and a longer life. Hence, there is consistent empirical evidence that social and group relationships are protective factors for psychological and physiological health: Individuals lacking social ties are physically and mentally less healthy and more likely to die prematurely than socially integrated individuals (House et al., 1988). Transferring these social relationship results to educational and school psychology means that students and teachers who (a) work together in a cooperative and friendly manner, (b) have a productive feedback culture, and (c) feel part of the social group within the classroom and/or school, should report better well-being and maybe also better academic results. However, despite results which describe a good teacher–child relationship as a predictive factor for favorable short- and long-term outcomes in students (Hamre & Pianta, 2006), there is less research on co-regulation processes in educational contexts.

1.3.1   Cooperation and Student–Teacher Interaction

The importance of student–teacher interaction for teaching and learning has been shown across many dimensions (Hamre & Pianta, 2006; Seidel & Shavelson, 2007; Verschueren & Koomen, 2012). Students who report better relationships with their

teacher have higher academic success, as well as better social and emotional competences. In particular, "at risk" students benefit from a good student–teacher relationship (Baker, 1999; Birch & Ladd, 1998; Cheon & Reeve, 2015; Eccles & Roeser, 2011; Jennings & Greenberg, 2009; Raufelder et al., 2016; Wentzel, 2009). Specifically, student–teacher relationships include the domains of (1) organizational support, (2) academic support, and (3) social support (Eccles & Roeser, 2011; Pianta & Hamre, 2009). From a transactional point of view, such interactional support can be seen as the result of a successful process of cooperation between the teacher and their students. According to Axelrod (1984), cooperation is the willingness to abstain from maximum personal gain in favor of a common good including the willingness to seek compromises. The common good in this case can be defined as "lesson quality", for which both students and teachers are interested in over a long-term perspective. Contributions to lesson quality by students are behaviors such as: (1) taking out their book in a good pace, (2) working silently in order not to disturb others, or (3) raising a question when feeling blocked. These behaviors are potentially hindered by students' short-term interests in more personal gains. Example behaviors of short-term interests which may override interest in the common good of lesson quality can be: (1) making contact to a classmate, (2) taking a rest, (3) avoiding being judged by others when asking questions, or (4) low impulse control such as wishing acknowledgment for a good joke. The concept of *cooperation* serves two more benefits. Firstly, neither students nor teachers feel personally judged, since cooperation addresses an interpersonal rather than an intra-individual facet of lesson quality. Thus, feelings of humiliation are avoided—so helping to prevent withdrawal or even revenge (Furman & Ahola, 2006). Furthermore, by viewing both teachers and students as contributors to classroom success, this serves students' need for justice as described above. Secondly, asking students how they evaluate the cooperation between themselves and their teacher implicitly conveys the message that teachers see students as capable of contributing and see their contribution as important, which supports students' needs of self-efficacy and self-determination (Ryan & Deci, 2009). Feedback which focuses on the cooperation between students and their teacher should help the contributors reflect on their cooperation and improve it in a threefold manner: (a) by helping students to bring up ideas for the improvement of lesson quality which are from their perspective relevant, (b) by creating a situation in which teachers can learn about how students perceive lessons, tasks, and explanations and thereby receive insight into the effects of their teaching, and (c) by improving social support when listening to each other and implementing ideas developed together.

2   A Feedback Technique for Iterative Feedback About Student–Teacher Cooperation

In order to implement reciprocal feedback as described above, we developed and tested a method which focusses on the quality of cooperation between a teacher and their class as perceived by both parties. Students and teachers give their feedback weekly at the end of the last school lesson. To do so, they answer the core question of the feedback technique, "How do you evaluate the cooperation between you as a class and your teacher during the last week?", by throwing a coin into a box with five labeled compartments (*very good, rather good, average, rather poor,* and *very poor*) for possible answers. The teacher answers the equivalent question, "How do you judge the cooperation between you and your class during the last week?", by throwing a different colored coin into the box. Results of each feedback session—the distribution of the students' answers and the teachers' answers—were displayed on a classroom poster at the beginning of the first lesson of the next week, and the results of all weeks remained visible during the whole feedback period. Teachers and students were invited to discuss the results of the feedback each week following a solution-focused protocol in which the teachers had been trained. Thereby, the classes are guided to discuss: characteristics of weeks with higher quality of cooperation ("Why did you assess this week as having better cooperation than this other one?"); which teacher activities and which student activities contributed to good lesson quality ("What did I do to help us cooperate in this week? What did you do?"); and what could each side do to further contribute to lesson quality ("What can I do to improve our cooperation? What could you do to improve our cooperation?").

3   Own Empirical Study

A first controlled trial study was conducted in the field of teachers' health. We specifically investigated the effects of the reciprocal feedback method on teacher health. The rationale behind this was that the reciprocal technique could help teachers take the transactional character of lesson quality more into account by using information the students give, which would in turn foster cooperative activities which the students can participate in. The first research question was: Does teacher health improve during or after the feedback period?

To ensure an appropriate application of the feedback method it is required that teachers share the underlying idea that quality of cooperation is a core ingredient of good lesson quality and that students can contribute important information to the improvement of cooperation. Therefore, we also measured teachers' *Resource Orientation* in respect to their students. Resource Orientation is the assumption that students have the ability to assess lesson quality and to develop ideas for the improvement of cooperation. Our hypothesis was that the experience of iterative feedback on cooperation should lead to a higher Resource Orientation among the teachers

through the experience of better cooperation, and thus reduce occupational stress which arises when teachers try to manage the class by relying primarily on their own activities. The second research question was: Does the perceived quality of cooperation as assessed by the students and by the teachers improve during the feedback period of three months?

3.1   Procedure

The sample consisted of 45 teachers from southern German mid-level schools and one of their classes between 6 and 9th grade (1022 students).

Each of the 45 teachers chose one of their classes in which they taught at least three lessons a week, and asked students to participate in the study. Teachers were randomly assigned to a treatment group ($n = 23$) or a waiting control group ($n = 22$). Resource Orientation and Teacher Health were assessed in the treatment and waiting control groups at three points of time ($T0$, $T1$, $T2$) with 12-week intervals between each time point. After students and their parents gave written consent, the first measurement ($T0$) took place. Subsequently, teachers of the treatment group received a one-day training for the feedback method and a group supervision session after four weeks. Teachers of the waiting control group received their training after $T2$. Immediately after the training, teachers and students in the treatment group applied the reciprocal feedback technique in their classes once a week for a consecutive period of 10 weeks. The supervision sessions during the feedback period were held in order to support teachers' use of the student feedback, helping them to understand the students' needs and how to lead solution-focused class talks, so that specific actions in the classroom could be derived from the feedback. For a more detailed description of the process of recruitment, random assignment, and data analysis see Schmidt (2018).

3.2   Measures

Teacher health was assessed with the General Health Questionnaire (GHQ-12) (Goldberg, 1992). The GHQ-12 is a frequently used worldwide screening instrument for detecting mental health problems. It assesses the inability to carry out one's normal healthy functions and the appearance of new phenomena of a distressing nature. The GHQ-12 asks about mental health issues during the last two weeks in comparison to the usual status of the participants. The questions include, for example, "Have you recently been feeling sad and gloomy?" Answers are coded on a four-point scale labeled e.g., less than usual, no more than usual, rather more than usual, much more than usual. Higher values indicate a higher problem level. The internal consistency of the GHQ-12 has been reported in a range of studies using Cronbach's alpha with correlations between .77 and .93.

To examine teachers' Resource Orientation, a scale called Resource Orientation Scale (ROS) was developed. The ROS consists of 12 items asking teachers how far they agree that (a) students are able to assess teacher–class cooperation and lesson quality (e.g., "My students can assess if they receive good individual support"), (b) students have useful ideas for the improvement of teacher–class cooperation and lesson quality ("My students have good ideas about what kind of support they need"), and (c) if the teacher actually uses the knowledge of students to improve lesson quality ("I use students' ideas on how to make tasks activating"). To quantify the extent of approval of the statements, answers were given on a four-point scale ranging from 1 (not true) to 4 (true). The measure's internal consistency was acceptable across time with Cronbach's alpha ranging $\alpha = .82$ at $T0$; $\alpha = .87$ at $T1$; $\alpha = .89$ at $T2$.

The perceived quality of cooperation was gathered by comparing the feedback of students and teachers at the beginning of the feedback process ($T1$) and at the end of the process ($T2$). Therefore, results of the first three weeks and results of the last three weeks of the period were averaged.

3.3 Results

To assess the effects of the training, treatment and control groups were compared with respect to changes of the outcome variables from $T0$ to $T1$ and from $T0$ to $T2$, using regression analysis (Table 1). Therefore, outcome variables were z-standardized to $T0$ means. Teachers' Resource Orientation increased significantly from $T0$ to $T1$ and teacher stress scores decreased significantly from $T0$ to $T2$, as reported in Tables 2 and 3, respectively. The patterns of changes of the Resource Orientation Scores (ROS) and teacher health (GHQ-12) scores in treatment and control group over all three points of measurement are displayed in Fig. 1.

To assess changes in the perceived quality of cooperation, T-Tests for dependent samples have been applied. Perceived Quality of Cooperation as assessed by teachers and by students increased significantly during the three-month feedback period with

Table 1 Unstandardized scores for resource orientation and teacher health outcomes at all measurement points

Scales		T_0 $N_{\text{treatment}} = 23$ $N_{\text{control}} = 20$		T_1 $N_{\text{treatment}} = 23$ $N_{\text{control}} = 21$		T_2 $N_{\text{treatment}} = 21$ $N_{\text{control}} = 20$	
		M	SD	M	SD	M	SD
ROS	Treatment	2.73	.39	3.02	.39	2.90	.44
	Control	2.68	.40	2.68	.46	2.72	.48
GHQ-12	Treatment	1.93	.43	1.80	.38	1.66	.29
	Control	1.85	.36	1.89	.32	1.89	.45

Note ROS = Resource Orientation Scale; GHQ-12 = General Health Questionnaire

Table 2 Regression analysis: treatment effects at $T1$

	ROS			GHQ-12		
	b	(SE)	p	b	(SE)	p
T_0	.610***	(.139)	< .001	.563***	(.215)	< .001
Treatment	.286*	(.107)	.011	−.119	(.087)	.180
F	13,827			13,278		
p	< .001			< .001		
R^2	.415			.399		

Note ROS = Resource Orientation Scale; GHQ-12 = General Health Questionnaire
* <.05, ***<.001

Table 3 Regression analysis: treatment effects at $T2$

	ROS			GHQ-12		
	b	(SE)	p	b	(SE)	p
T_0	.723***	(.148)	< .001	.734***	(.137)	< .001
Treatment	.079	(.117)	.502	−.206*	(.091)	.029
F	12,691			17,023		
p	< .001			< .001		
R^2	.420			.479		

Note ROS = Resource Orientation Scale; GHQ-12 = General Health Questionnaire
* <.05, ***<.001

$t(16) = 4, 24; p = .001; d = 1, 12$ for the students' view and $t(15) = 3.90; p = .001; d = 1.30$ for the teachers' view. Descriptive results for all classes of the treatment group can be seen in Fig. 2.

4 Discussion

Choosing quality of cooperation as a topic of feedback between students and their teachers and then applying reciprocal feedback repeatedly in a weekly frequency seems to be a promising approach for initiating improvement of lesson quality. Improvement in the perceived quality of cooperation from both the students' point of view and the teacher's point of view has been shown. Moreover, providing feedback about the perceived quality of cooperation to classes and inviting students to discuss cooperation in order to facilitate high lesson quality yielded improvements in teacher health. Furthermore, using such feedback for discussions between students and their teacher addresses a core process of lesson quality, since it fosters the effective use of feedback by addressing teachers and students in their role as cooperative partners.
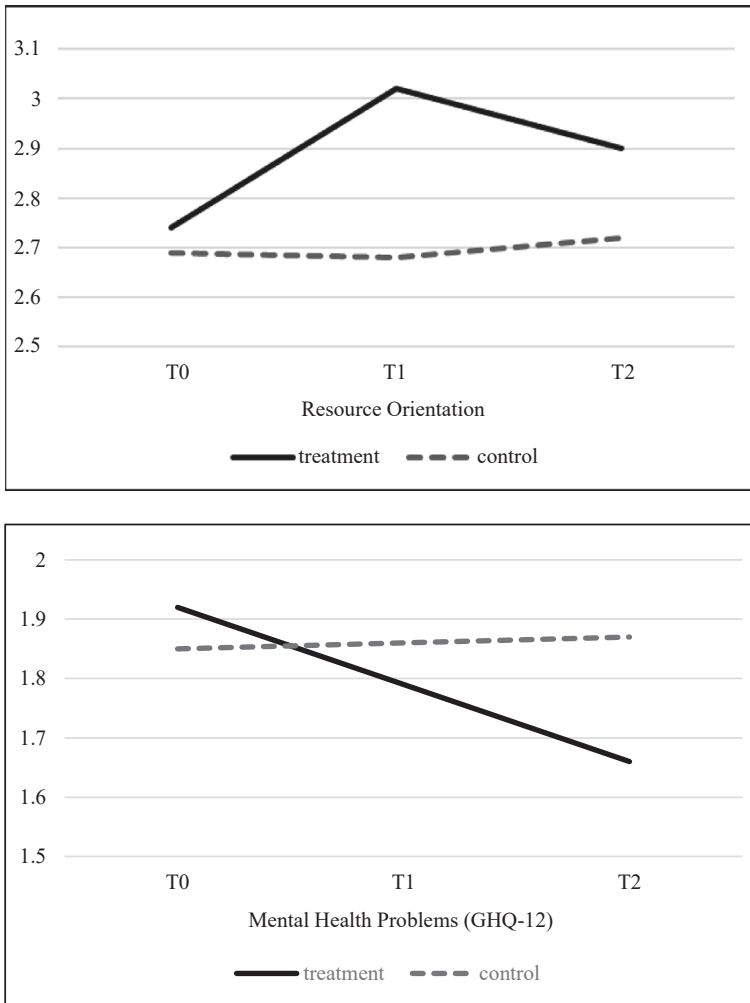
Fig. 1 Resource Orientation Scores (ROS) and teacher health (GHQ-12) scores in treatment and control group

This empirical evidence should encourage further research, as there are several limitations of the study. Firstly, the choice of classes by their teachers was deliberated. Teachers pointed out that they chose classes in which (a) improvement of cooperation between teacher and class is needed from their perspective and (b) they were confident that the group of students would be capable of using the method effectively in terms of the social relations among the students. Conflicts and a poor social climate among the students may be an obstacle to such feedback or might have to be addressed first. Secondly, future research should investigate effects of the suggested kind of feedback on other lesson quality measures than the perceived
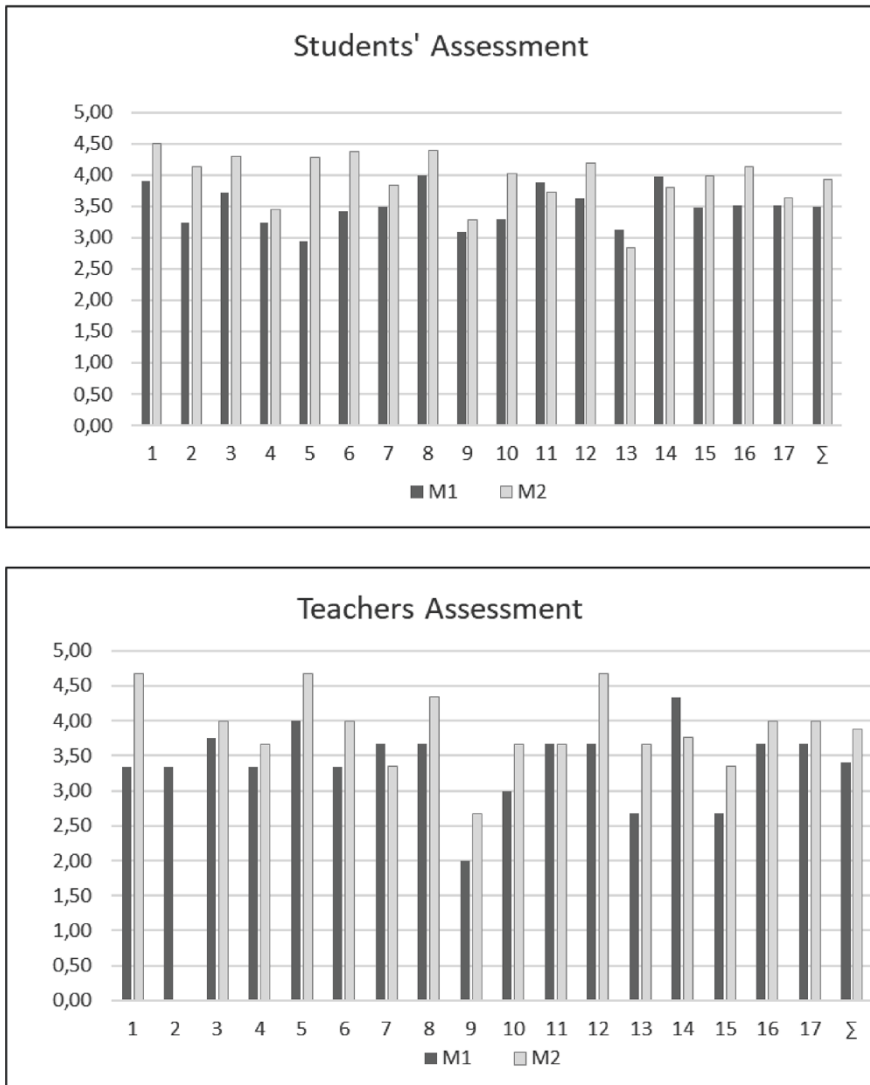
Fig. 2 Perceived quality of cooperation in each class (*Note M*1 = average of first three weeks of feedback; *M*2 = average of last three weeks of feedback. Due to technical barriers, not all classes provided data for all weeks of the feedback)

quality of cooperation; such measures could include time on task, cognitive activation, or emotional support, as assessed by students or external observers. We would tentatively suggest that improvement in those measures may well be as a result of improvements in cooperation between teachers and their students. Thirdly, the applied feedback technique includes several characteristics which should be further

investigated. For example, the high-frequency application of feedback could possibly be tested with other feedback topics or methods. As things can develop fast in living systems, real-time data concerning the state of a system are crucial for understanding and adapting to particular situations. The reciprocal approach—inviting students and teachers to give feedback at the same time on the same topic—can be applied to other feedback topics. Lastly, the hypothesis that the type of feedback studied here fosters student–teacher relationships should be investigated more thoroughly.

In addition, further studies are needed which examine long-term effects of the regular use of iterative and reciprocal feedback on student–teacher relationships, teacher health, and students' academic results. Moreover, the idea that students can be viewed as partners in cooperation to improve lesson quality and that they can provide useful information to the process of cooperation should play a role in teacher education and teacher training—here teachers would develop an attitude and learn techniques to continuously strive for high lesson quality.

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