Chapter 6
Fostering Effective Teaching at Schools Through Measurements of Student Perceptions: Processes, Risks and Chances

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Abstract Student perceptions of teaching quality have become increasingly important for measuring teaching effectiveness and can be used for the subsequent improvement of teachers' teaching. However, measuring teaching quality through student perceptions reliably and validly and the subsequent improvement is not guaranteed. On the one hand, students' teaching quality data are influenced by many characteristics of the students, classes and measurement instruments, and on the other hand, teachers' use of the feedback data is influenced by factors such as personality, context and data characteristics. This chapter, therefore, provides important insights into measuring teacher effectiveness through student perceptions, risks and opportunities of using these teaching quality perceptions and the effective use of student feedback data for the development of teaching and teachers.

Keywords Student perceptions · Teaching quality · Feedback · Teacher development

1 Introduction

Within schools, teaching quality is one of the most important factors in student achievement (Nye et al., 2004; Rivkin et al., 2005). Thus, in order to address the decline in student achievement all over the world (OECD, 2014), increased emphasis has been placed on examining teaching quality and improving teacher effectiveness (Timperley et al., 2007). Teaching quality can be determined in several

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ways; for example, through lesson observations by external observers to analyze student achievement growth, or by teacher self-evaluation. All of these approaches have their advantages and disadvantages.

In addition to the above-mentioned methods, student perceptions of teaching quality have become increasingly important for measuring teacher effectiveness (Bell & Aldridge, 2014; Ferguson, 2012; Goe et al., 2008). Students' ratings for a lesson can be used for conducting research on, for example, the effectiveness of classroom interventions, and, to a limited extent (see Part III), for accountability purposes at schools. Moreover, with the student ratings, teachers can identify where improvement of their teaching is still possible and they can make their teaching more effective for student learning (Gärtner, 2014; Peterson et al., 2000). Student perceptions are thus considered very helpful for developing instructional quality. For example, in the early years of teacher effectiveness research, Gage (1960) studied sixth grade teachers receiving information as to how their students described their actual and their ideal teacher. More recently, Bell and Aldridge (2014) investigated the use of student perception data for teacher reflection and classroom improvement, and Mandouit (2018) used action research to investigate the impact of student feedback on teacher practices. A recent meta-analysis of student feedback intervention studies was able to show that, on average, the use of student feedback on teaching can indeed generate a significant, albeit small, positive effect on teaching quality as viewed from the student's perspective (Röhl, 2021). Notably, the systematic literature search for this meta-analysis revealed that, with the exception of one study from Turkey, only intervention studies from Western countries were found, even though student perceptions are assumed to be as effective for measurements of teaching quality and learning environments in Eastern countries and cultures as well (e.g., Khalil & Aldridge, 2019; Maulana et al., 2012).

Some issues have been raised concerning the reliability and validity of students' perceptions for assessing teaching quality. Various statistical techniques can be used to correct for these problems, namely, Classical Test Theory, Item Response Theory or Generalizability Theory. These techniques function as being exemplars for the connection between psychometric theories and the different perspectives on the validity of student perceptions (Bijlsma et al., 2021).

However, the arguments for and against the use of student ratings as a basis for improving teaching have been going on for some time now. And even if student ratings were guaranteed to be accurate measures of teaching quality, the ratings cannot in themselves support improvement of individual teaching performance (Loeb, 2013). For improvement to occur, it is also necessary for teachers to meaningfully reflect on the feedback they receive and use it to develop and implement improvement-oriented actions.

Therefore, in this chapter, we first present a process model of the use of student feedback in schools that visualizes its productive use for the improvement of teaching quality. This model illustrates that, on the one hand, the teaching quality data are influenced by several characteristics of the students, classes, and measurement instruments, and, on the other hand, teachers' use of the feedback data is influenced by factors such as personality, context and data characteristics. The advantage of

this model lies in its cyclic way of looking at student feedback utilization by teachers, instead of a linear approach, used, for example, by Gärtner (2014), and which further does not consider factors influencing students' perceptions and feedback. Following this, we present an overview of the empirical literature on peculiarities of student perception data, especially concerning validity, reliability and potential factors influencing student ratings, and discuss how these measurement characteristics should be considered by teachers when using student ratings of teaching quality for the improvement of their teaching. This is followed by an overview of factors influencing the utilization of student feedback for the improvement of teaching and teachers. Lastly, we consider the conditions under which teachers' process of collecting, interpreting and accepting the data, and subsequent teaching improvement can be accomplished. Opportunities for further research are presented.

In this chapter, thus, we give an overview of the literature, focussing on what we know about student feedback on teaching and what teachers should keep in mind when they perceive and utilize the feedback for their professional development and improvement of teaching. With this overview, we aim to provide important insights into measuring teacher effectiveness through student perceptions, risks and opportunities of these teaching quality perceptions, and the effective use of student feedback data for the development of teaching and teachers.

2 Process Model of Student Feedback on Teaching

The process of using students' teaching quality ratings to improve instructional quality has many necessary stages and is influenced by many individual and contextual factors, starting with the specifics of obtaining information about teaching quality using student perception questionnaires. To make sure that the information available in the teaching quality data actually leads to professional development of teaching, the teachers must transform the information into improvement-oriented actions. Such actions include giving special attention to possible areas of improvement during lesson preparation or teaching, attending targeted training courses, asking colleagues for advice, or looking for ways to improve the teaching situation together with the students (for an overview, see Röhl, 2021; Bijlsma et al., 2019b). Unfortunately, receiving feedback does not automatically lead to improvement processes. Röhl et al. (2021) summarized findings from organizational psychology on productive feedback use (Ilgen et al., 1979; Kahmann & Mulder, 2011; Kluger & DeNisi, 1996; Smither et al., 2005) in a model to visualize teachers' feedback use processes (Fig. 6.1).

Once the feedback information is available, the teacher has to perceive, understand, and interpret the data. Teachers need a form of data literacy (Kippers et al., 2018; Mandinach & Gummer, 2013) to interpret the information in feedback reports correctly. Additionally, reactions to received feedback have not only cognitive, but also affective components (Kahmann & Mulder, 2011; Taylor et al., 1984). Therefore, during this interpretation process, positive emotions such as satisfaction

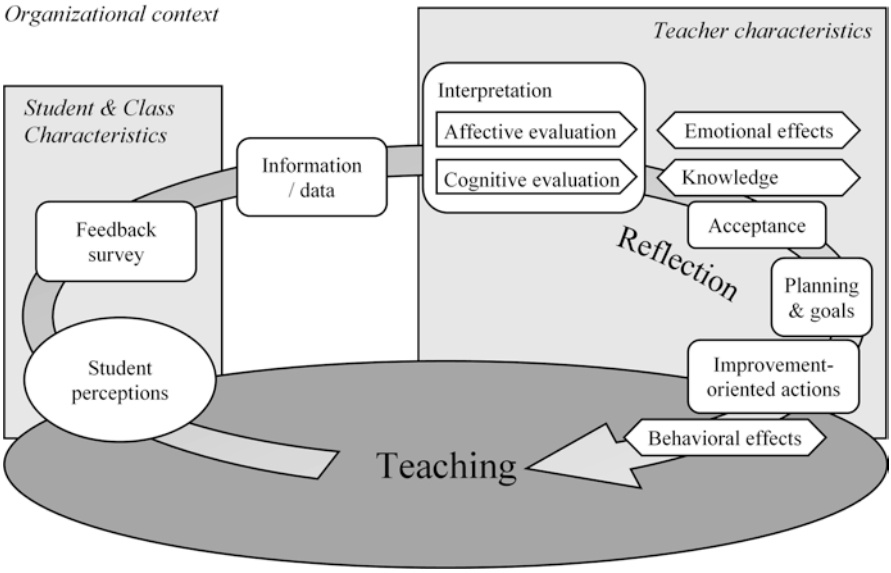

Fig. 6.1 Process model of student feedback on teaching. (Source: Röhl et al., 2021, p. 4)

and joy, or negative ones such as dissatisfaction or defensiveness can occur as emotional effects. On the cognitive level, knowledge effects can occur when feedback provides the teacher with new information about the students' view of their teaching or the feedback reinforces their existing knowledge.

The new knowledge is linked to the teacher's own perceptions and standards for teaching. Any discrepancies must be considered (i.e., the feedback that contradicts one's own perceptions) in order for the teacher to consider changes in their teaching. This could lead to the teacher's planning and goal-setting for the elimination of a discrepancy in a possible area of improvement (Smither et al., 2005), which could finally result in improvement-oriented actions as behavioral effects of the feedback. This process on the part of the teacher represents, in a sense, the bottleneck for realizing the potential of student feedback for teaching improvement. This process is influenced by factors concerning the students and classes, the teacher, and the organizational context, the importance of which for the practice of student feedback use we discuss below.

3 Factors Associated with Student Perception Measurements

Perceptions of the quality of the same teaching practices differ between students. These differences are not undesirable per se, because ratings do reflect a student's personal perspectives on teaching quality, and students do differ (Kenny, 2004).

Insight into the extent to which differences in student ratings are related to factors on the student, teacher and class levels is important for evaluating the ratings students give and avoiding any incorrect conclusions. For example, the average teaching quality score can be lower in a class with many low-performing students without the teaching quality actually being lower. Female teachers might receive significantly lower ratings from male students although they are doing as good a job as male teachers do. In the following section, we discuss factors associated with student perceptions of teaching quality on four levels: characteristics of students, teachers, classes and measurements.

3.1 Student Characteristics

Some research has reported that teachers at both the primary and secondary school levels were viewed as more dominant, more positive and more cooperative by girls than by boys (Den Brok et al., 2006; Fisher et al., 2006; Levy et al., 2003; Rickards, 1998; Veldman & Peck, 1969). However, it is not clear to what extent the gender effect is confounded with the effects of other variables, as gender seems to interact with a number of other variables, such as students' subject preferences (Baker & Leary, 1995; Jones & Kirk, 1990), ethnicity or culturally-related gender role definitions (Levy et al., 2003; Timm, 1999; Worthington, 2002) and level of academic performance (Brophy & Good, 1986; Goh & Fraser, 1995; Levy et al., 2003). Student age was found to be related to student perceptions of their teacher, as older students tend to perceive their teachers as more strict and noted more teacher dominance than their younger peers in some studies (Levy et al., 1997; Levy et al., 2003). Moreover, students with higher general interest in the subject are more likely to give a higher rating of teaching quality than students with lower interest (Cashin, 1988; Fisher et al., 2006). Students' achievement was also found to be related to their perceptions of their teacher: Students with high prior achievement tend to perceive the quality of their teacher's teaching more positively than students with low prior achievement (Atlay et al., 2019; Bijlsma et al., 2022; Gärtner & Brunner, 2018; Marsh, 2007). Additionally, the level of parental education and wealth of the students should be considered, as a study by Atlay et al. (2019) pointed towards a negative association of these characteristics with student perceptions of their teachers' behavior.

3.2 Teacher Characteristics

Mixed results have been found for teacher gender influencing student ratings of teaching quality. Veldman and Peck (1969) found a significant but weak effect of teacher gender, showing that female secondary school teachers tend to receive higher ratings than their male colleagues, but this effect was only found for being 'friendly and cheerful' and not for other aspects of teaching quality. Bijlsma et al. (2022) did not find any significant effects of gender on student ratings. They studied effects of teacher popularity on student perceptions of teaching quality and found that the more popular the teacher is according to their students, the higher students' ratings of their teaching qualities. This relationship was also addressed by Gärtner (2014), Gärtner and Brunner (2018), Clausen (2002), Fauth et al. (2014), Goe et al. (2008) and Donahue (1994). In addition, teachers with more teaching experience receive higher teaching quality ratings from their students than teachers with little teaching experience (Bijlsma et al., 2022; Brekelmans et al., 2002; Day et al., 2008; Kini & Podolsky, 2016; Leigh, 2010; Rowley, 2003). Other variables mentioned in the literature that might influence student ratings of their teacher are teachers' cultural and ethnic background, whereby teachers from another ethnic background than the student receives lower teaching quality ratings (den Brok et al., 2002; den Brok et al., 2003), teachers' personality, whereby more stressed teachers are rated as less socially oriented (Klusmann et al., 2006), and teachers' teaching ability or capacity, whereby lower ability or capacity results in lower teaching quality ratings (Veldman & Peck, 1969).

3.3 Class Characteristics

Compared to the student and teacher factors, less is known about class-level factors influencing students' perceptions of teaching quality. Class size might be related to differences in student ratings, as teachers might have more difficulty with classroom management in large classes, which is reflected in the students' teaching quality ratings. In a study by Levy et al. (2003), however, it appeared that class size was negatively related to student perceptions of teacher proximity and unrelated to their perceptions of teacher influence. According to Bijlsma et al. (2022), class size also did not matter for the students' perception of teaching quality. However, according to Göllner et al. (2020), classes with higher proportions of boys and lower mean achievement levels had lower teacher scores for classroom management. Fisher et al. (2006) found that students in highly motivated classes had more favorable perceptions of their teachers. Moreover, they concluded that class composition variables such as percentage of students with a migration background seemed important for differences in student ratings (on average, those classes rated their teachers lower). Bijlsma et al. (2022) however, did not find an impact of the ethnic make-up of the class on students' perceptions of teaching quality. Other class-level variables

that are related to student perceptions of teaching quality are the subject being taught by the teacher (Gärtner & Brunner, 2018; Veldman & Peck, 1969) and the class' average level of academic achievement (Bijlsma et al., 2022; Veldman & Peck, 1969).

3.4 Measurement Characteristics

Although a student perception questionnaire can be seen as text material in normal language (i.e., textual information presented in the form of separate items; Tourangeau et al., 2000), existing student perception questionnaires differ fundamentally in their linguistic complexity, which shapes student responses (Göllner et al., 2021; Krosnick & Presser, 2010; Tourangeau et al., 2000). It can therefore be argued that differences in student ratings of their teaching quality arise because students encounter difficulties in comprehending the questionnaire items. For example, items that include many linguistic features, including surface aspects (e.g., the length of words and sentences) and characteristics that require more linguistic analysis (e.g., the number of complex noun phrases) can be difficult to understand. Moreover, an item's referent (the subject to which an item refers) and addressee are two salient characteristics that might affect the information obtained from student ratings of teaching quality. Measurement characteristics also refer to the frequency of measurements (time between the assessments; Gärtner & Brunner, 2018) and to the anonymity of the ratings (Gärtner, 2014).

4 Interpreting and Analyzing Student Feedback Data

Insight into the factors related to differences in student perceptions of teaching quality as presented in Sect. 3 can strengthen the general awareness among teachers of the required nuanced and careful interpretation of student feedback (Bijlsma et al., 2022; Den Brok et al., 2006). For example, if a teacher receives high teaching quality ratings from their students, it is good to be aware that this could have to do with, for example, being a good teacher, popularity (for some reason), or the fact that there are many high-performing or highly motivated students in the class in question. In lower grades teachers' interpretation of very positive ratings regarding their teaching quality should be more cautious than in the higher grades, as teachers' proximity to younger students might be greater than their proximity to older students, which might cause a strong effect on teaching quality ratings. Of course, not all of the factors presented above always represent a bias in reported teaching quality. For example, it is to be expected that teachers with a higher level of experience will also have higher reported teaching quality, and that teachers with a high level of stress will find it more difficult to deliver lessons of a high quality.

In addition to gaining knowledge of the factors influencing student perceptions for the most valid interpretation of the feedback received, it is advisable for teachers to disclose the feedback received to the class. By doing so, the teacher can ask directly about specific conspicuous aspects and how these results are to be interpreted from the class's point of view. Although this may remove the veil of anonymity for student respondents, the information in the feedback can be exploited, for example, by identifying and clarifying misunderstandings of item formulations and other rating biases.

Scientific findings have indicated that not only the mean values, but also the consensus of students' ratings on teaching quality within classes is predictive for learning achievement (Schweig, 2016). Thus, if students' answers to an item differ strongly within a class, this can be seen as an important indication of possibilities for improving one's own teaching in this respect.

As called for in many places (AERA, APA, & NCME, 2014; Bell, 2019; Hill et al., 2011), the validity of student perception measures should always be considered in light of the purpose of data collection. The following situations can be distinguished: (a) teachers voluntarily searching for feedback on their own initiative, (b) student feedback delivered to teachers as established practice or given by the organization, but without official accountability purpose, and (c) student feedback with accountability purposes (Röhl & Gärtner, 2021). The interpretation and analysis of formative student feedback to teachers with the purpose of professional development must be clearly distinguished from any form of summative evaluation, assessment, or rating that is used for administrative decisions.

5 Relevant Conditions for Teachers' Utilization of Student Feedback

Careful interpretation of the student feedback data is included in the Process Model of Student Feedback on Teaching (presented in Sect. 2 of the chapter) by teachers' reflection and action phases and subsequent improvement of teaching quality. In order words, teachers may utilize the feedback data to work on improving their instruction.

Many findings and theories from feedback research point to the relevance of both individual teacher characteristics and organizational characteristics for teachers' use of student feedback for improving teaching quality. In this section, we will outline relevant factors influencing teachers' use of student feedback from both an organizational psychology perspective (Ilgen et al., 1979; Smither et al., 2005) and a data-based decision-making perspective (Brunner & Light, 2008; Schildkamp & Lai, 2013; Schildkamp et al., 2013).

5.1 Characteristics of Feedback Recipients (Teachers)

Empirical findings show that teachers' age and professional experience affect teachers' use of student feedback. In general, older teachers seek less collegial feedback (Kunst et al., 2018; Runhaar et al., 2010) and use feedback less often compared to younger teachers (Ditton & Arnold, 2004). Teachers with longer professional experience are more skeptical of the usefulness of feedback (Dretzke et al., 2015). Some findings on gender effects regarding feedback show that female teachers more often seek collegial feedback (Runhaar et al., 2010) and tend to improve their teaching more after receiving and utilizing student feedback (Buurman et al., 2018). Teachers with higher self-efficacy seek more feedback and are more willing to reflect upon it (Ditton & Arnold, 2004; Runhaar et al., 2010). Moreover, teachers' motivation to use the feedback data for improving teaching quality is a relevant factor (Bijlsma et al., 2019a), as well as teachers' data literacy (their ability to understand numerical or other data and translate them into actions; Mandinach & Gummer, 2016; Schildkamp et al., 2017). Other individual characteristics of teachers that might foster the processing and use of student feedback are high mastery goal orientation (Elliott & Dweck, 1988), lower level of perceived stress (Ditton & Arnold, 2004; Elstad et al., 2015), and more positive attitude towards students' trustworthiness or competence as feedback providers (Balch, 2012; Ditton & Arnold, 2004; Elstad et al., 2017; Ilgen et al., 1979).

5.2 Characteristics of the Organization (School)

A feedback culture is generally defined by different organizational characteristics, such as support for giving and interpreting feedback, a non-threatening atmosphere, shared valuing of feedback for improvement, team psychological safety, and support in understanding feedback, setting goals, and implementing them in practice. In general, a well-established feedback culture has proved to be effective for the use of feedback in organizations (London & Smither, 2002). In the context of student feedback, in particular, those intervention studies that provided supportive measures for reflection and teaching development showed significantly higher positive effects (Röhl, 2021). In all of this, leadership plays an important role in feedback usage processes (Röhl & Gärtner, 2021). In an educational setting, it is important that school leaders have a clear vision of the schools' future, inspire teachers in their work, give the work a greater sense of meaning, and stimulate the questioning of old assumptions (transformational leadership; Bass, 1985; Runhaar et al., 2010). Active encouragement by school leaders to seek student feedback is also supportive, as extrinsically motivated feedback use is as beneficial to reported improvements in teaching as is intrinsically motivated feedback use (Gärtner, 2014; Röhl & Gärtner, 2021). However, it is important to ensure that the use of feedback is communicated as an opportunity for development and not as control or accountability, as the latter

can lead to resistance to its use (Elstad et al., 2017). School leaders should also give teachers the feeling of autonomy to make decisions about their instruction in data-use processes in schools (Prenger & Schildkamp, 2018).

5.3 Characteristics of Feedback Information (Data)

With regard to the characteristics of the feedback message, the comprehensibility, valence, specificity and timing of the feedback data are relevant in the processing and use of feedback (Röhl & Gärtner, 2021). The feedback data need to be presented in such a way that teachers understand the results, for example, mean scores in graphs or scale plots, or means for every item. The more positive the feedback, the more precise reception, easier remembering of contents, and better acceptance of the feedback by teachers (Ilgen et al., 1979; Lyden et al., 2002). The literature shows different findings on the specifics of the feedback, ranging from 'highly specific feedback' to 'low specificity or summarized feedback'. High-specificity feedback seems to be more effective for beginners and for short-term learning, whereas low-specificity feedback tends to have a stronger impact on long-term learning performance (Röhl & Gärtner, 2021).

The timing of the feedback refers to the time between the actual act or task and the provision of the feedback. If the feedback is provided to the teacher right after a lesson, the link between the actual actions of the teacher in the classroom and the student feedback is clearer than in the case of feedback on teacher behavior in general (across many lessons; Hattie & Timperley, 2007; Shute, 2008). When feedback is given immediately, it is found to be more effective than when it is postponed (Timmers & Veldkamp, 2011). Teachers might therefore be able to work better on improving their teaching quality when feedback is given immediately (Bijlsma et al., 2019b). Furthermore, a survey instrument that is scientifically and psychometrically validated and reliable should be carefully selected for reliable and valuable use of student feedback data (Bijlsma, 2021).

6 Conclusions and Future Directions

Student feedback can be a valuable tool to improve teaching. However, teachers' use of feedback data to assist in their professional development does not happen automatically. On the basis of the Process Model of Student Feedback on Teaching (see above, Röhl et al., 2021), we pointed out that on the one hand, student teaching quality perceptions are influenced by several characteristics of the students, classes and measurement instruments, and on the other hand, teachers' use of the feedback data is influenced by factors such as individual characteristics of the teacher, and context and data characteristics. Insight into these factors can strengthen the general awareness among practitioners of the conditions under which teachers' process of

collecting, interpreting and valuing the results, and the subsequent teaching improvement, can be accomplished successfully.

For future research, an interesting question is how the prerequisites for teacher development based on student feedback can be fulfilled to match with what is possible within the context of schools. From the research on deliberate practice by professionals and experts by Ericsson (2006), we know that improving as a teacher requires a coach who guides the teacher through the improvement process and who knows what ideal teaching behavior looks like, how this behavior can be trained effectively, and what practices are effective if problems occur during the improvement process. From the research on Professional Learning Communities (e.g., Brown & Poortman, 2018), we know that teacher collaboration in improvement processes is a promising way to improve teachers' teaching, in which the underlying goal is to improve teaching and teacher learning within the school (Blankenship & Ruona, 2007; Prenger et al., 2017). We recommend investigating the role of a coach and the collaborative learning process among teachers when improving teaching quality based on student feedback.

Moreover, it would be profitable to investigate the use of student feedback data for improving teaching quality in non-Western cultures. Although student perceptions have mainly been used in Europe, Australia and the USA thus far, we assume that they might also be useful in non-Western school cultures. There are studies on student perceptions of teaching quality in schools and also on its use in higher education, for example in Asian countries (e.g., Maulana et al., 2012). However, to the best of our knowledge, there is a lack of studies dealing with how student perceptions of teaching quality can be used as feedback to teachers for the purpose of improving teaching in primary and secondary schools. Adapting findings from Western cultures to the cultural conditions in non-Western cultures might be necessary here.

Another direction for future research might be to combine different teaching quality measures (e.g., classroom observations, student perceptions and teacher perceptions) to obtain a rich picture of teaching quality. Some aspects of teaching quality, for example, are probably best assessed by students, such as whether students feel that the teacher has high expectations of them, and whether students experience the classroom climate as safe. To understand other teacher quality aspects, other perspectives might be more relevant. For example, does an external observer, based on his or her professional standards, think that the explanation of subject matter by the teacher is correct? Moreover, as far as teachers' perspectives on their lessons are concerned, it would be interesting to know how they perceive their own teaching quality and compare this with the student perceptions, as this may influence their opinion about the need for improvement of their lessons.

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